

# Local Climate Change Impacts for Central Illinois



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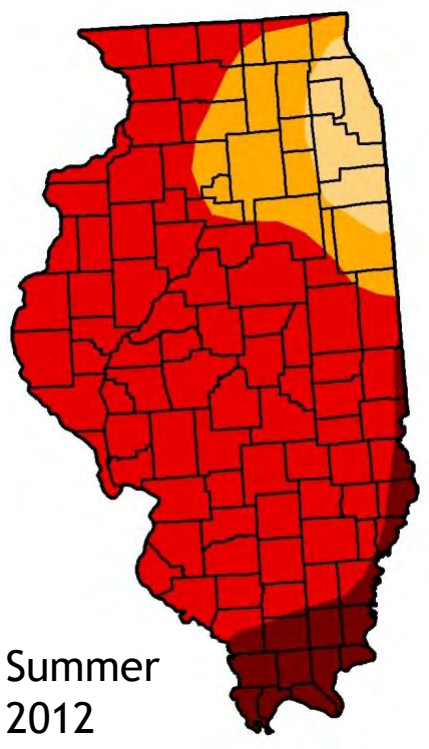
# Climate of Central Illinois

Peoria Journal Star



1-2010)

News-Gazette



Summer 2012



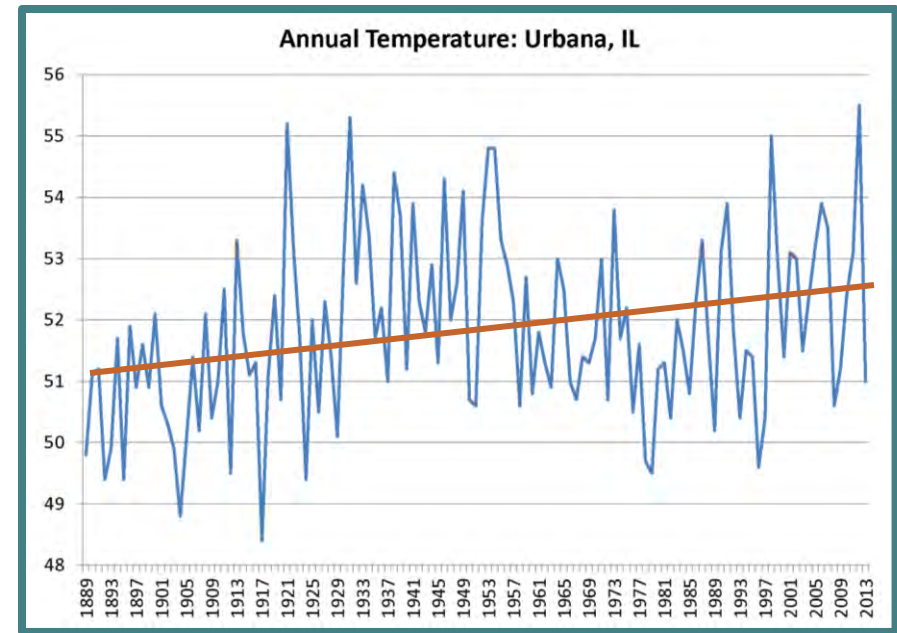
News-Gazette



Inches

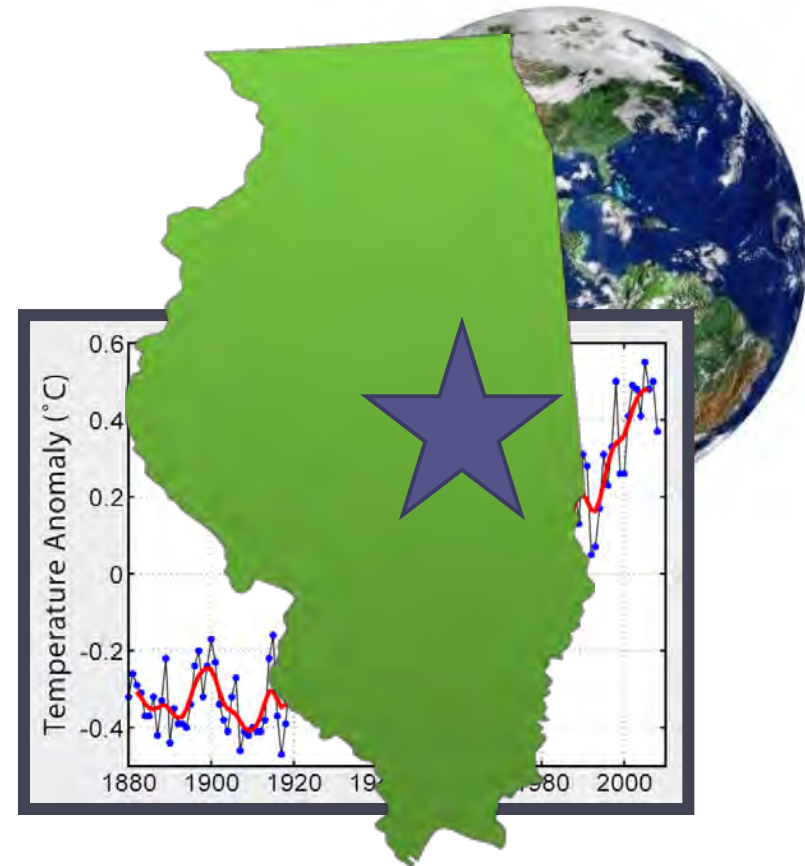
# Climate Change...or Variability?

- What is **climate variability**?
  - The natural fluctuation in climate on time scales of seasons to decades
- What is **climate change**?
  - Long-term (several decades or longer) and persistent shifts in the climate of a location



# Global...to Local

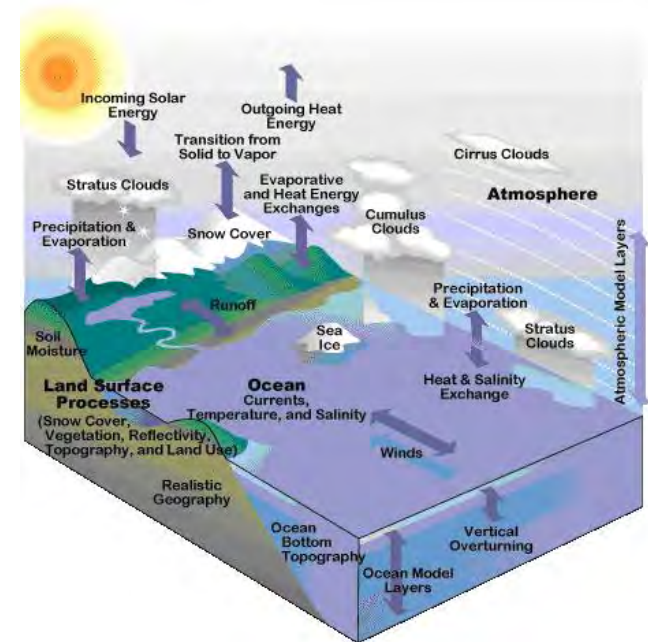
- We often hear about global **trends and impacts...**
- What has been changing locally?
  - Historical trends
- And what may we anticipate for the future?
  - Future projections
  - Potential impacts





# Using and Interpreting Climate Models

- Why is there uncertainty in climate models?
  - Clouds, hydrological processes, topography, and other regional features are difficult to model
- Many scientists are confident that models provide reasonable estimates of future climate

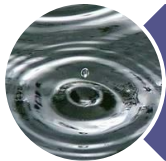


U.S. Global Change Research Program  
**National Climate  
Assessment**

# Overview of Presentation



Temperature



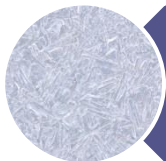
Precipitation



Extreme Precipitation



Plant Hardiness Zone

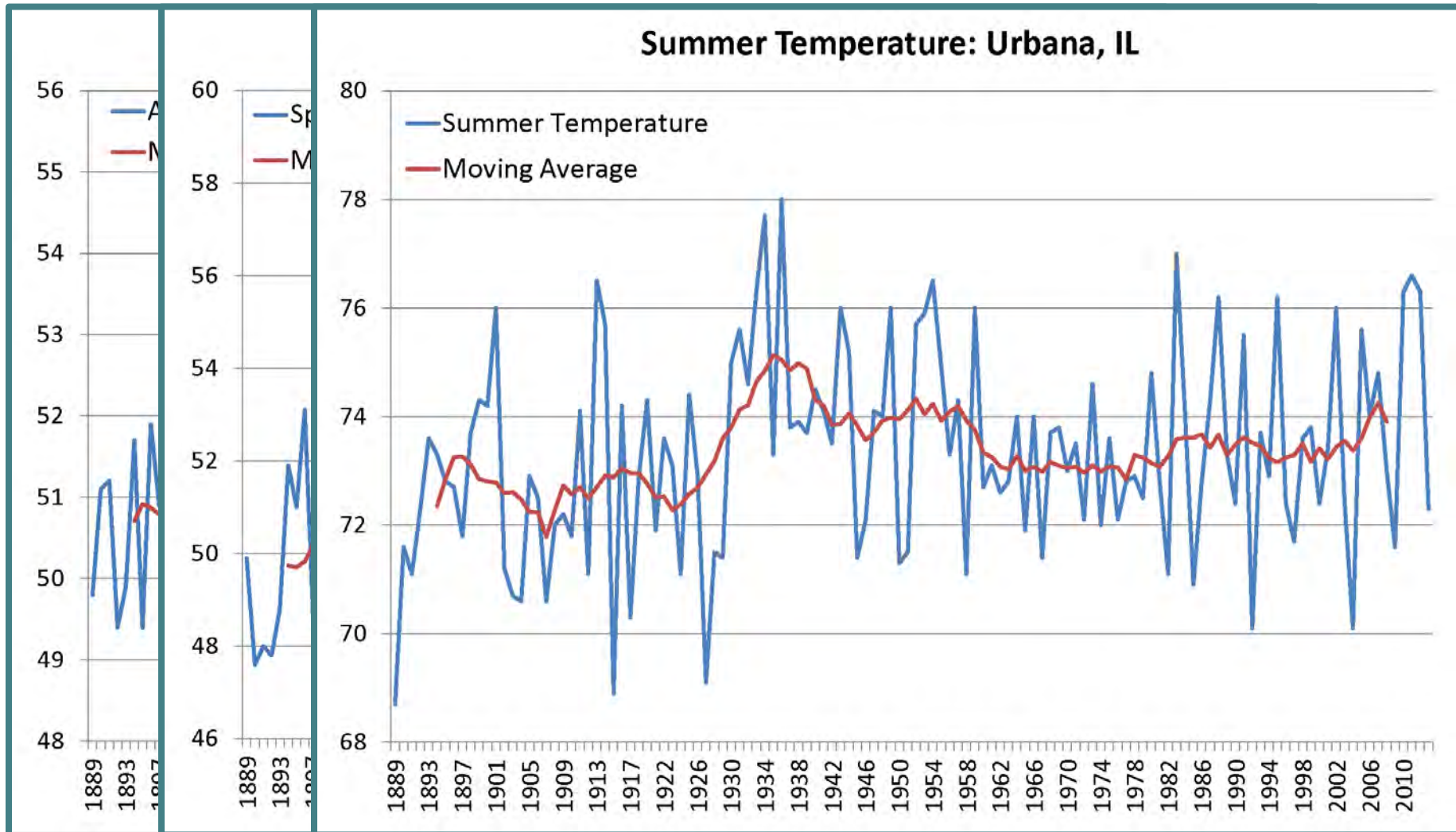


Freeze-Thaw Events

# Temperature Trends & Projections

- Projections agree that temperatures will **increase...**
  - By mid-century: 3.5-5.5°F
  - By end of century: 5.5-9°F
- Seasonal differences?
  - By end of century, largest increase in summer
    - Winter may see greatest increase in near future (2010-2039)

# Temperature Trends & Projections





# Increased Temperature Impacts

## Cold-season impacts

- Decreased energy use
- Reduced risk of cold-related illness and death
- Reduced killing of pests



## Warm-season impacts

- Public health issues
  - More heat waves
  - Increased ozone pollution
- Higher energy demand in summer
- Longer growing season



## Other impacts

- Shifting seasons may affect native species and entire ecosystems
- Shifting of plant hardiness zones



# Heat Waves

- How heat waves may change...
  - Frequency
  - Duration
  - Intensity
  - Heat wave “season” extended

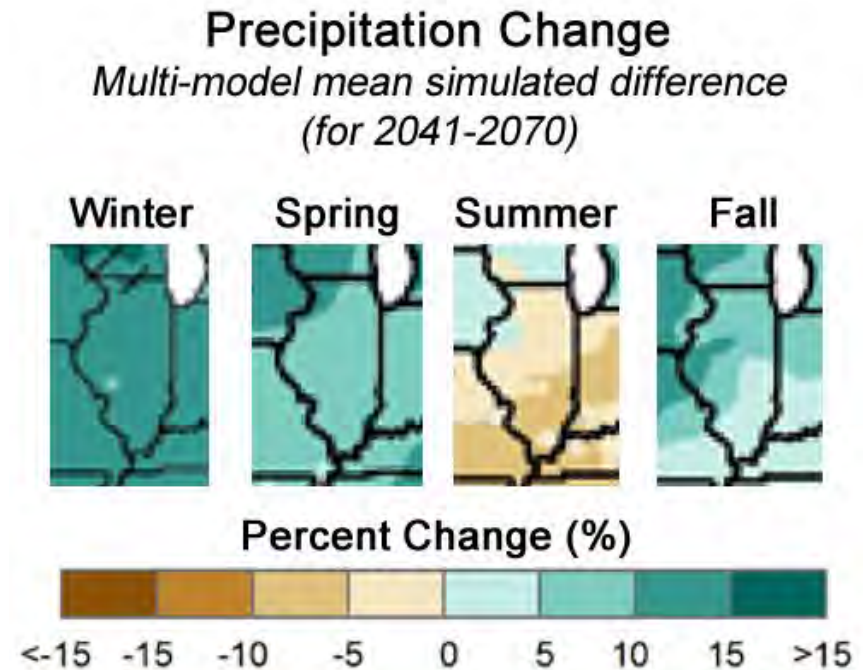


*Peoria Journal Star*

<b>Fu et al. (2012)</b>	<b>Frequency (events/year)</b>	<b>Duration (days/event)</b>	<b>Intensity (°F)</b>
Indianapolis	+4.35 events	+1.84 days	+5.5°F
Chicago	+5.05 events	+1.37 days	+6.6°F

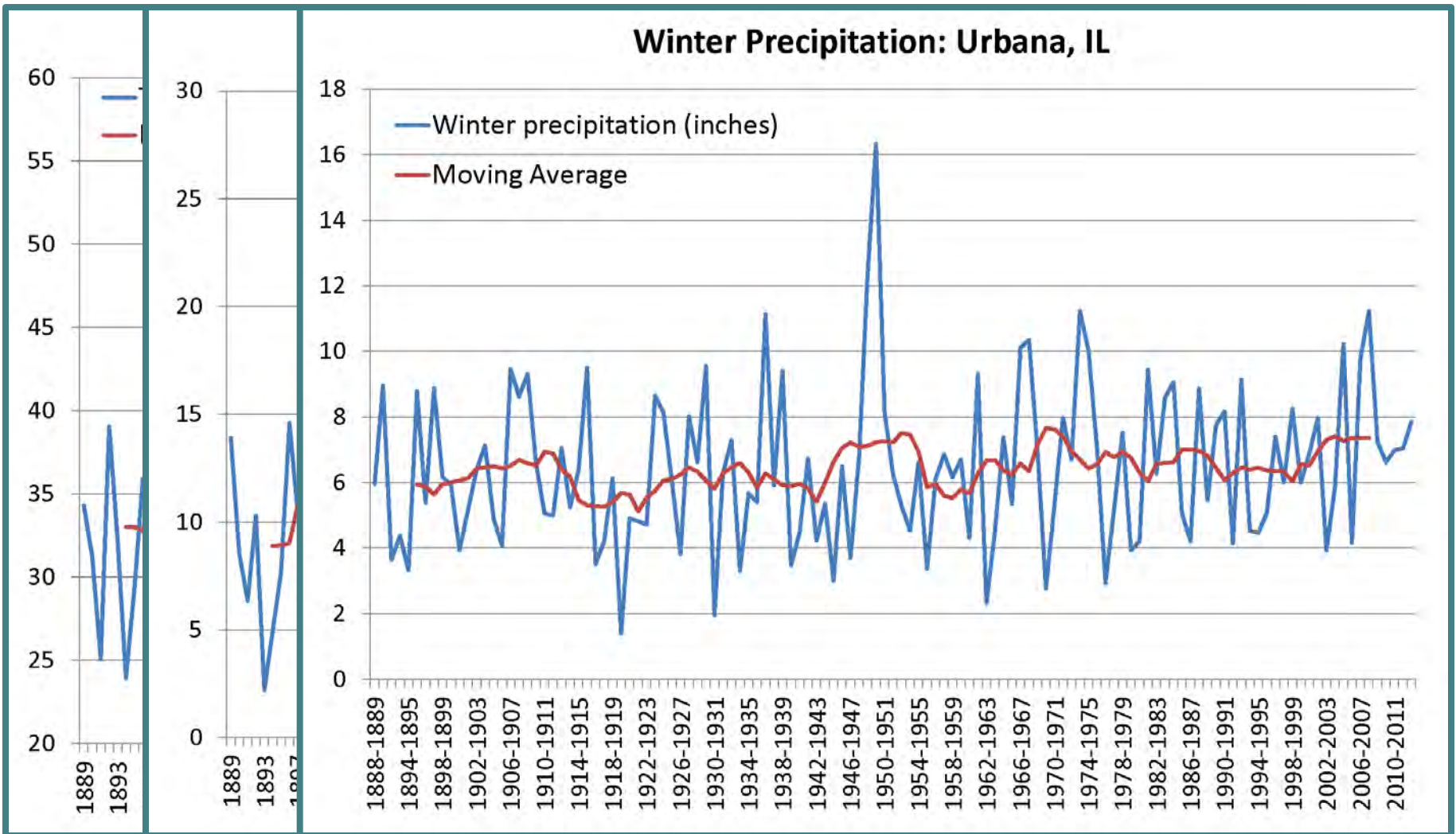
# Precipitation Trends & Projections

- Annual precipitation
  - By end of century, average annual increase of 3-6%
- Seasonal precipitation
  - Greatest increase in winter
  - Small decrease in summer
- More winter precipitation will fall as rain



Source: 2013 National Climate Assessment report

# Precipitation Trends & Projections



# Precipitation Impacts

## Overall annual increase

- Good for groundwater replenishment
- Could come in the form of more extreme events

## Shift in seasonal precipitation

- Summer: plan for variation
- Greater risk for river flooding in spring

## Shift in type of precipitation

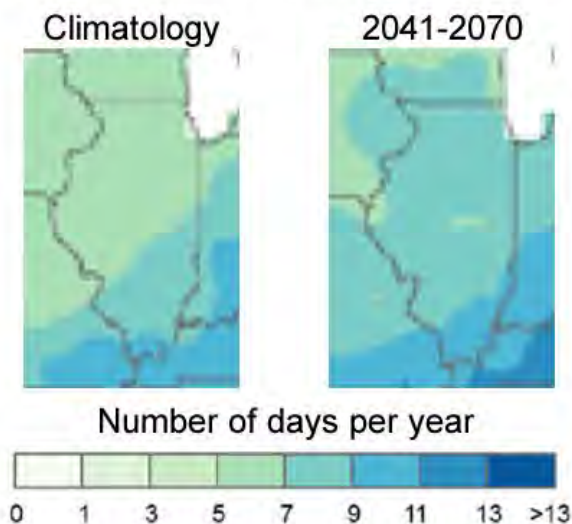
- More precipitation falling as rain instead of snow in winter
  - Higher risk of flooding
  - Rain falling on frozen ground or snow (more runoff)
  - Less road salting over entire snow season



# Future Extreme Precipitation

- Intensity of precipitation may increase in the future
- Days with precipitation **greater than 1”**
  - Climatology: 5-7 days/year
  - Future (2041-2070): 7-9 days/year

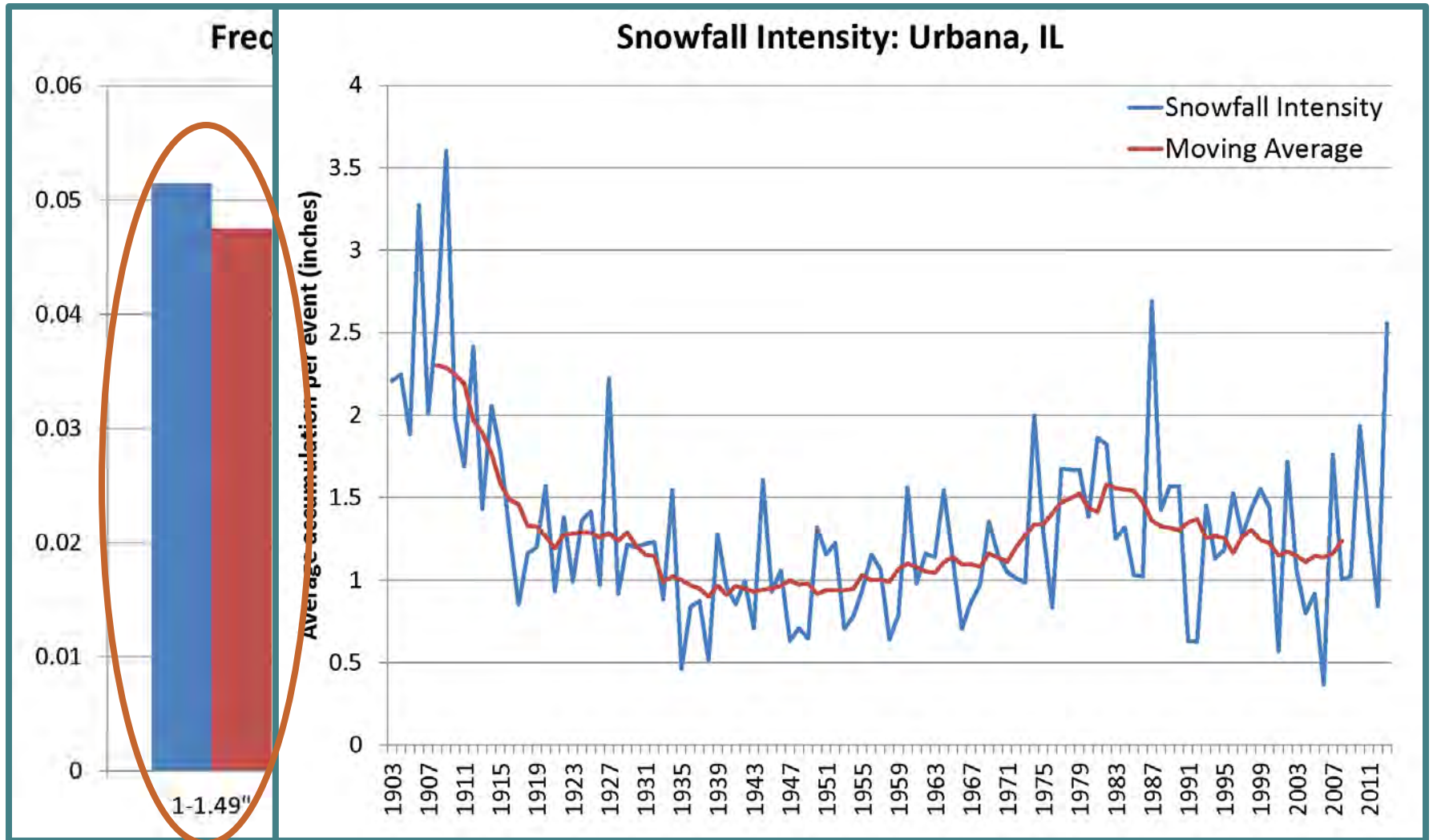
Annual Number of Days with Precipitation Greater than 1 inch



Source: 2013 National Climate Assessment report

Fu et al. (2012)	Total extreme rainfall (in/year)	Annual extreme events (days/year)
Indianapolis	+6.6 in/year	2.8 days/year
Chicago	+4.8 in/year	1.3 days/year

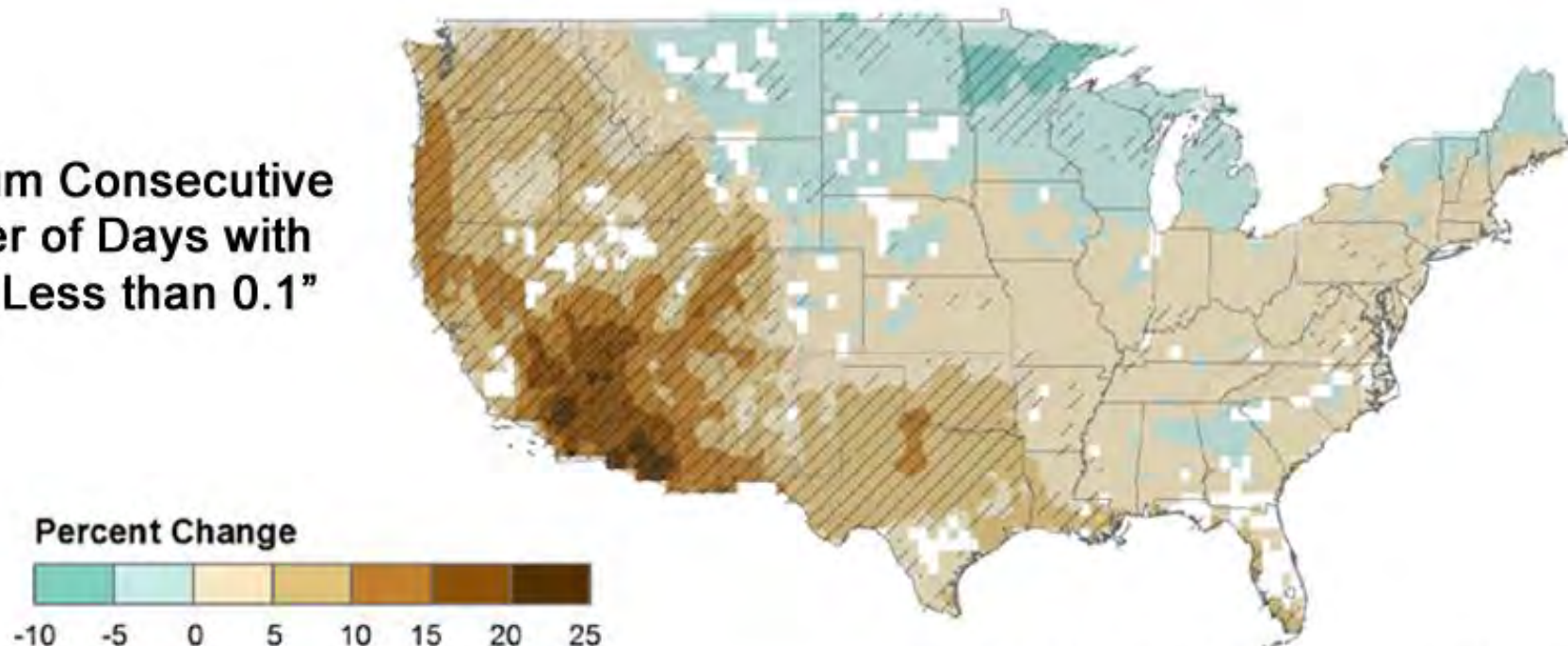
# Extreme Precipitation



# Future Extreme Precipitation

- Higher annual precipitation and more heavy rainfall does not necessarily mean no drought

**Maximum Consecutive  
Number of Days with  
Precip Less than 0.1”**



Source: 2013 National Climate Assessment report

# Extreme Precipitation Impacts

## Higher intensity rainfall

- Flooding issues
- Water quality issues
  - More non-point pollution
  - Sewer overflows

## Higher intensity snowfall

- Increased risk for falling trees and branches due to heavy snow
- Increased risk for winter power blackouts

## Drought

- Longer periods without water replenishment
- Possible increasing population
- Stress agriculture
- Water needs for energy production

# Plant Hardiness Zone

Current: Zone 5b

- -15°F to -10°F

Projections

- As climate warms, plant hardiness zone is projected to move northward





# Plant Hardiness Zone



## Impact of northward shift

- Optimal tree and plant species for central IL may change

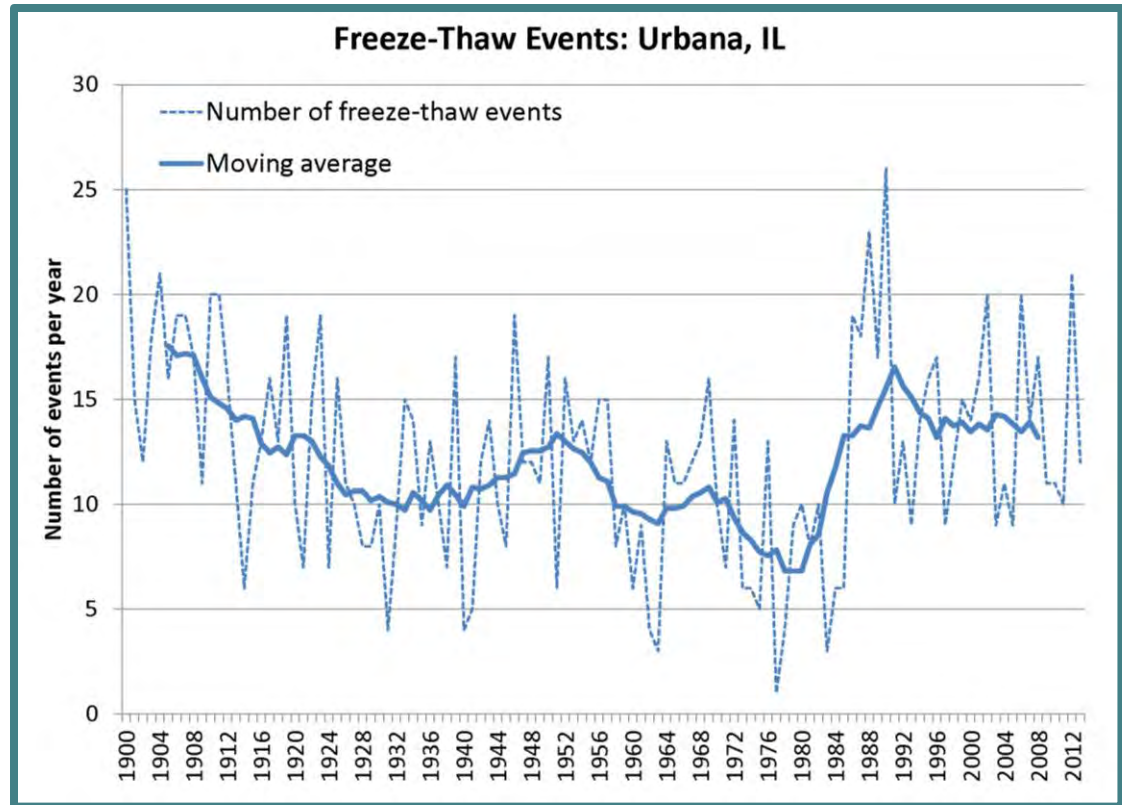


## Other CC impacts on trees

- Warmer, potentially dryer summers will also have implications for current tree species
- Heavier snow may stress tree branches

# Freeze-Thaw Events

- Projections:
  - Possibility for more episodic frost events in early fall or late spring
- Impacts:
  - With more freeze-thaw events, concrete roads and structures are more susceptible to spalling, cracking, and potholes



Thank you! Questions?

