



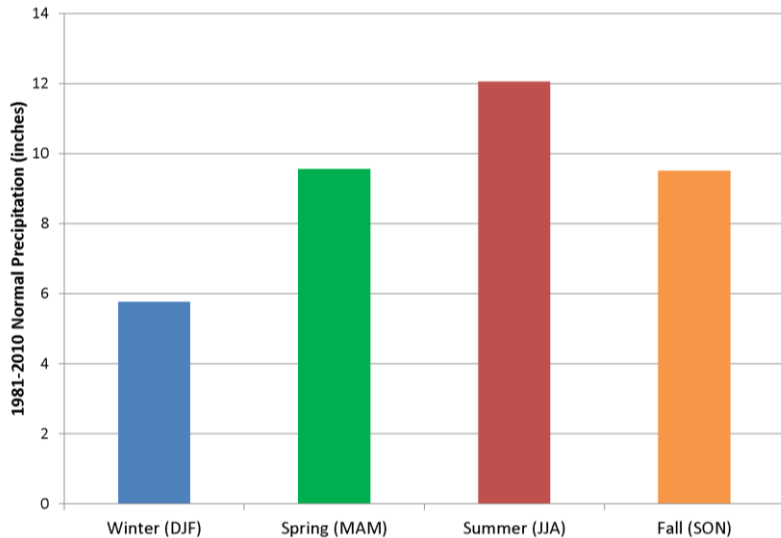
# Extreme Precipitation

Historical Trends, Future  
Changes, & Potential  
Impacts



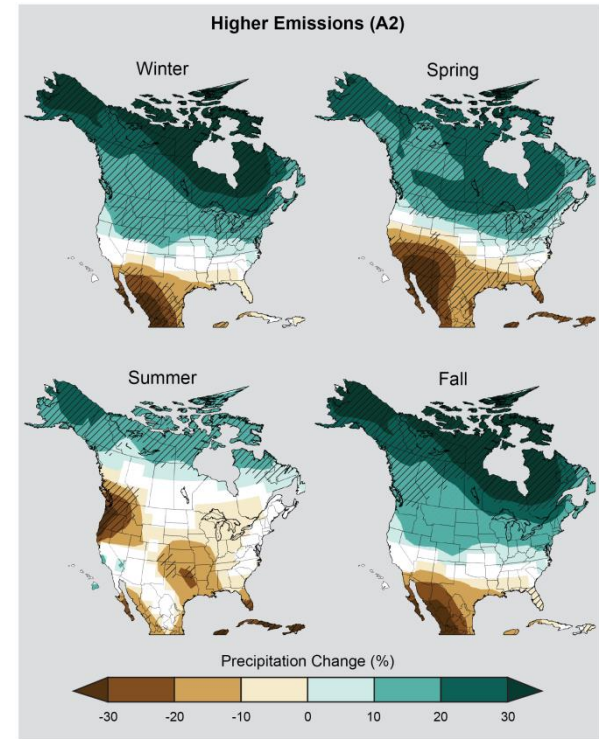
# Seasonal Precipitation

- Historical



1981-2010 precipitation normals by season (Chicago O'Hare Airport)

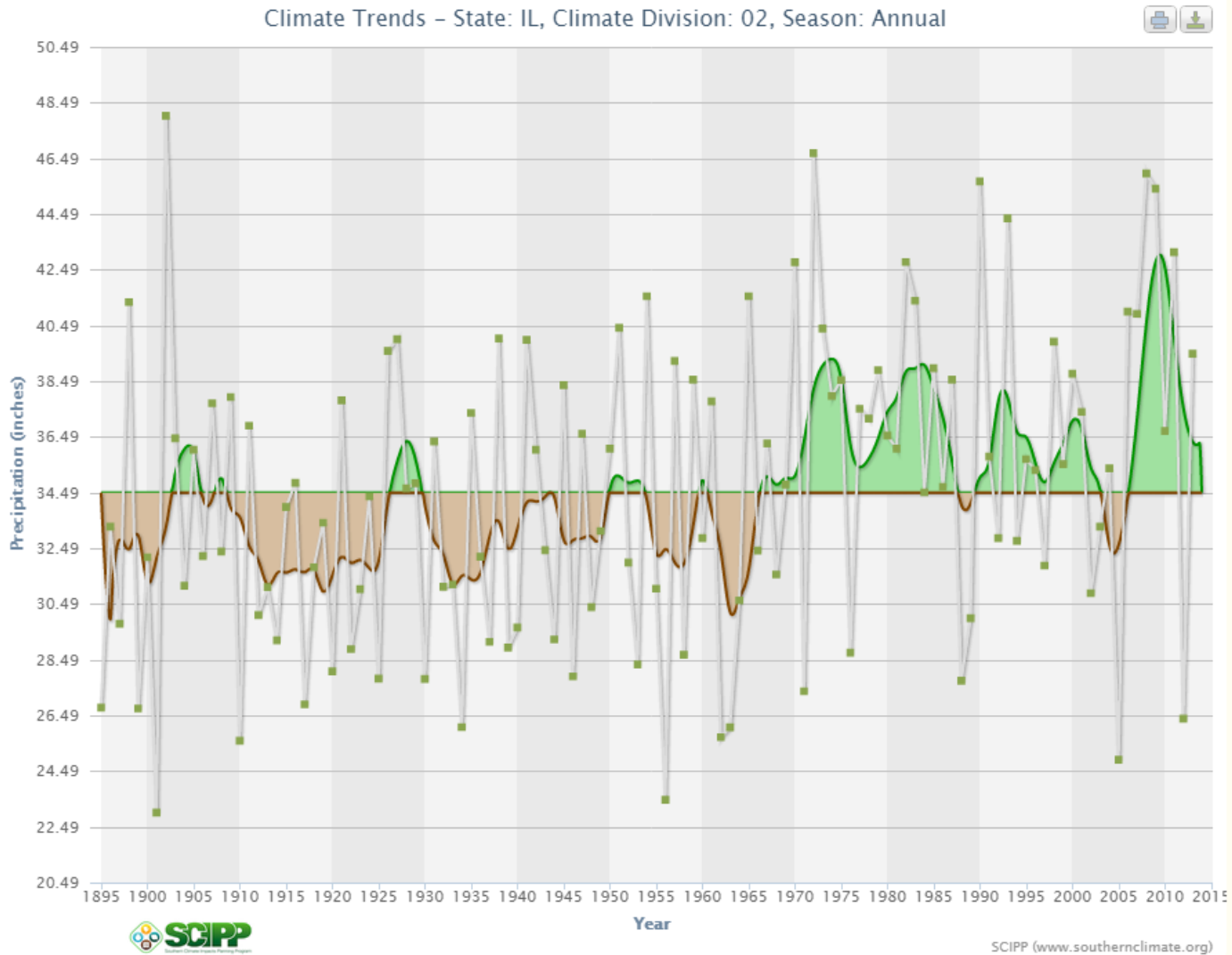
- Future



Projected percent change by season for 2071-2099 (compared to 1971-1999) (NCA 2014)

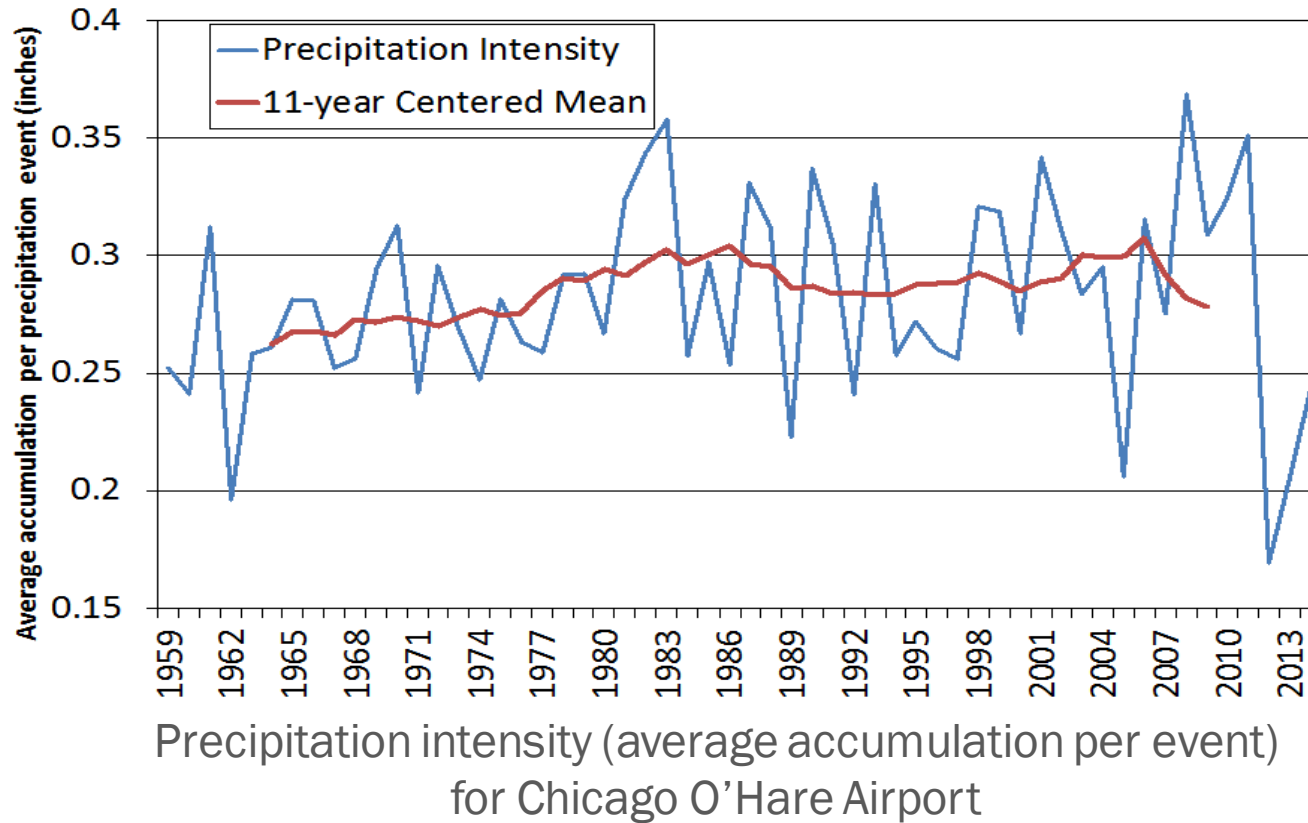


# NE Illinois Annual Precipitation



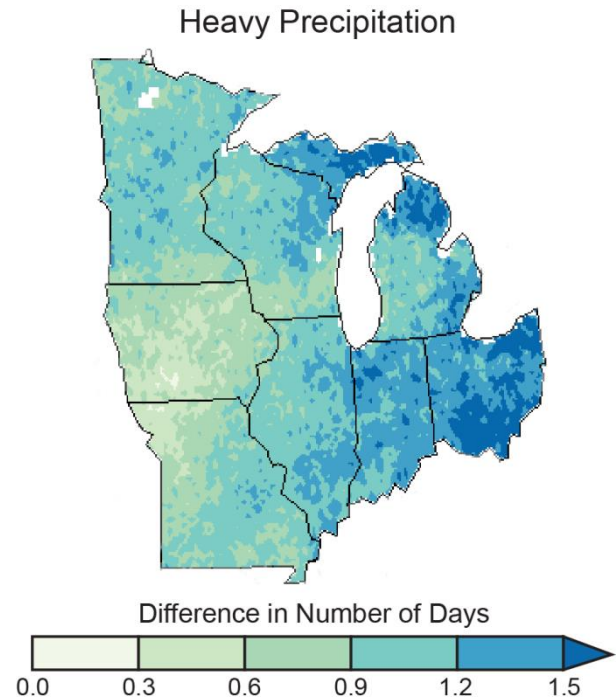
# Precipitation Intensity: Historical

Precipitation Intensity  
Chicago O'Hare



# Precipitation Intensity: Future

- Increases in frequency and intensity of extreme precipitation expected
- Chicago
  - Heavy precipitation days: +0.9-1.5 days per year

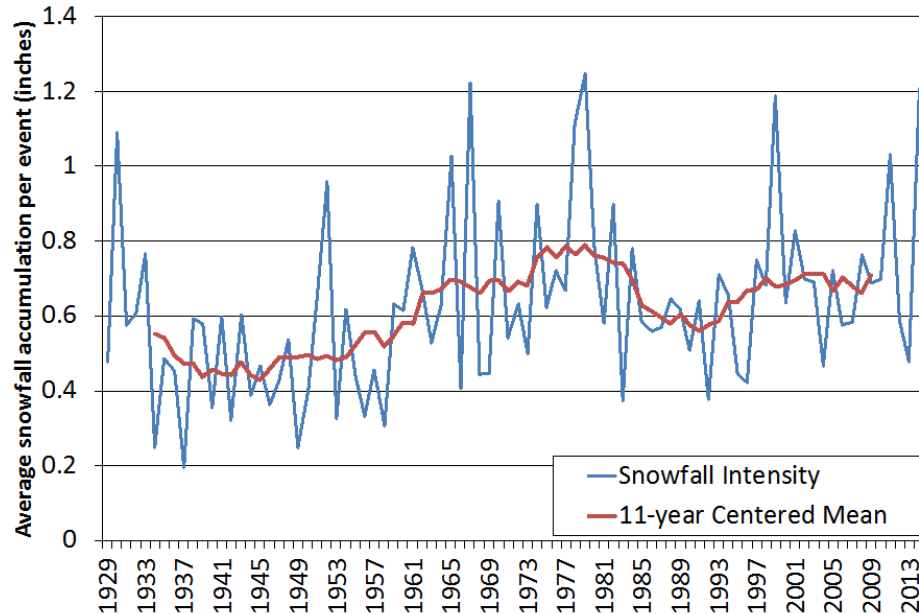


Increase in number of days with very heavy precipitation (top 2% of rainfalls) in 2071-2099 (compared to 1971-2000)  
(NCA 2014)

# Snowfall Intensity

- Historical

Snowfall Intensity Chicago Midway



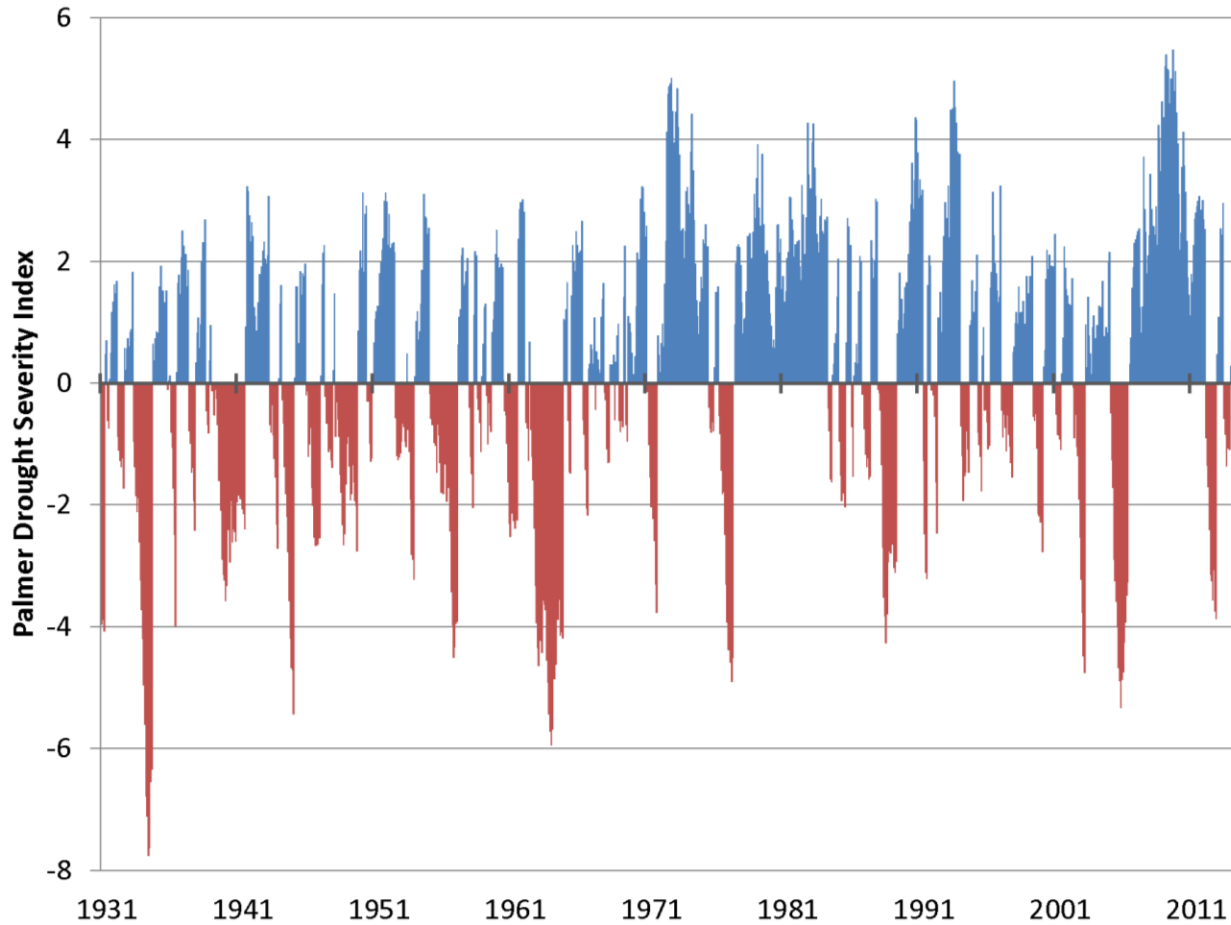
Snowfall intensity (average snow accumulation per event) at Chicago Midway Airport since 1929

- Future

- Increased winter precipitation could mean greater chances for both heavy snowfall *and* rainfall events (Hayhoe et al. 2010).



# Drought: Historical



Palmer Drought Severity Index

Northeast Illinois (Climate Division 2)

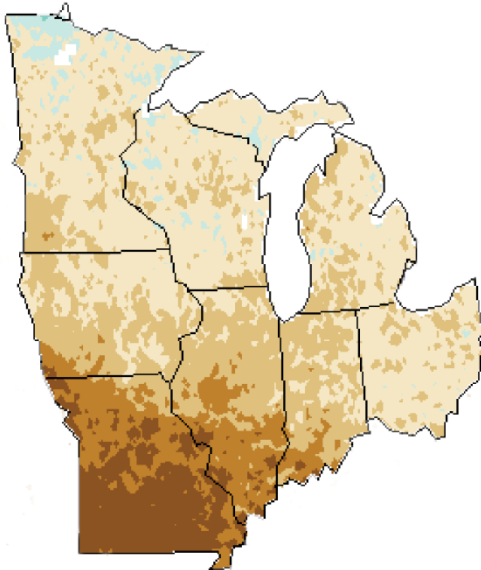
Drought: red  
Non-drought: blue





# Drought: Future

Consecutive Dry Days



Difference in Number of Days



Change in average maximum number of consecutive days each year with no precipitation in 2071-2099 (compared to 1971-2000) (NCA 2014)

- Both floods and droughts expected increase in frequency in the future in the Midwest (2014 NCA)
- Longer periods of dry conditions



# Impacts: Seasonal Shift

- **Summer decrease**
  - Increased agricultural drought issues
- **Spring increase**
  - Increased river flooding risk (combined with seasonal snowmelt)
- **Winter increase**
  - Increase flood and heavy snowfall risk
  - Increased runoff issues with rain falling on snow/frozen ground





# Impacts: Higher Intensity Rainfall

2014 National Climate Assessment  
Key Message 5 for the Midwest

## Increased Rainfall and Flooding

Extreme rainfall events and flooding have increased during the last century, and these trends are expected to continue, causing erosion, declining water quality, and negative impacts on transportation, agriculture, human health, and infrastructure.



# Impacts: Higher Intensity Rainfall

- **Increased flood risk**

- Expansion of urban areas (impervious surfaces) exacerbate impacts



- **Water quality issues**

- More non-point pollution
- More combined sewer overflows/lake reversals
  - 120% increase in CSO's into Lake Michigan by 2100 (2014 NCA)



# Update Bulletin 70

- Design standard since the 1980s.
- Defines things like the 10-year and 100-year storm.
- Better to think of the 100-year storm as having a 1% chance of occurring in any year.
- The challenge is in anticipating future climate change.



# Impacts: Higher Intensity Snowfall

\* Winter adaptation  
handout with policy  
recommendations  
in folder\*



- Increased risk for winter power blackouts
- Increased risk for falling trees and branches
- Transportation issues



# Impacts: Drought

- Increased stress/regulations for municipalities reliant on ground water
- Stress on municipal infrastructure
  - E.g. pipe issues
- Increased stress to agriculture/urban green space
  - More irrigation needed?

