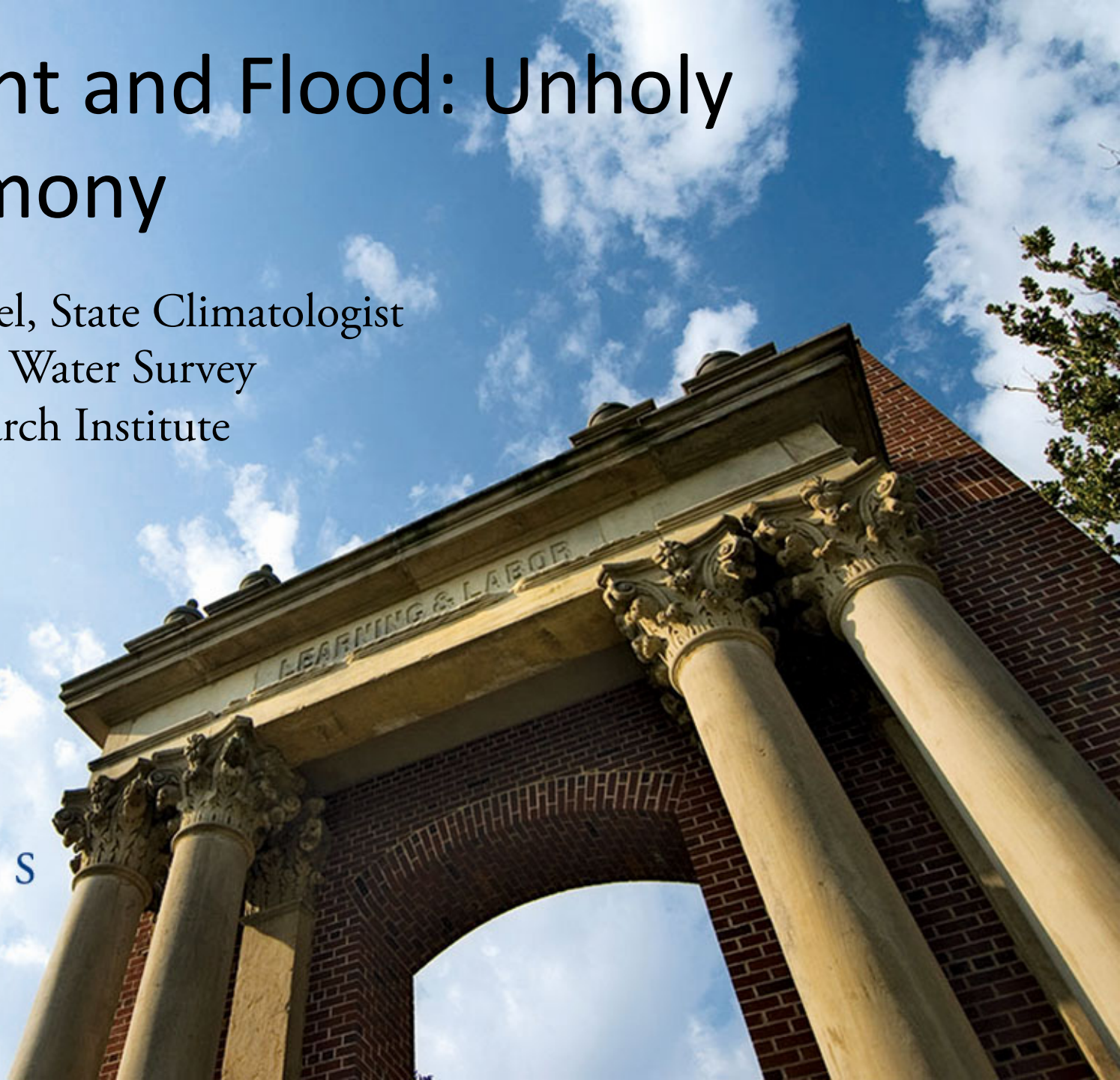
Drought and Flood: Unholy Matrimony

Dr. Jim Angel, State Climatologist
Illinois State Water Survey
Prairie Research Institute



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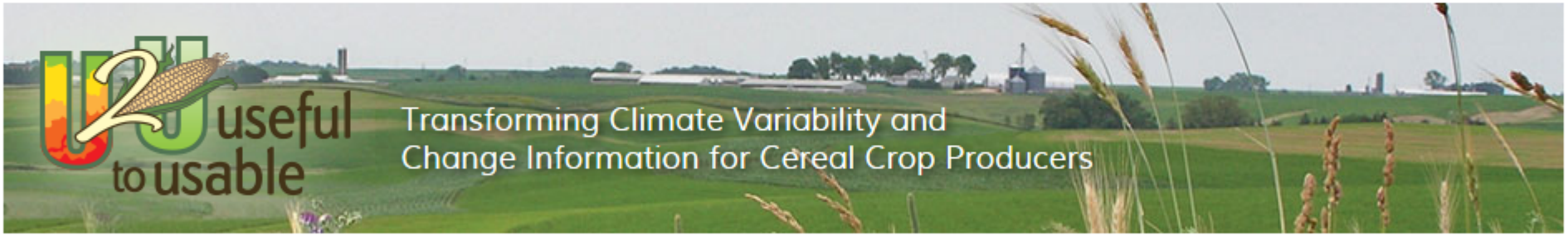

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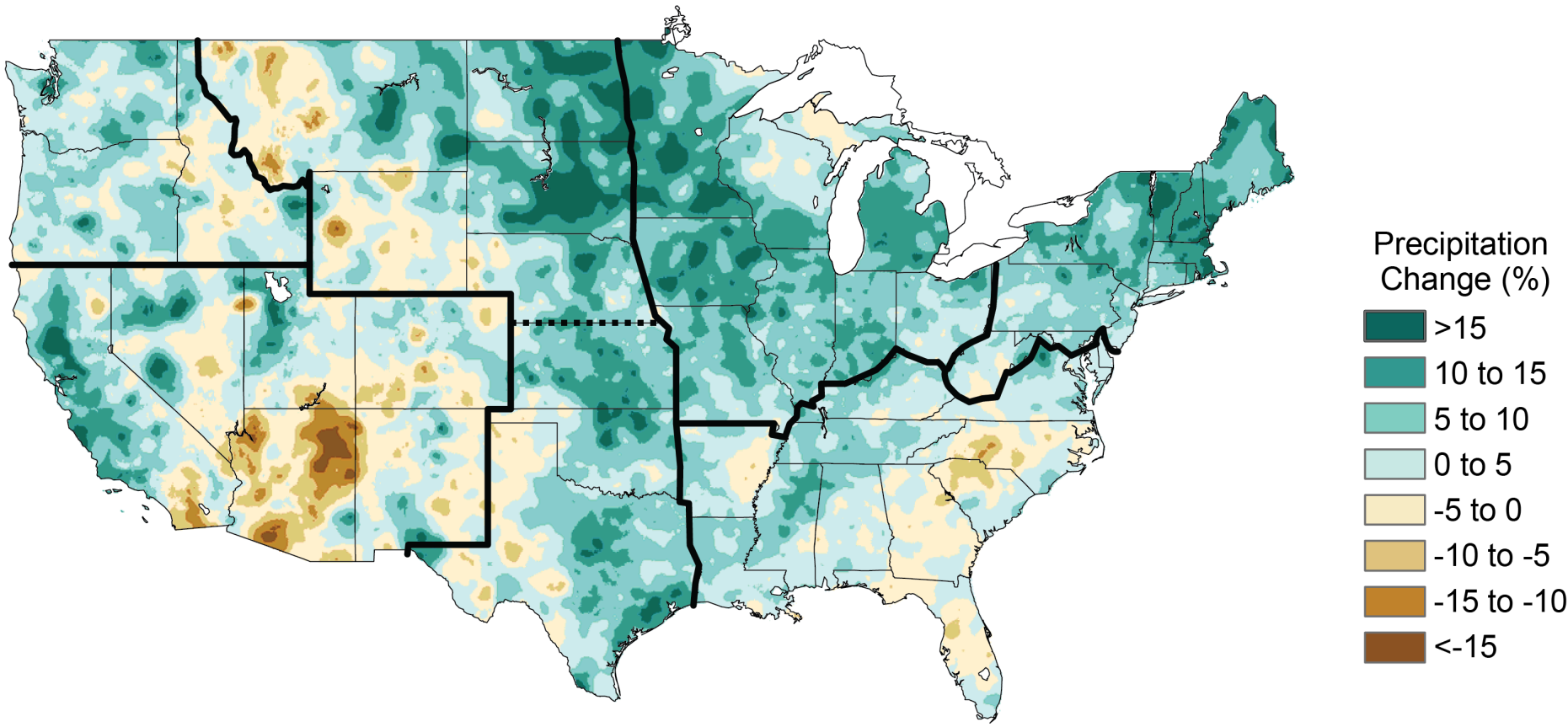
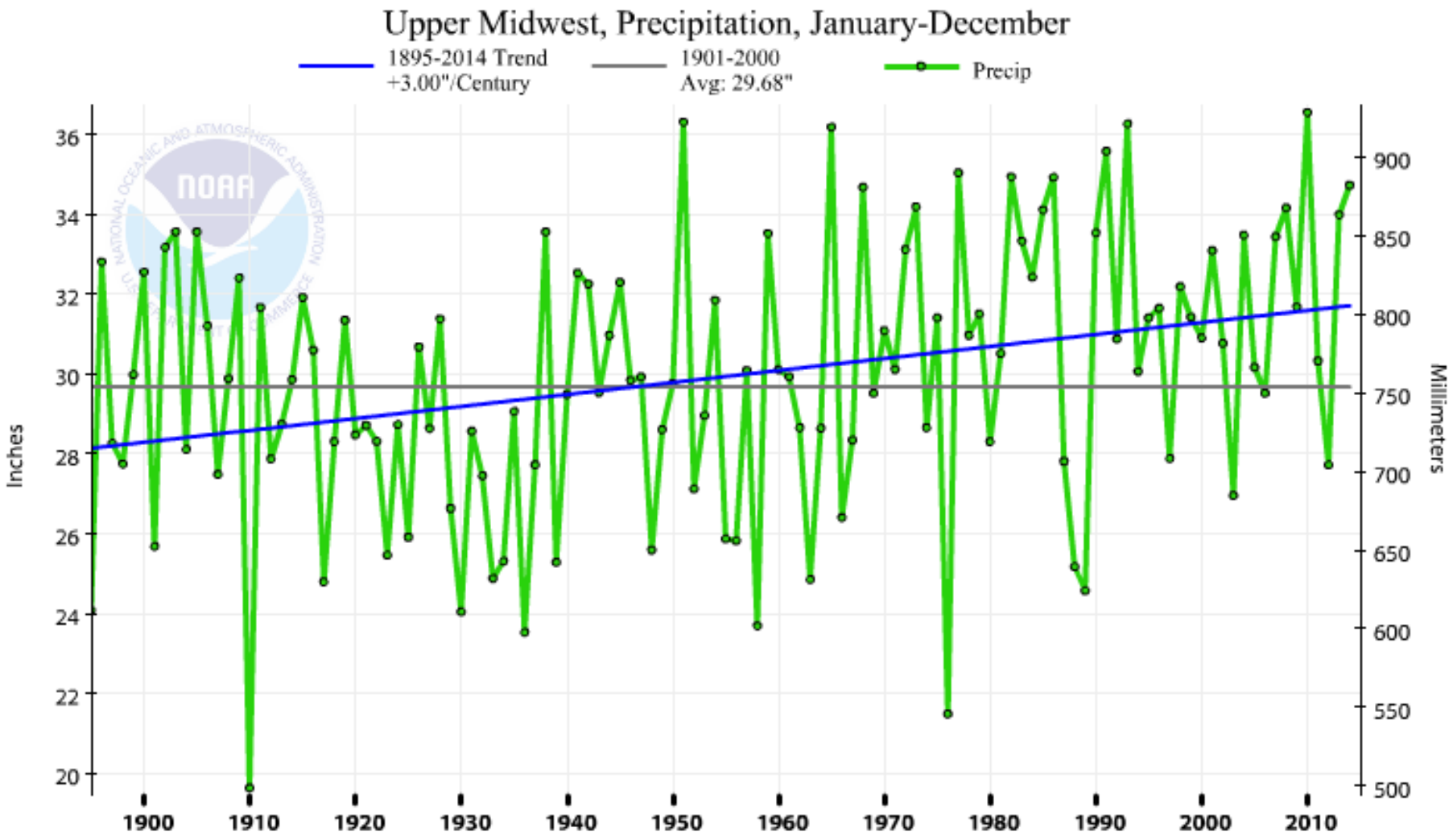
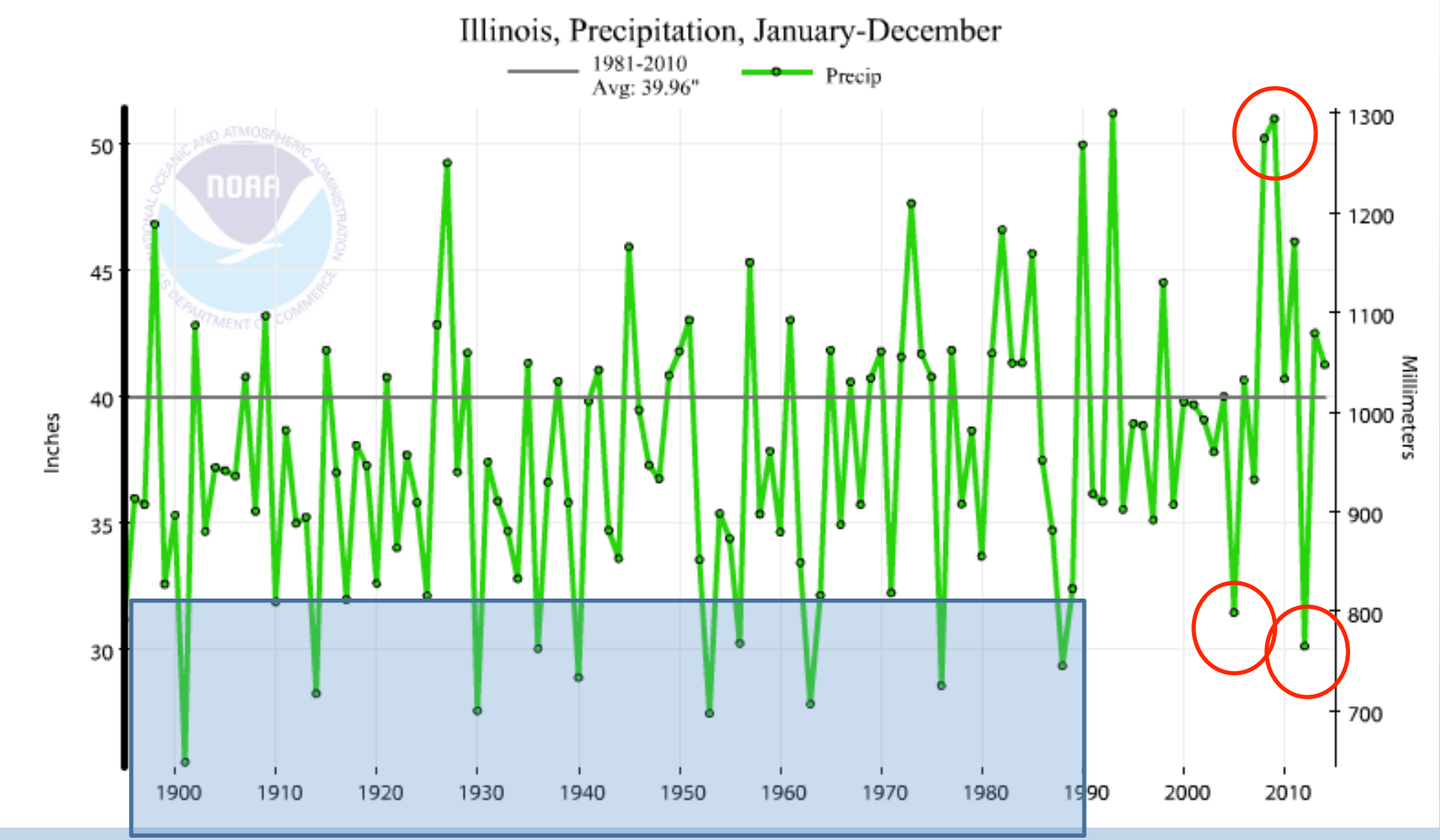
Observed U.S. Precipitation Change



The colors on the map show annual total precipitation changes for 1991-2012 compared to the 1901-1960 average, and show wetter conditions in most areas.

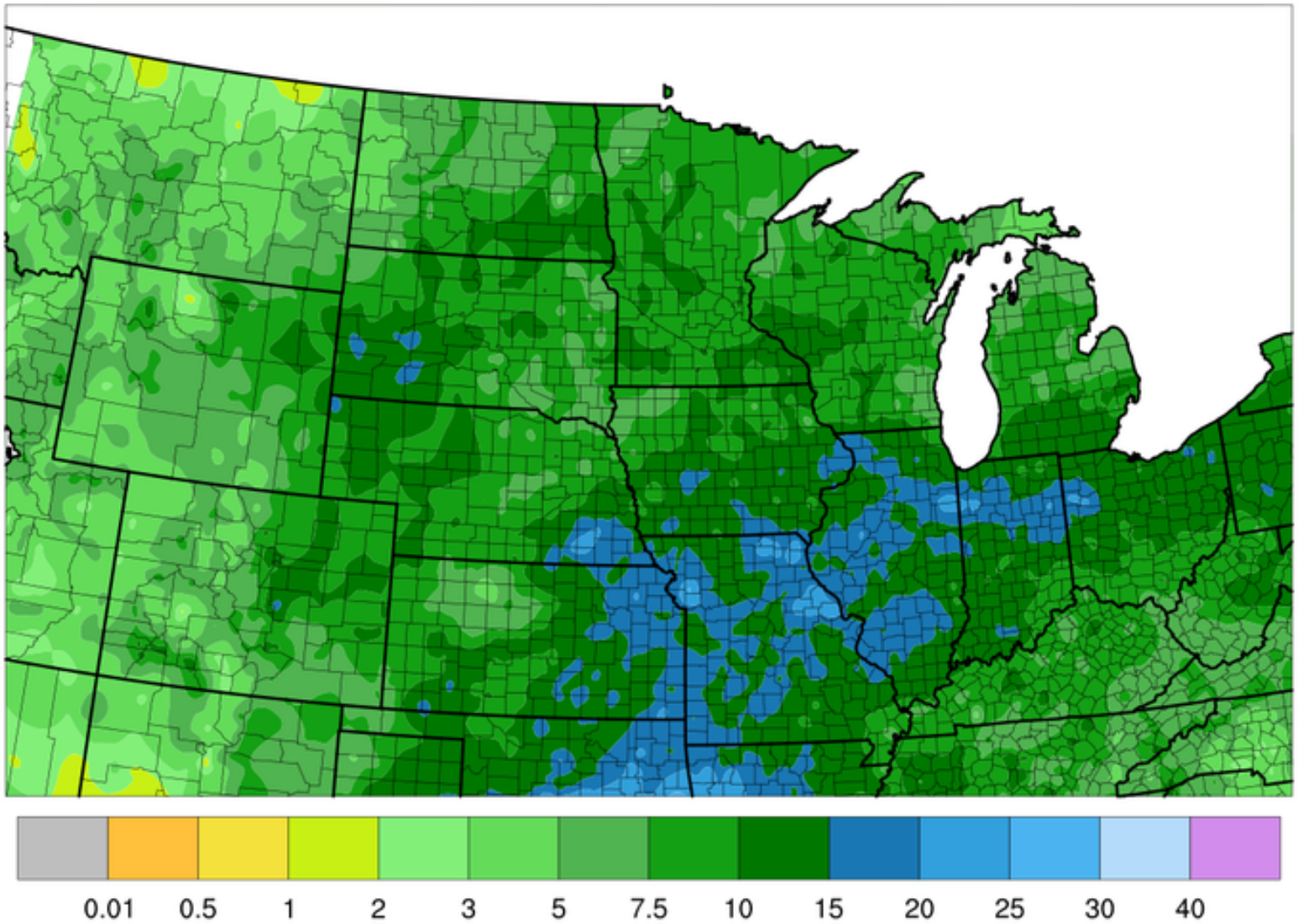

Upper Midwest, Precipitation, January-December
1895-2014 Trend
+3.00"/Century
1901-2000
Avg: 29.68"
Precip
Inches
Millimeters
36
34
32
30
28
26
24
22
20
900
850
800
750
700
650
600
550
500
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010

Illinois: Annual Precipitation



Accumulated Precipitation (in)

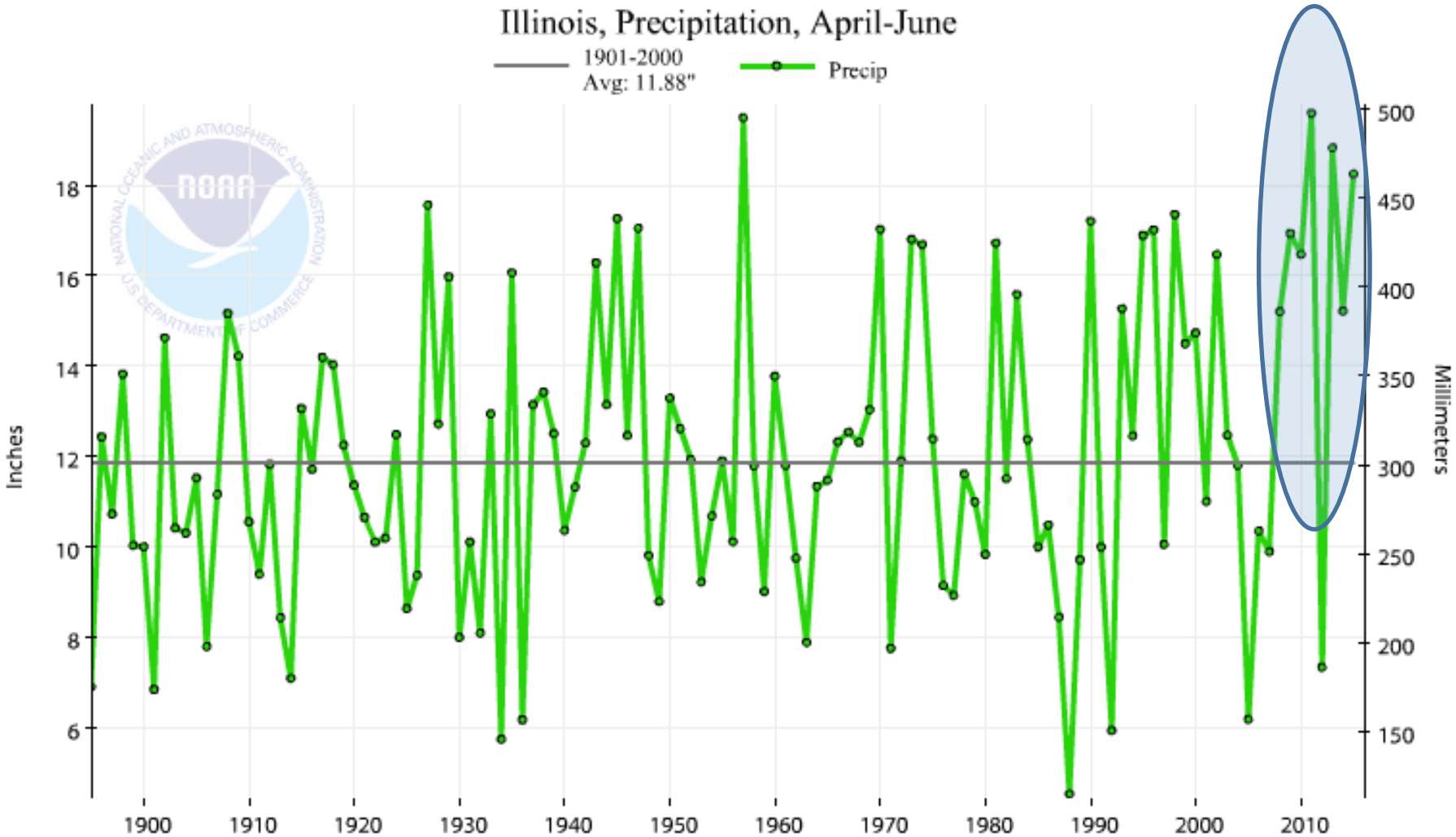
May 01, 2015 to June 30, 2015



Stations from the following networks used: WBAN, COOP, FAA, GHCN, ThreadEx, CoCoRaHS, WMO, ICAO, NWSLI, Missouri FSA, Missouri Mesonet,

Midwestern Regional Climate Center
cli-MATE: MRCC Application Tools Environment
Generated at: 9/29/2015 8:10:20 AM CDT

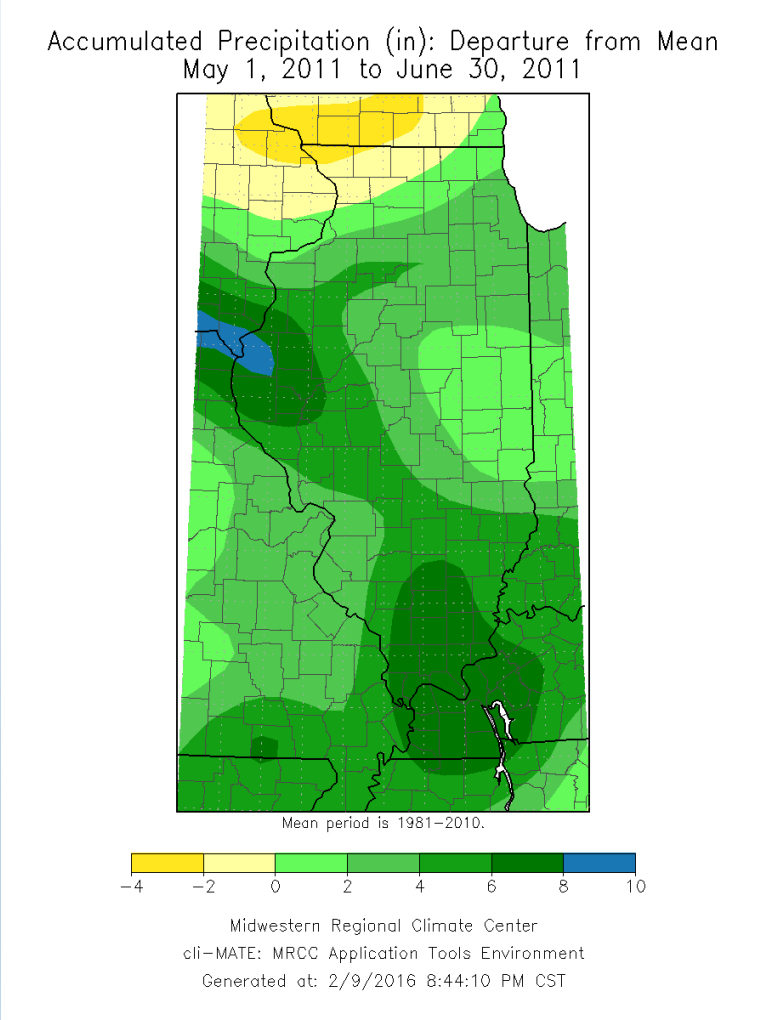
Illinois: April - June



Increasing Spring Precipitation

- Reduced workable field days
- Planting delays
- Replanting
- Soil compaction
- Drainage
- Nitrogen loss
- Root development

Wet Spring, Dry Summer 2011



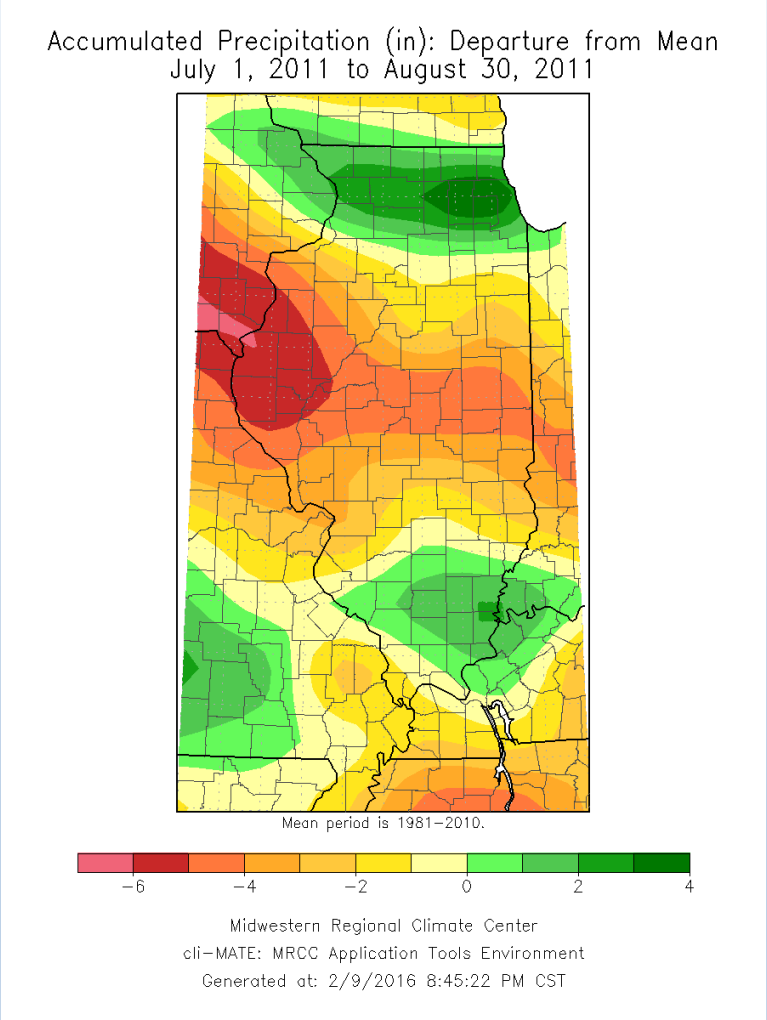
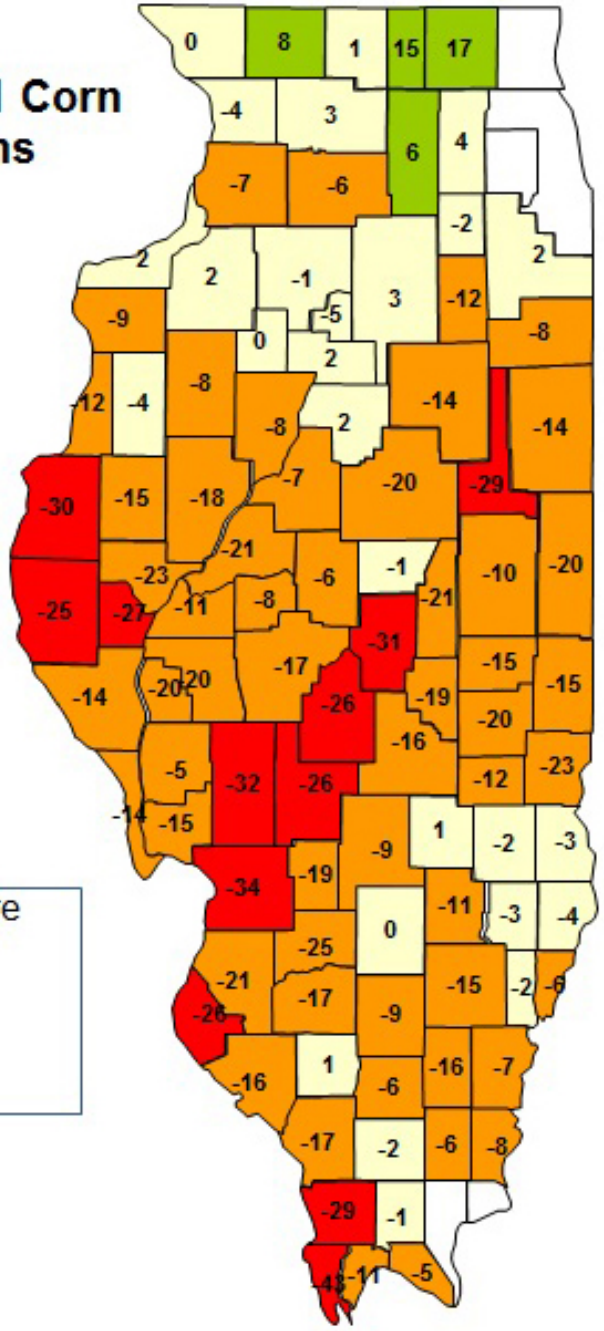
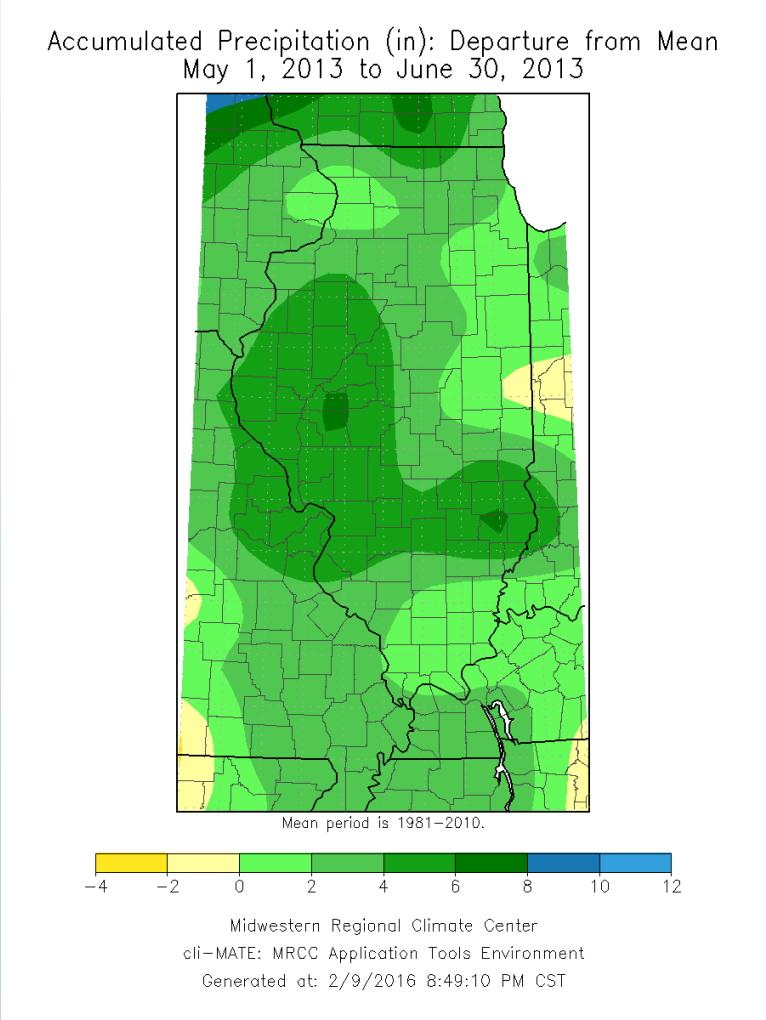
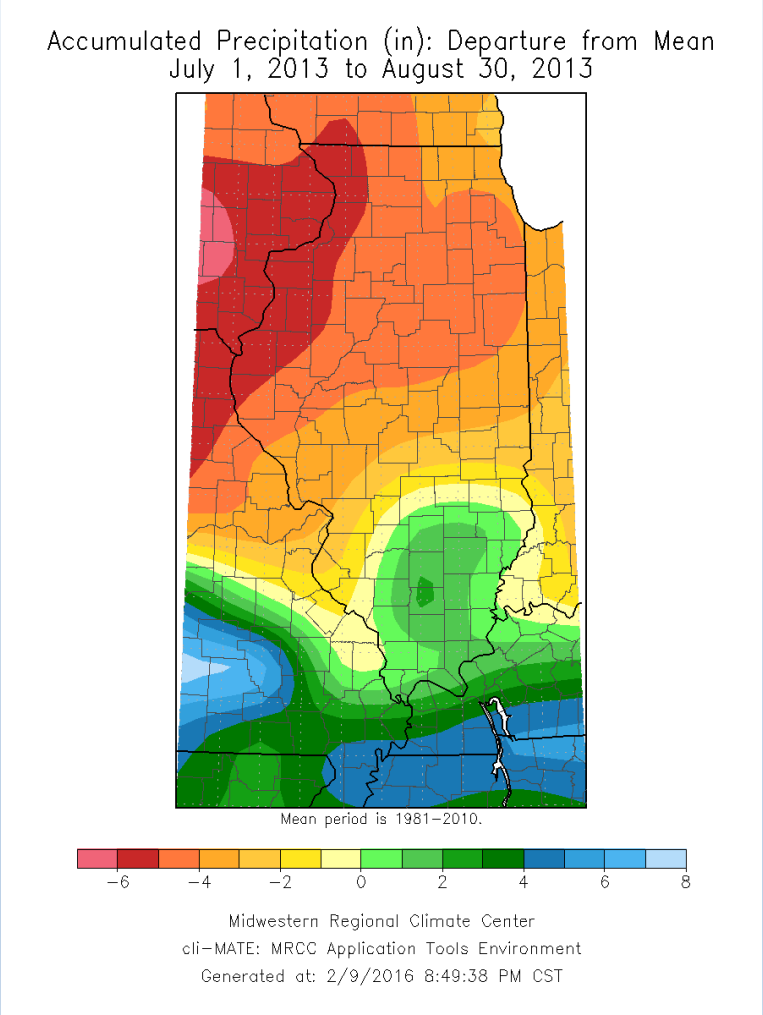


Figure 1. 2011 Corn Yield Deviations from Trend.



Spring/Summer 2013

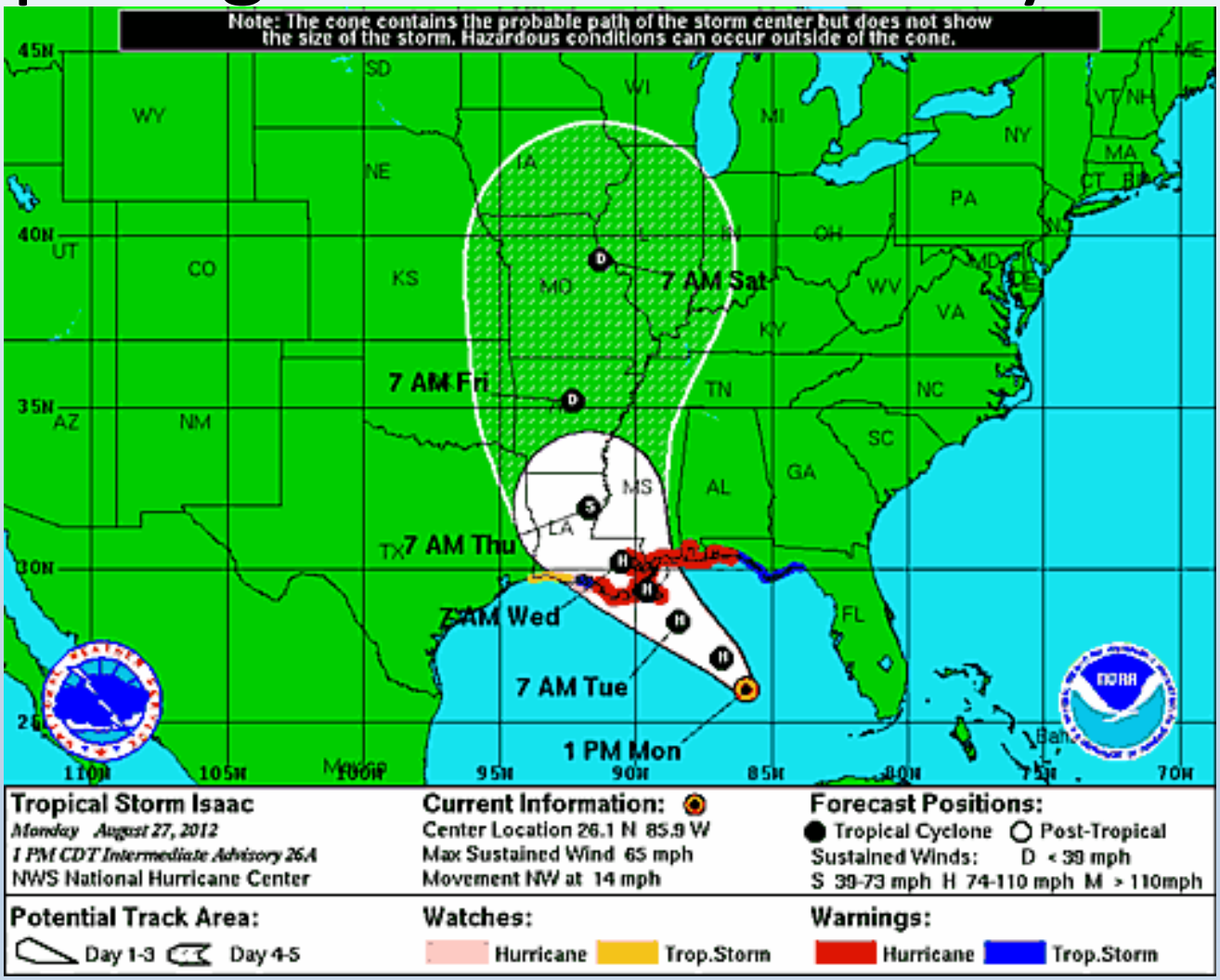




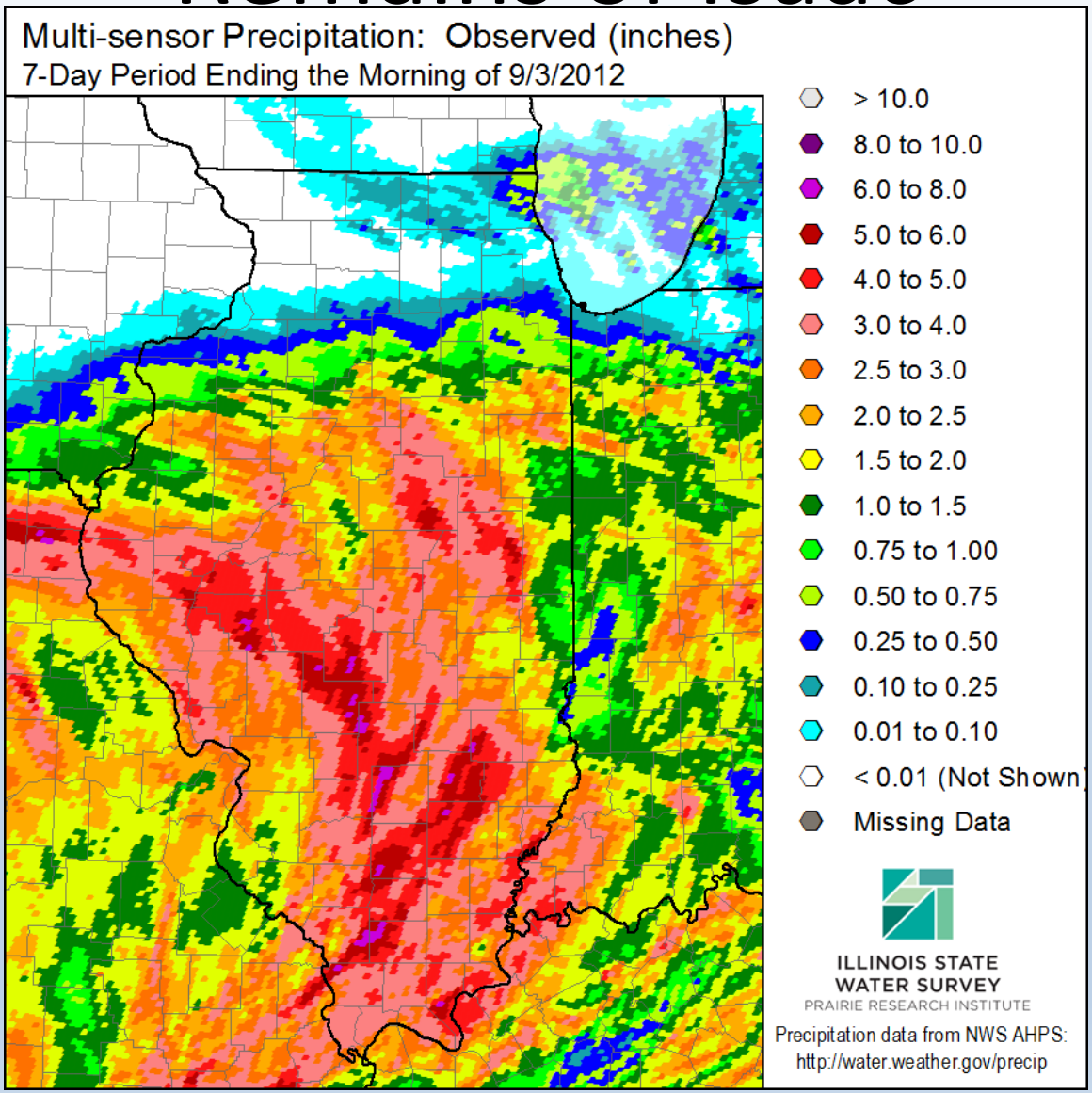
Rapid Recovery from Drought

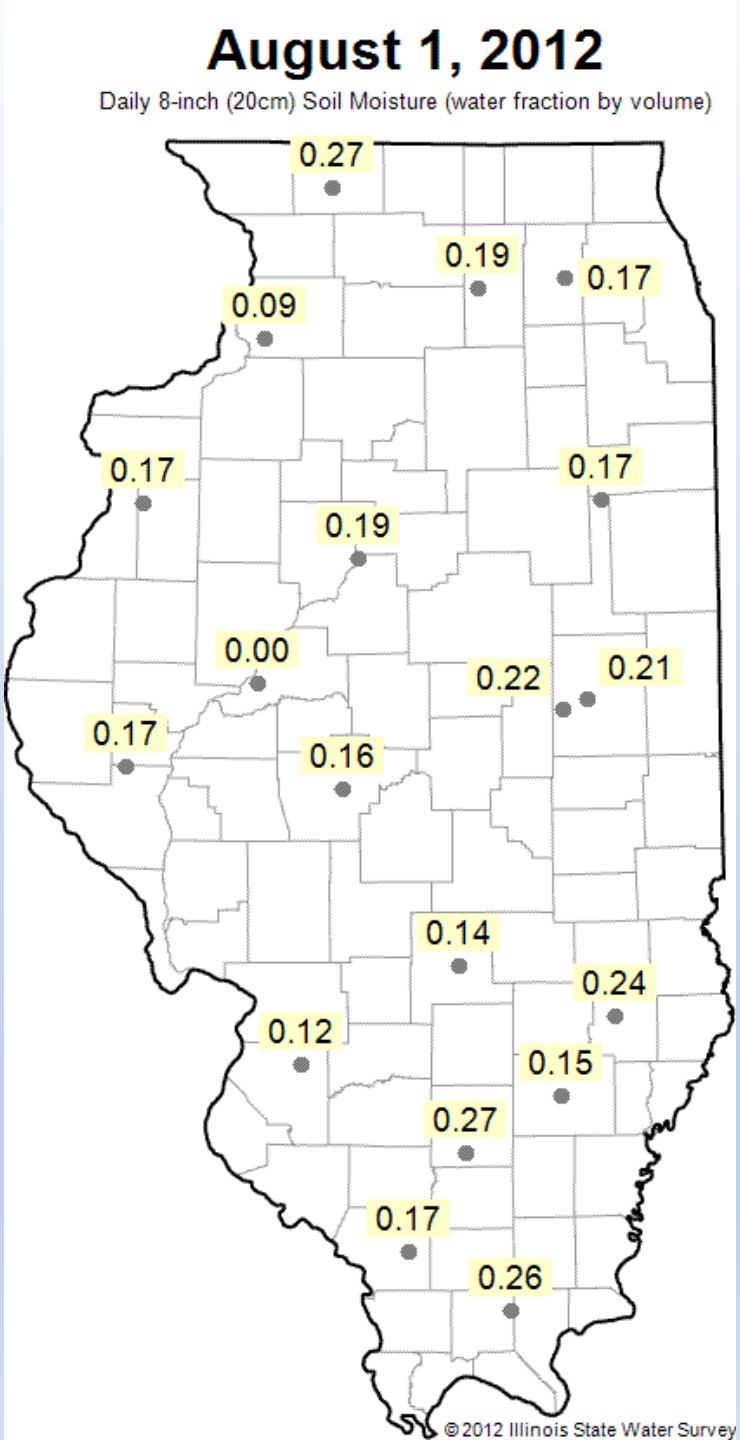
- 2005 with four tropical systems
- 2012 with Hurricane Isaac
- 2015 Tropical Storm Bill (TX and OK)

Preparing for a slow recovery … until



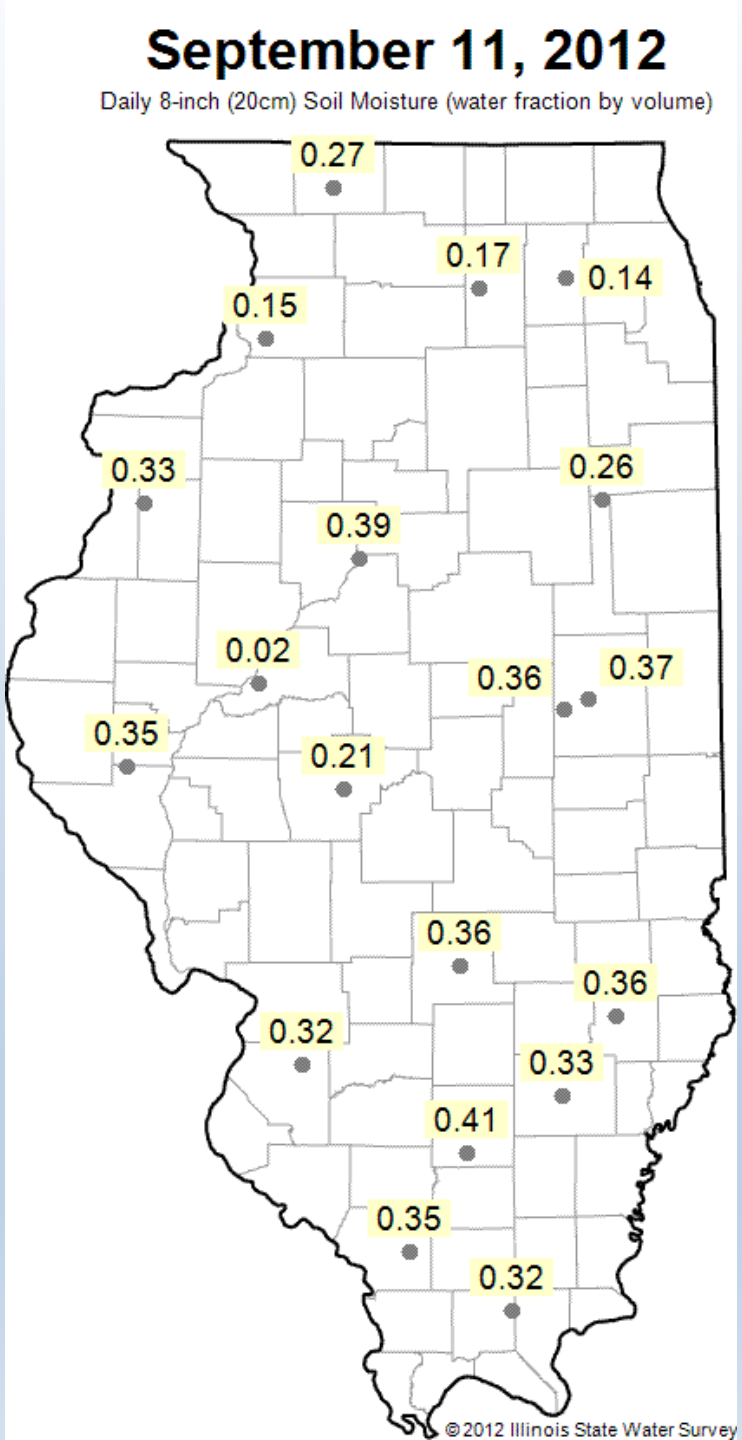
Remains of Isaac





Fraction of soil made up of water

- 0.3 to 0.4 = Wet
- 0.2 to 0.3 = OK
- 0.1 to 0.2 = Dry



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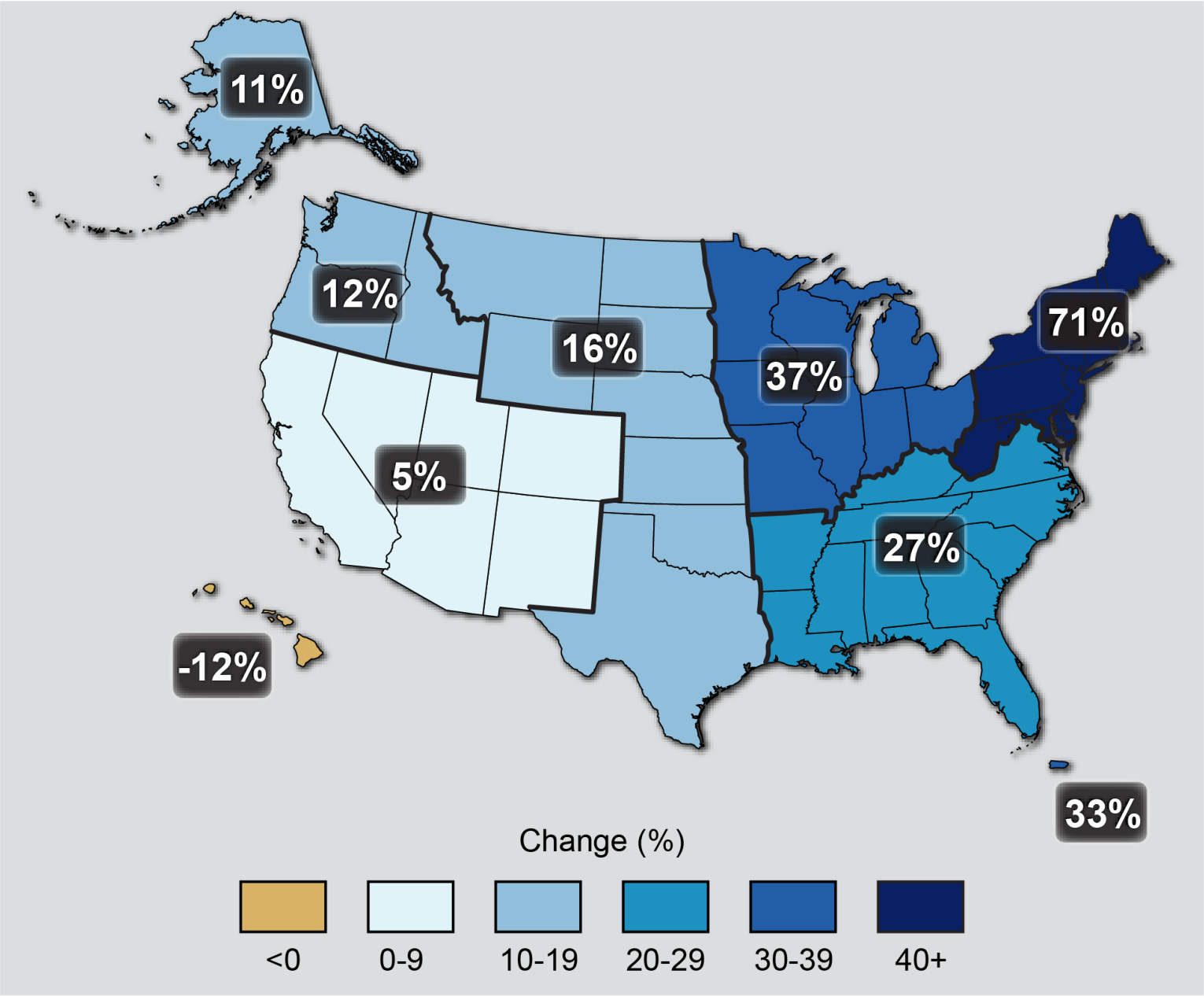
Observed Change in Very Heavy Precipitation



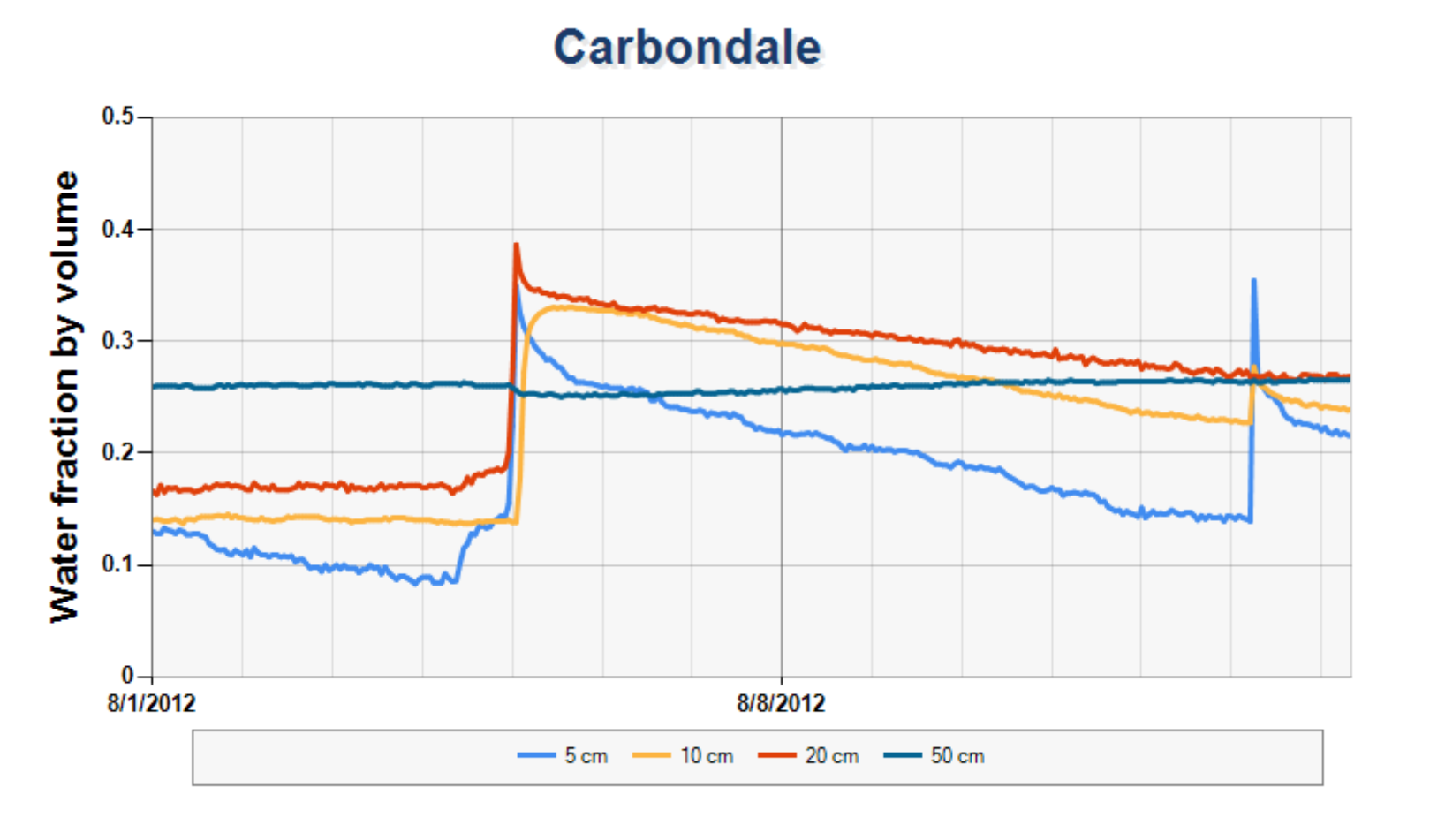
Increased Intensity of Rain Events

May increase drought vulnerability

- More soil erosion damages soil

Photo Credit: (Betts, 2011)

How Effective Are Heavy Rains During Drought



July 5, 2012: 4.92 inches in 5 hours

Conclusions

- Droughts can happen even in a wetter climate
- Quickly go from drought to flood & from flood to drought within months
- Heavy, high-intensity thunderstorms are not always effective drought relief