

2022 Weather Year & Longer-Term Trends

TRENT FORD

ILLINOIS STATE CLIMATOLOGIST

ILLINOIS STATE WATER SURVEY/PRAIRIE RESEARCH INSTITUTE

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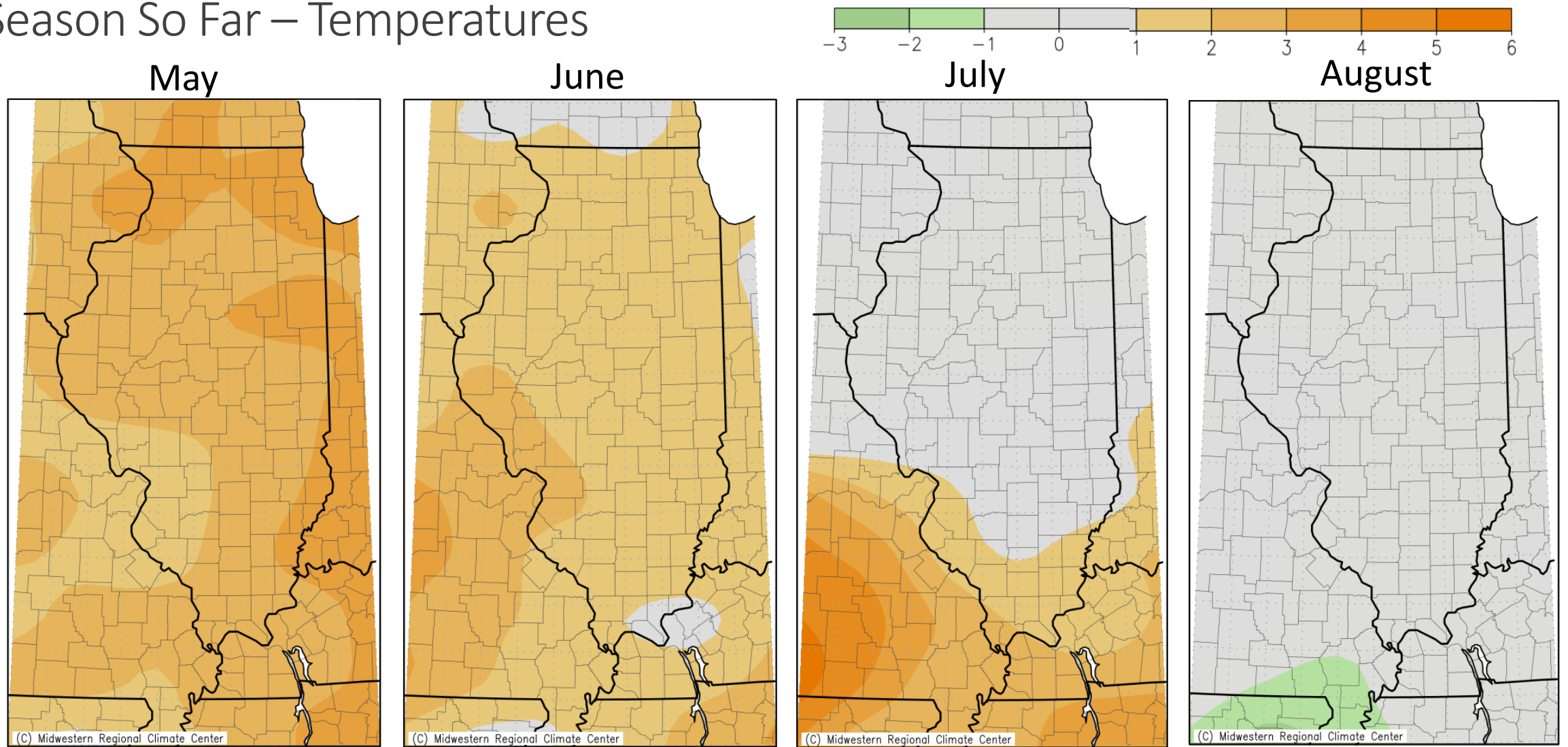


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Illinois State Water Survey

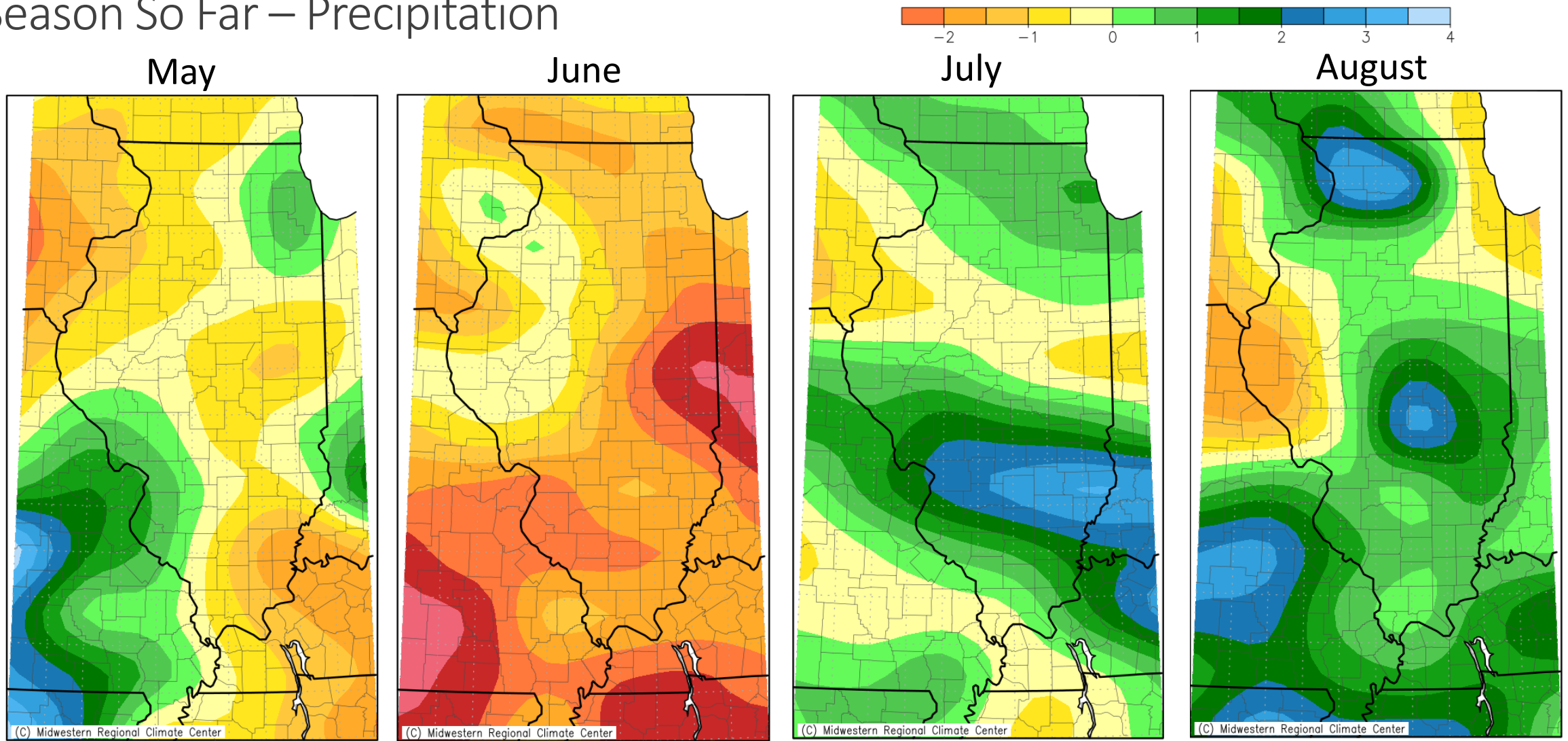
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Season So Far – Temperatures



- Very warm May & June, followed by near normal July and August
- Nighttime temperatures were in low to mid-70s in late June/early July

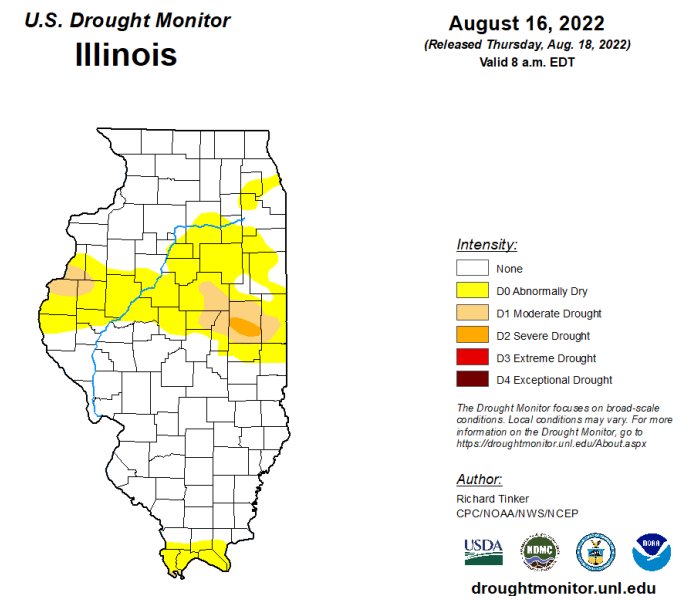
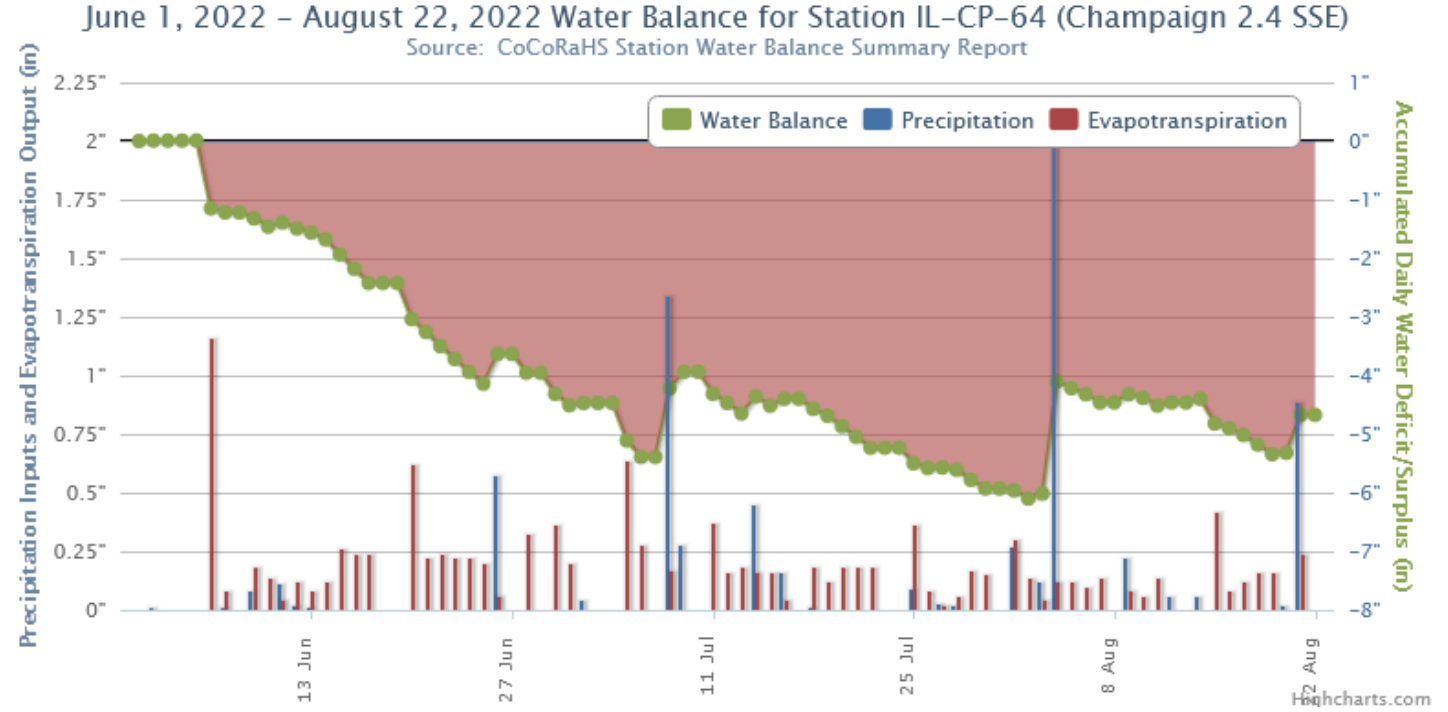
Season So Far – Precipitation



- Very warm May & June, followed by near normal July and August
- Nighttime temperatures were in low to mid-70s in late June/early July

Drought in Central Illinois

- Top 4-8" soil somewhat to very dry across I-74 corridor
- “moderate” to “severe” drought in western and east-central IL
- Champaign had just 0.88” in June, but 6”+ of evaporation



Extreme Rainfall Elsewhere

- 6-8" in 6 hours in St. Louis Metro East
- 6"+ in 6 hours in Lake County
- 12-14" in July in Edwards-Richland Counties
- 9-12" of rain in 24 hours in Effingham-Olney area



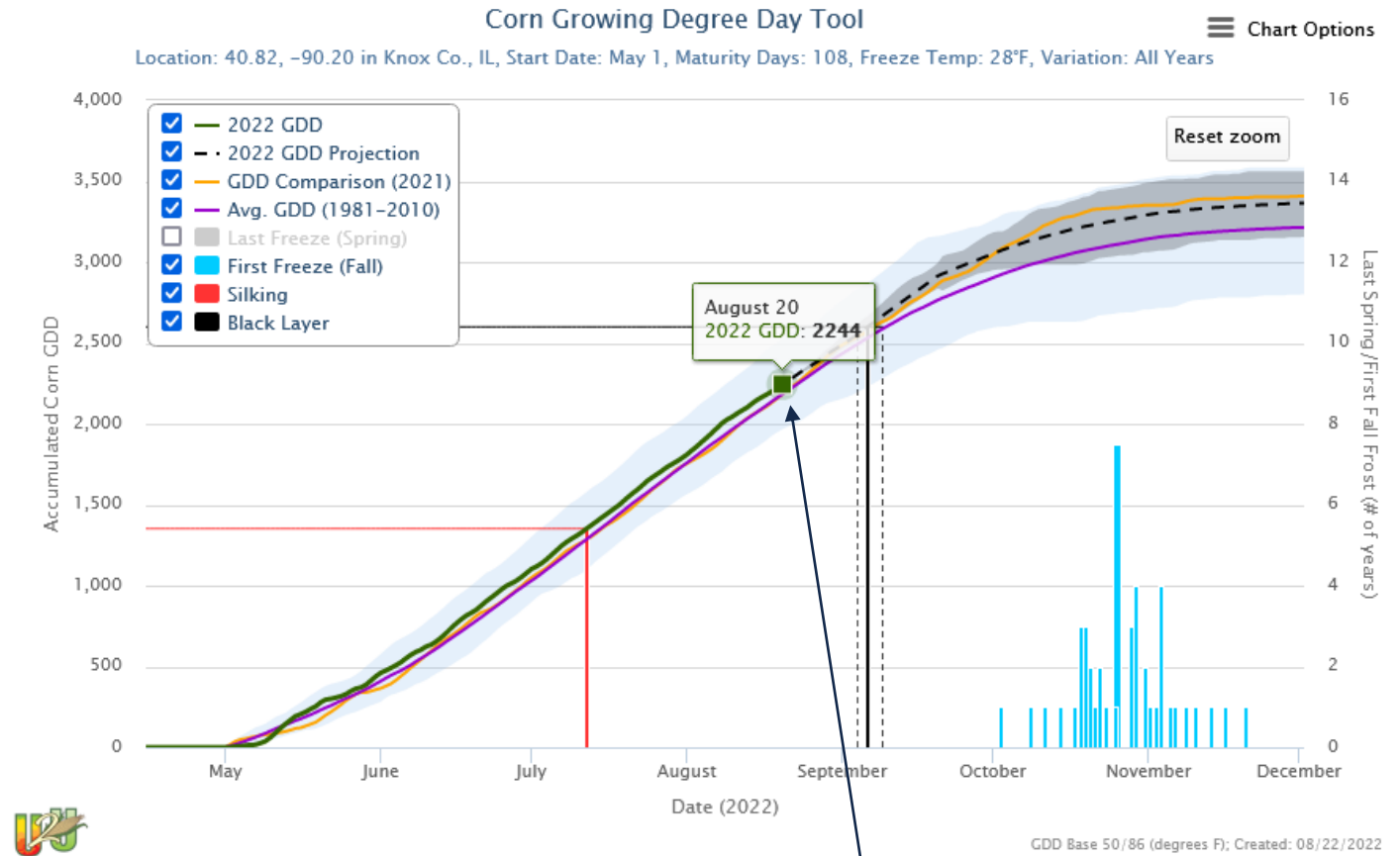
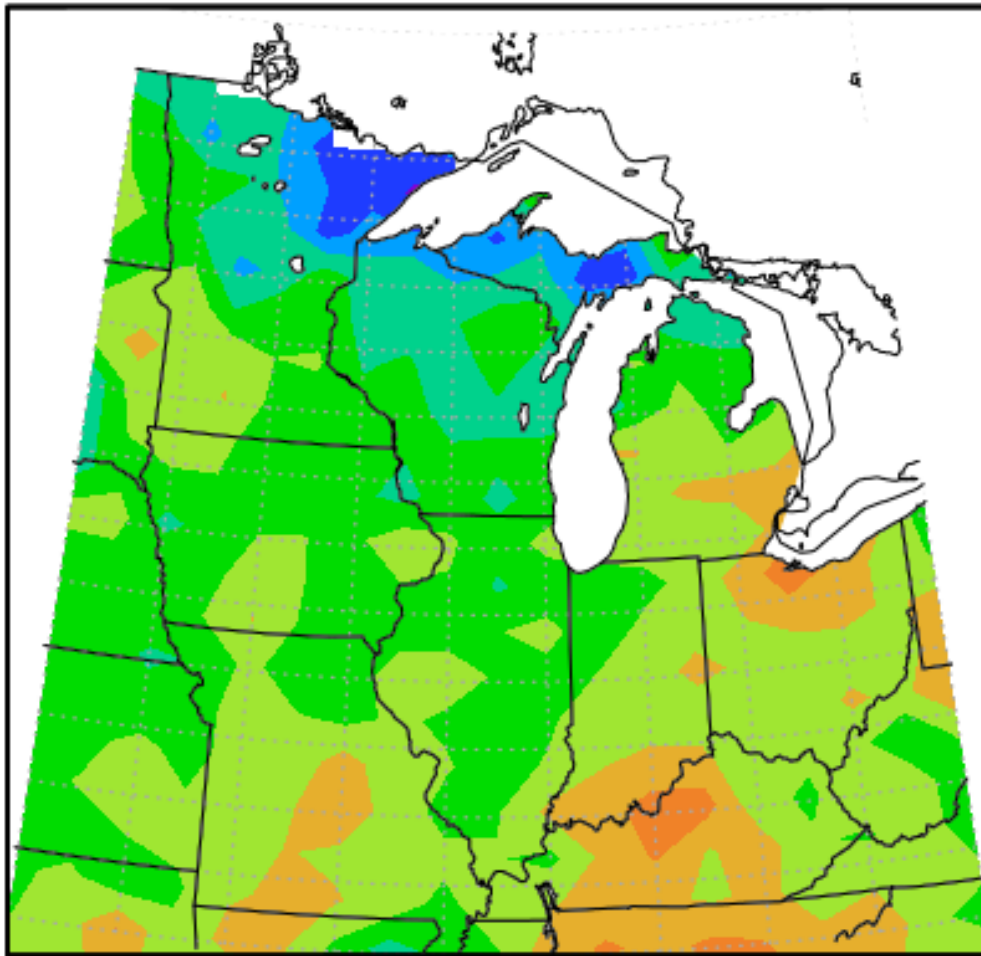
Flooding near downtown Belleville



Flood-damaged field in Edwards County.

Heat & Growing Degree Days

MGDD Departure, 5/1/2022 to 8/21/2022



Corn Growing Degree Days in Knox County

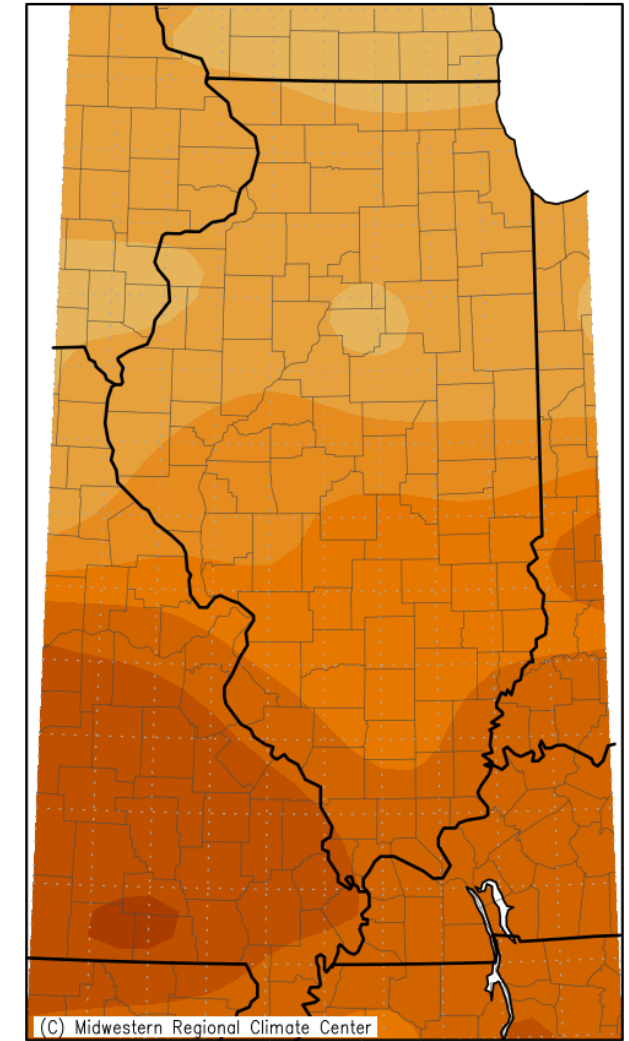
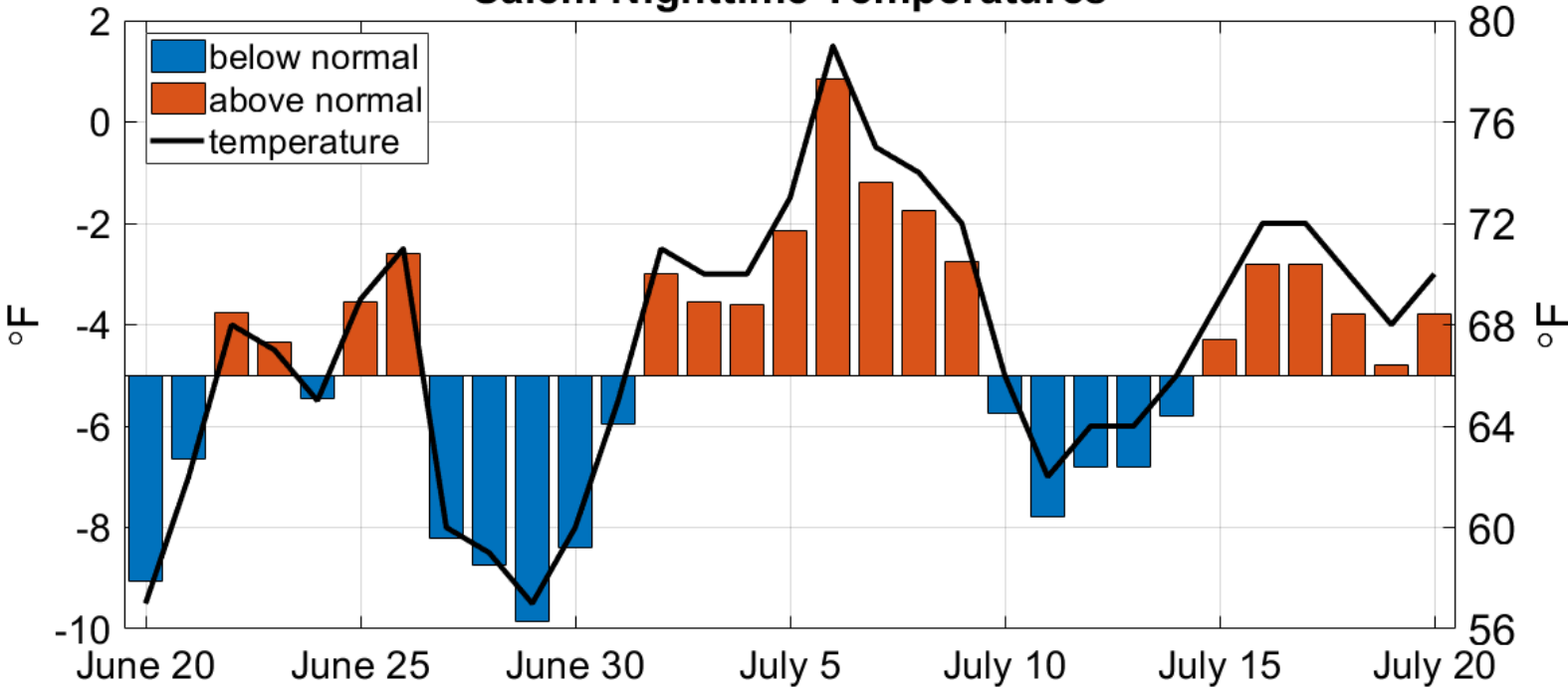


Poorly Timed Warm Nights

Nighttime Temperature Departure from Normal July 3 – 9

- Lower overall humidity than last summer
- Poorly timed heat in early July, very high nighttime temperatures
- Delayed planting shifted critical growth stages to align with heat, adding to drought stress in some areas

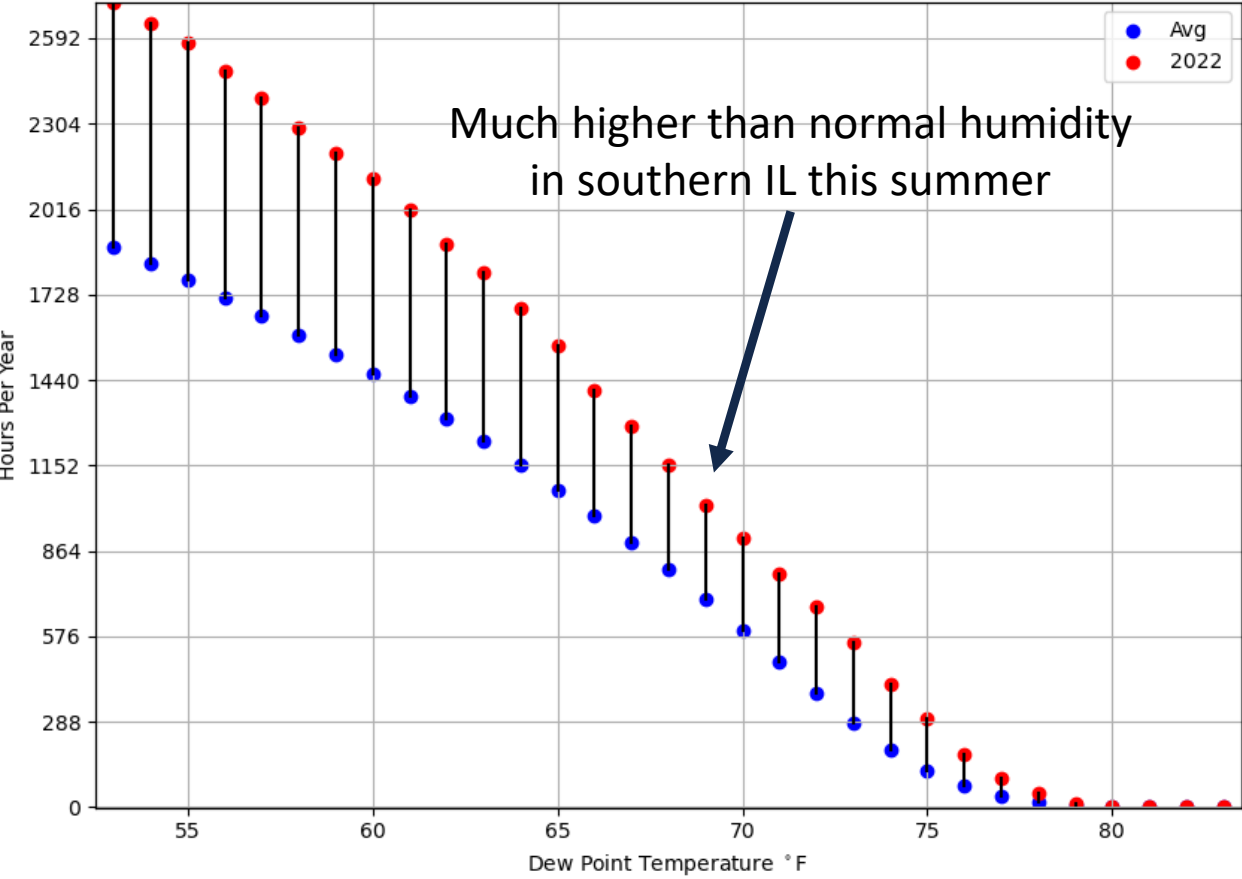
Salem Nighttime Temperatures



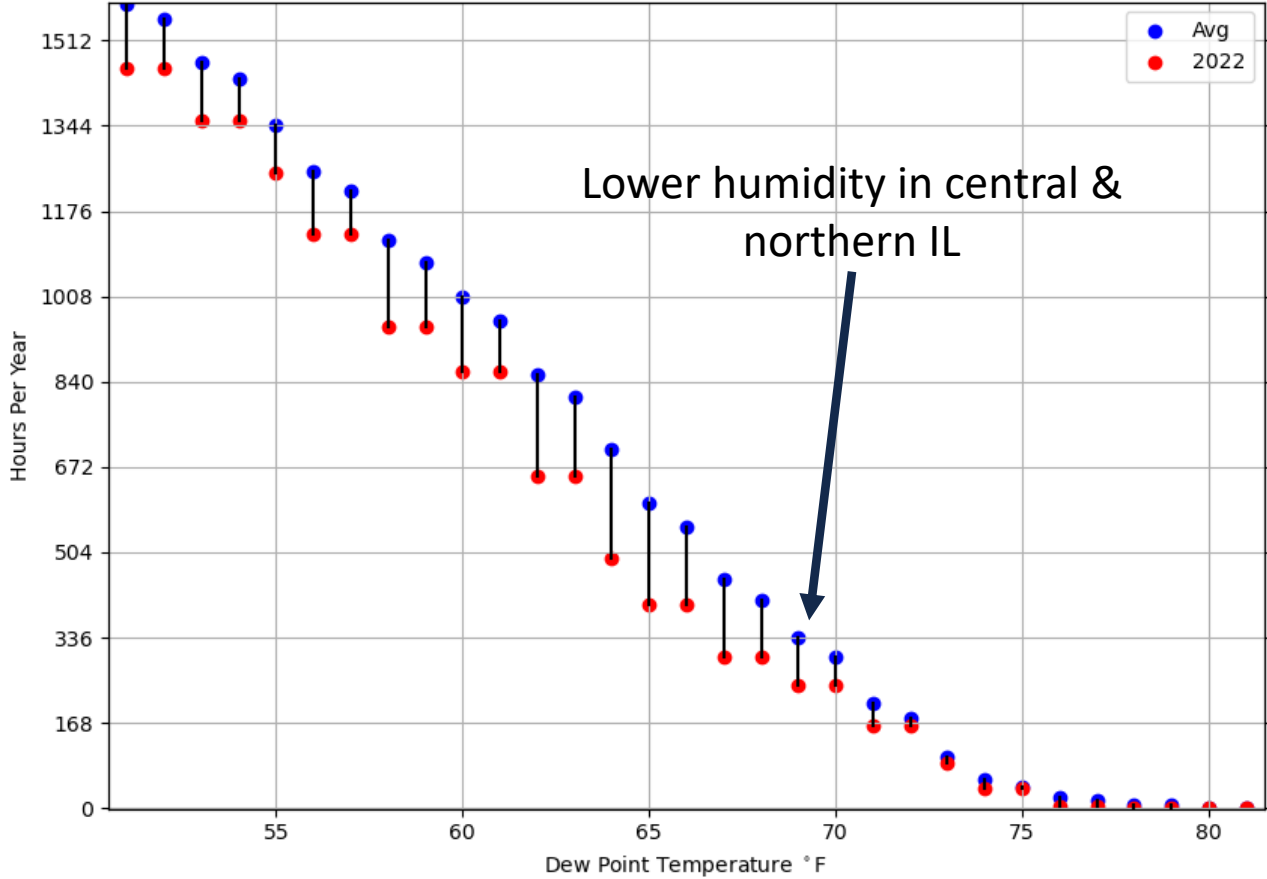
Less Humidity & Lower Disease Pressure... for some



[MDH] CARBONDALE/MURPH (1973-2022)
Dew Point Temperature Histogram (till 23 Aug)



[IKK] KANKAKEE (2001-2022)
Dew Point Temperature Histogram (till 23 Aug)

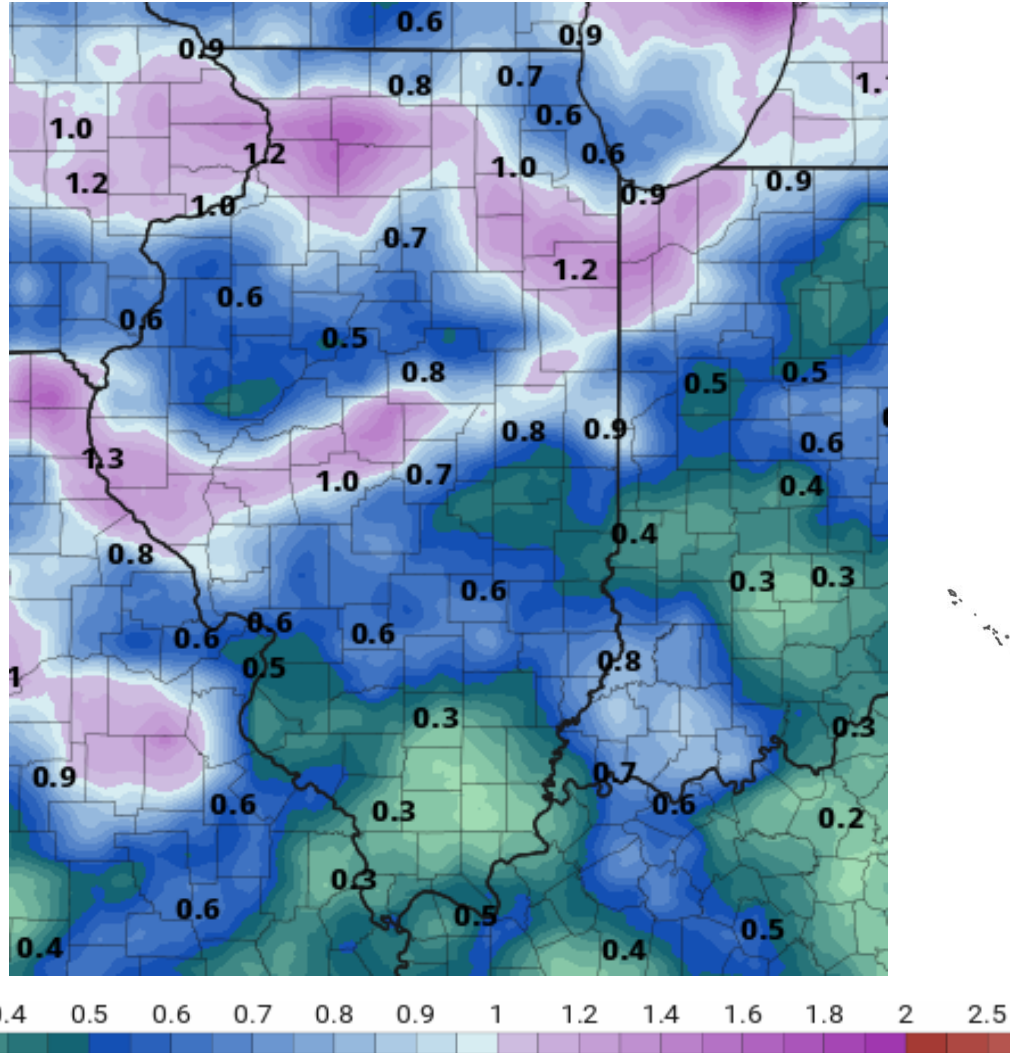


Generated at 23 Aug 2022 7:49 AM CDT in 6.62s



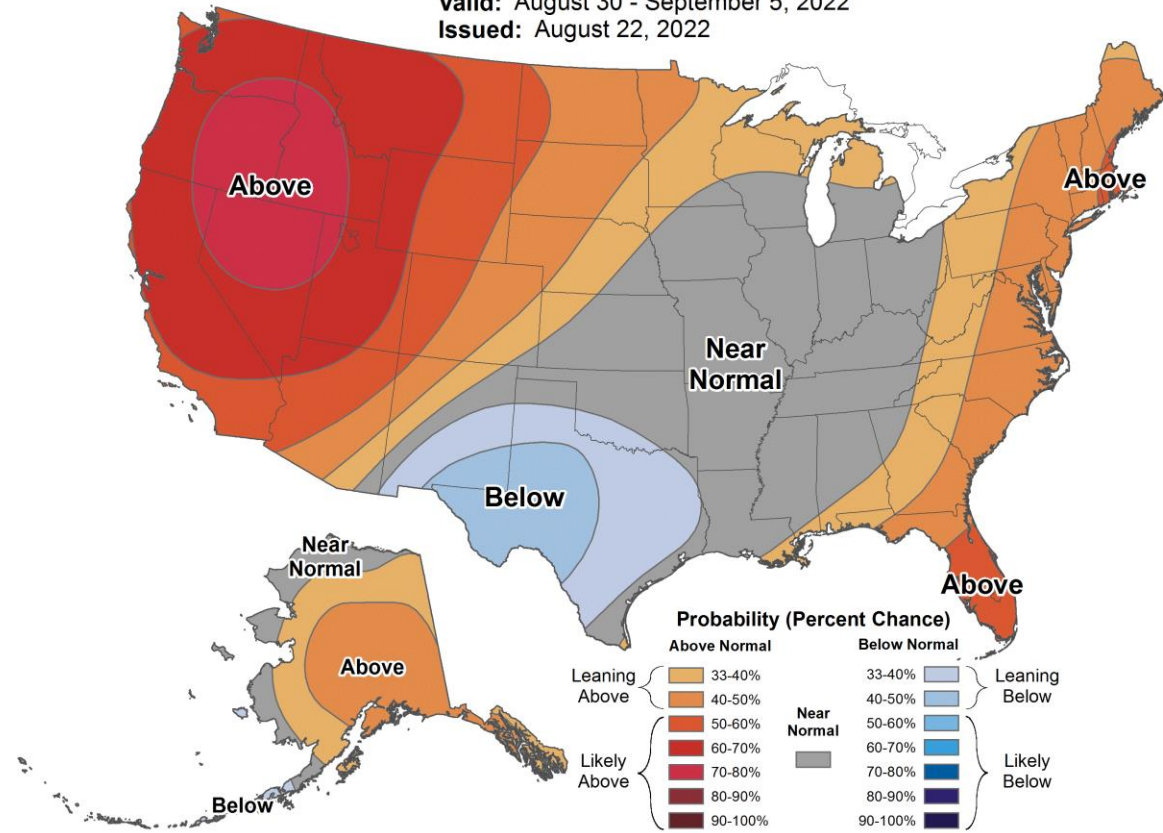
Looking Ahead – Next 2 Weeks

Mostly less than 1" over the next 7-days, very dry in southern IL again



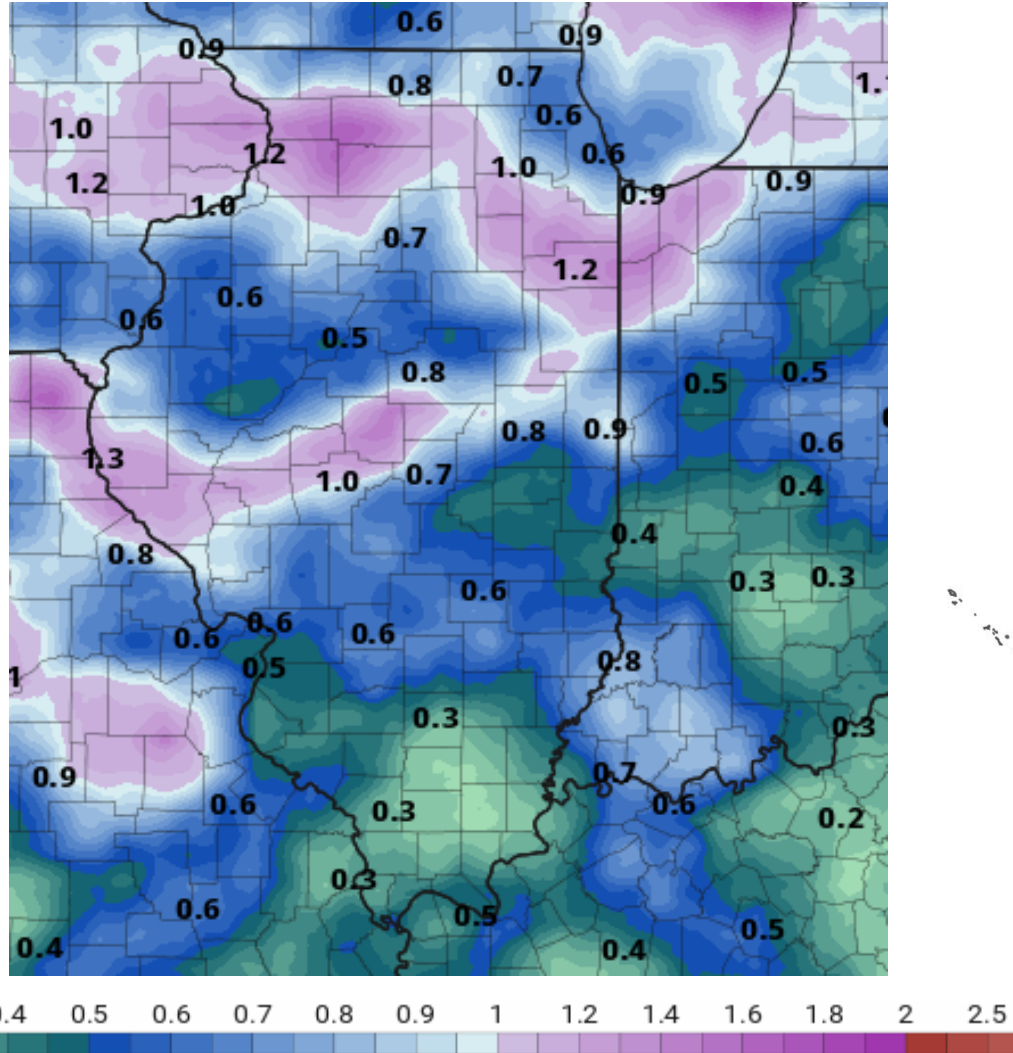
8-14 Day Temperature Outlook

Valid: August 30 - September 5, 2022
Issued: August 22, 2022



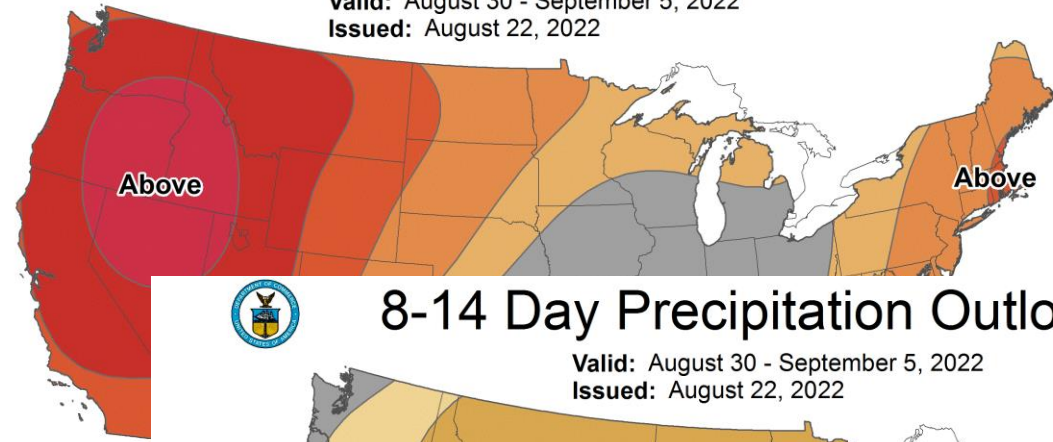
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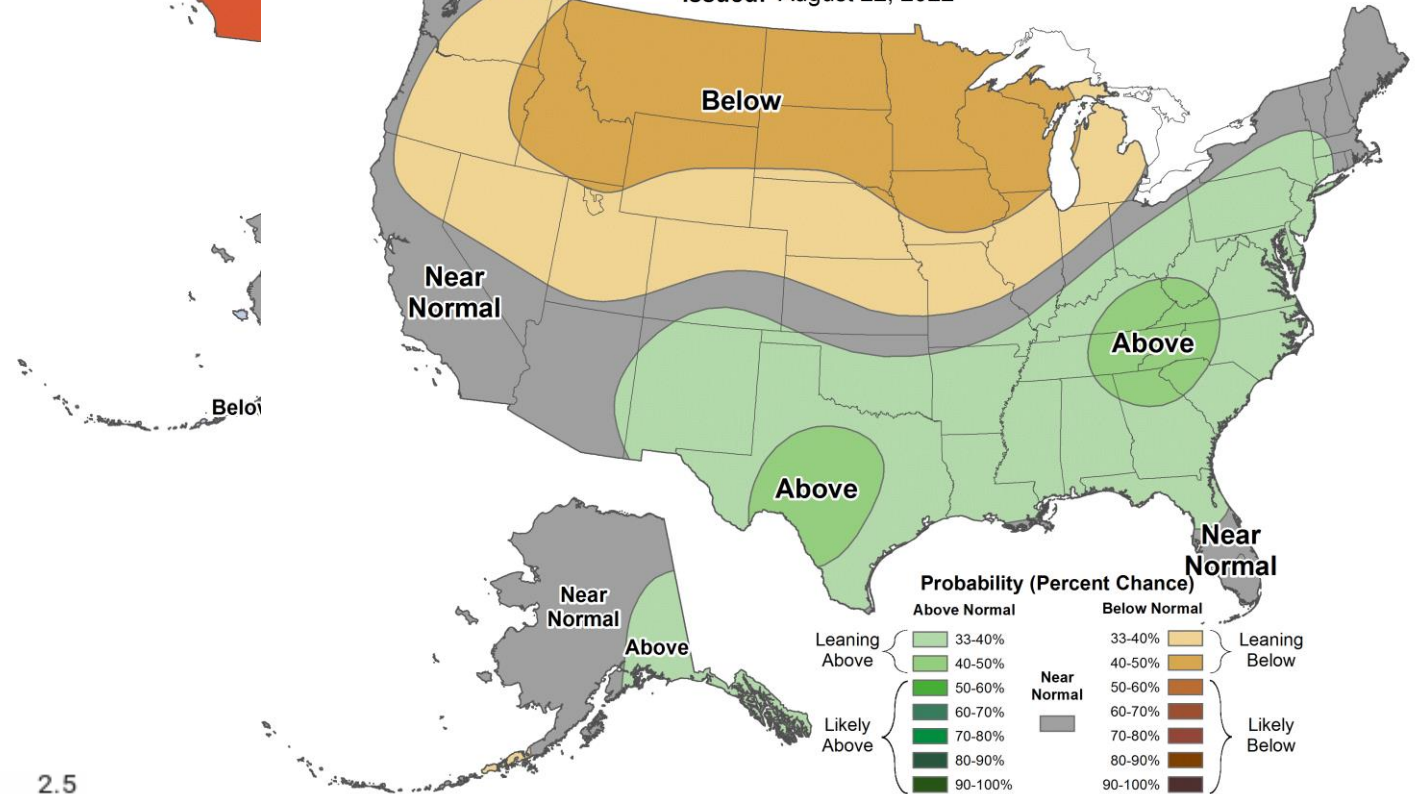
8-14 Day Temperature Outlook

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8-14 Day Precipitation Outlook

Valid: August 30 - September 5, 2022
Issued: August 22, 2022



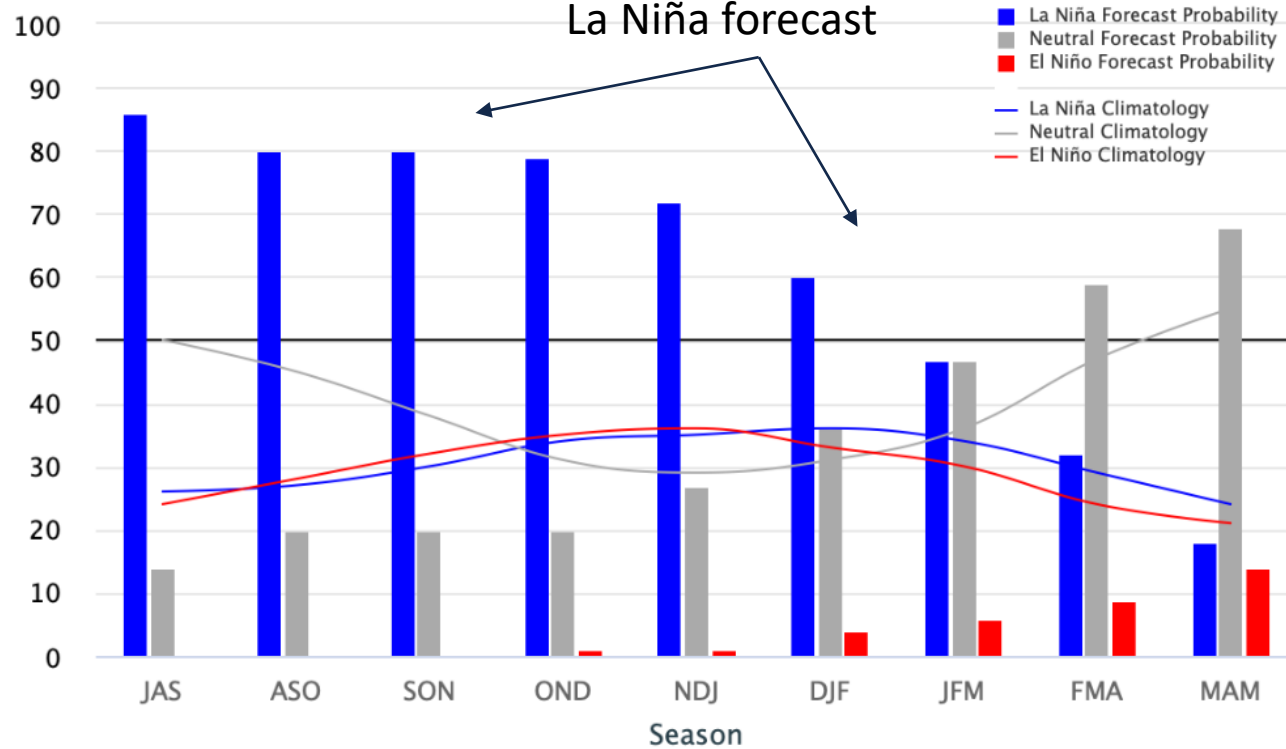
Looking Ahead – Early Fall

- Forecast of a third consecutive La Niña cold season
- Drier than normal fall outlook, wetter in winter

Early–August 2022 CPC Official Probabilistic ENSO Forecasts

ENSO state based on NINO3.4 SST Anomaly
Neutral ENSO: -0.5 °C to 0.5 °C

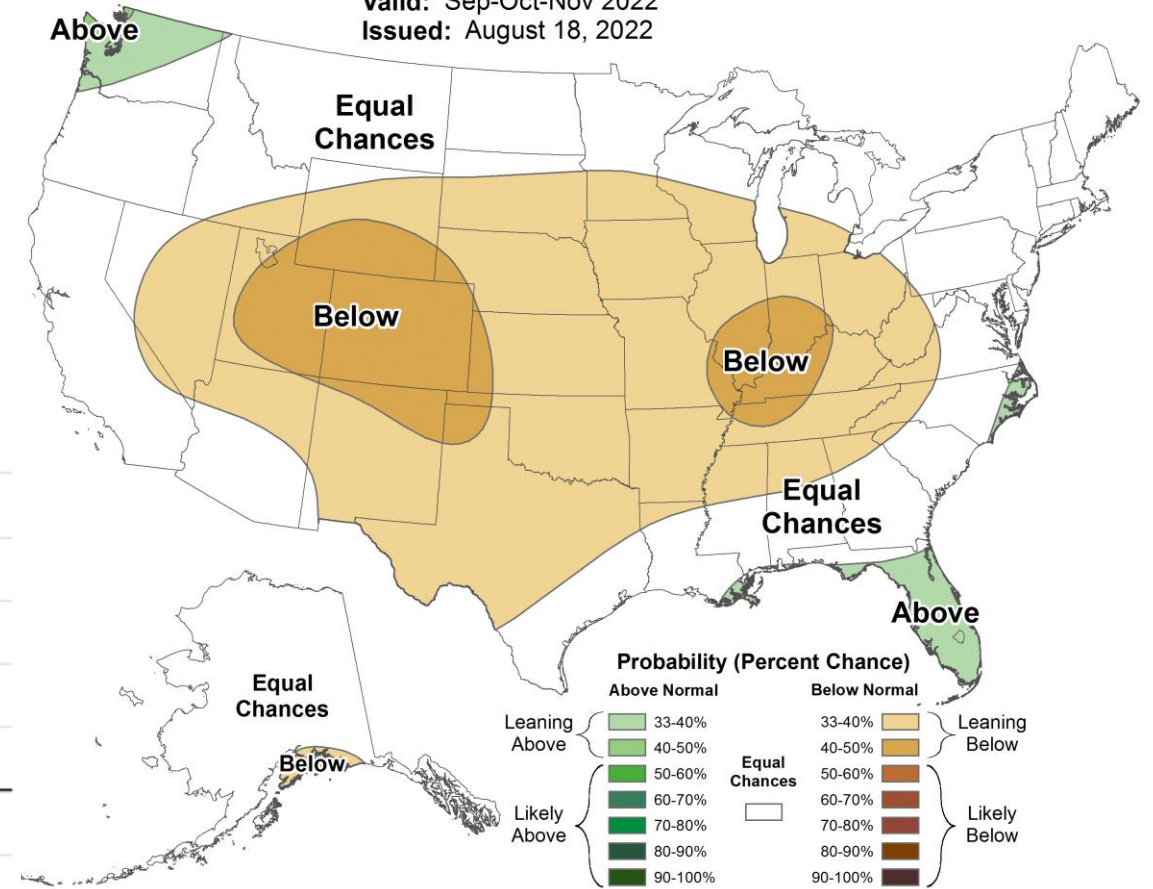
La Niña forecast



Seasonal Precipitation Outlook



Valid: Sep-Oct-Nov 2022
Issued: August 18, 2022



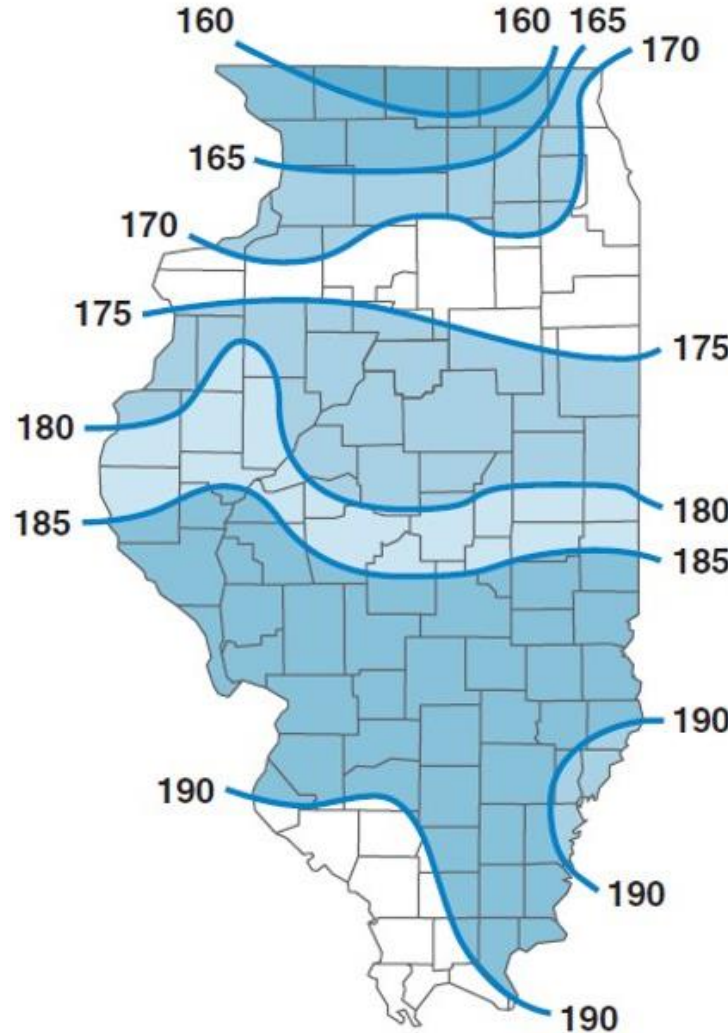
Longer-Term Trends: Longer Growing Season

- Latest 30-year average growing season is **10 to 25 days longer** than 1971-2000
- Projected growing season length increases by another **8 to 12 days** by 2050

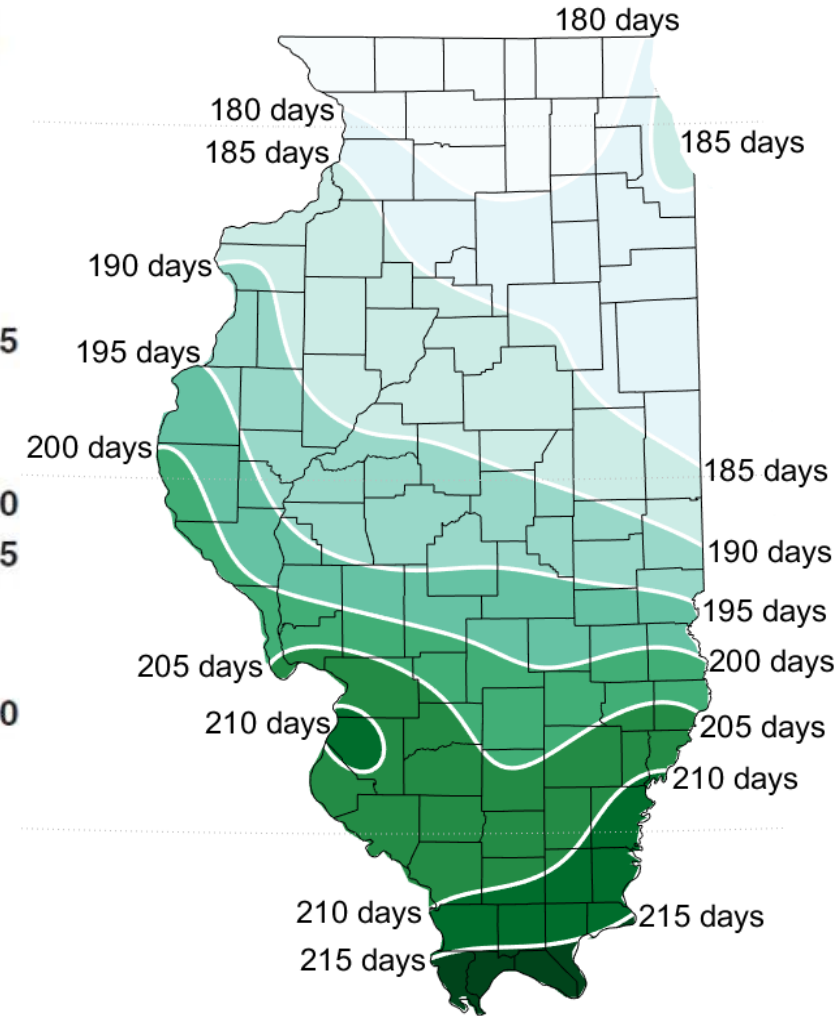
Impacts

- Lessens issues from delayed planting, emergence, etc. (e.g., 2019, 2022)
- Increased weed pressure

1971 – 2000 Average



1991 – 2020 Average

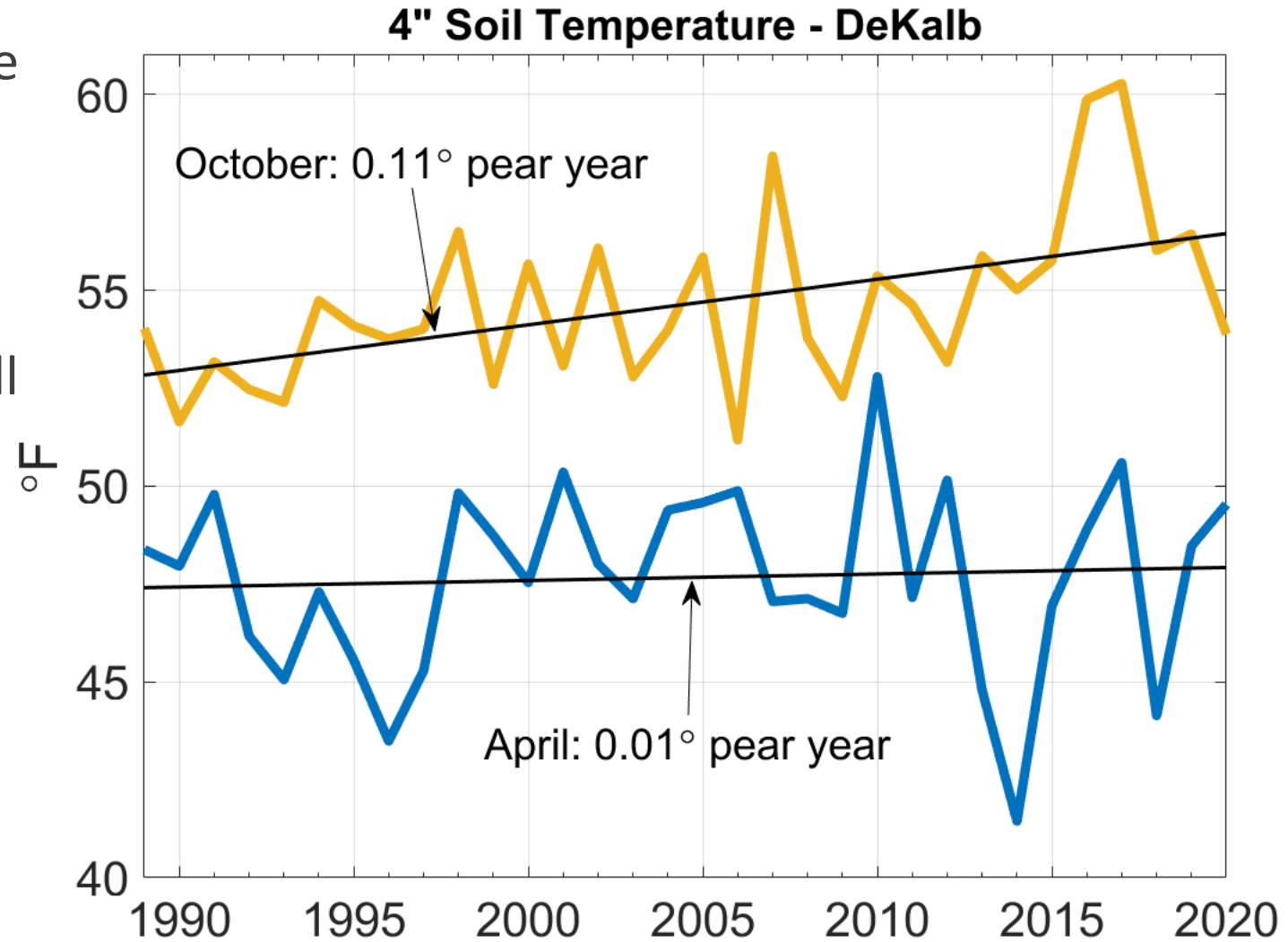


Longer-Term Trends: Warmer Soils

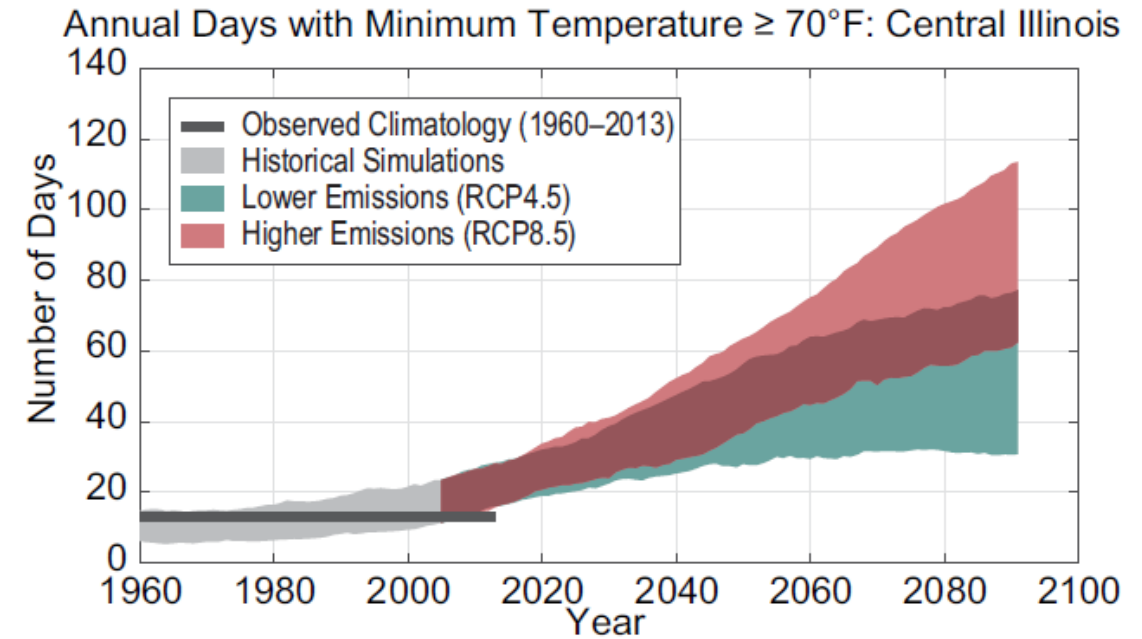
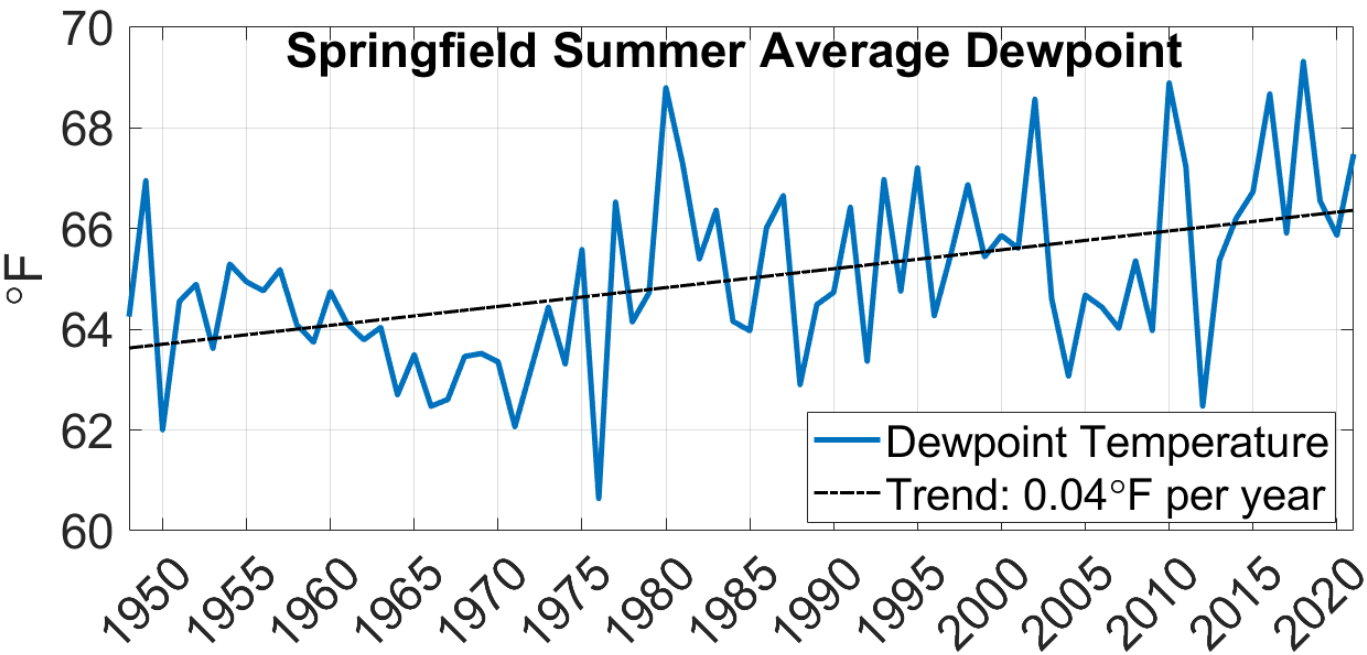
- Fall soil temps have increased over the last 30-years, much more than spring

Impacts:

- Extension of warm soils in the fall reduces window of opportunity for fall fertilizer application (e.g., 2021)
- Lack of spring soil warming has not facilitated earlier planting



Longer-Term Trends: More Humidity + Warmer Nights



Impacts

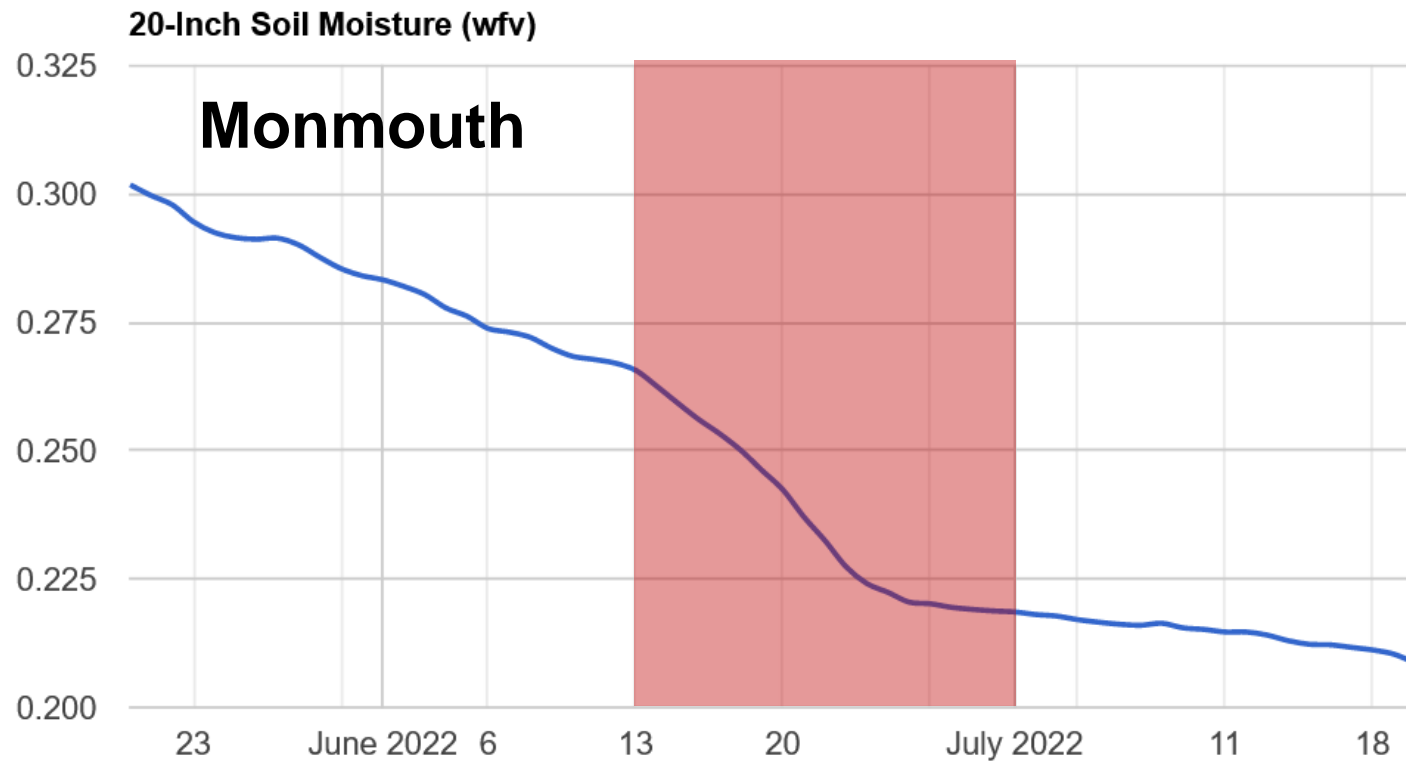
- Welcoming environment for insect and weed pests, and fungal disease (e.g., 2021)
- Risk of extreme heat/demand stress on crops during silking, reproduction, grain fill
- Higher risk of health impacts to outdoor workers

Longer-Term Trends: Poorly Timed Droughts

- More summer rainfall variability + higher temps = more hot dry spells

Impacts

- Crop stress from high evaporative demand & depleted soil moisture
- Drought stress made worse by poor soil health & water holding capacity



Tip back in Warren County field



Longer-Term Trends: Wetter Springs

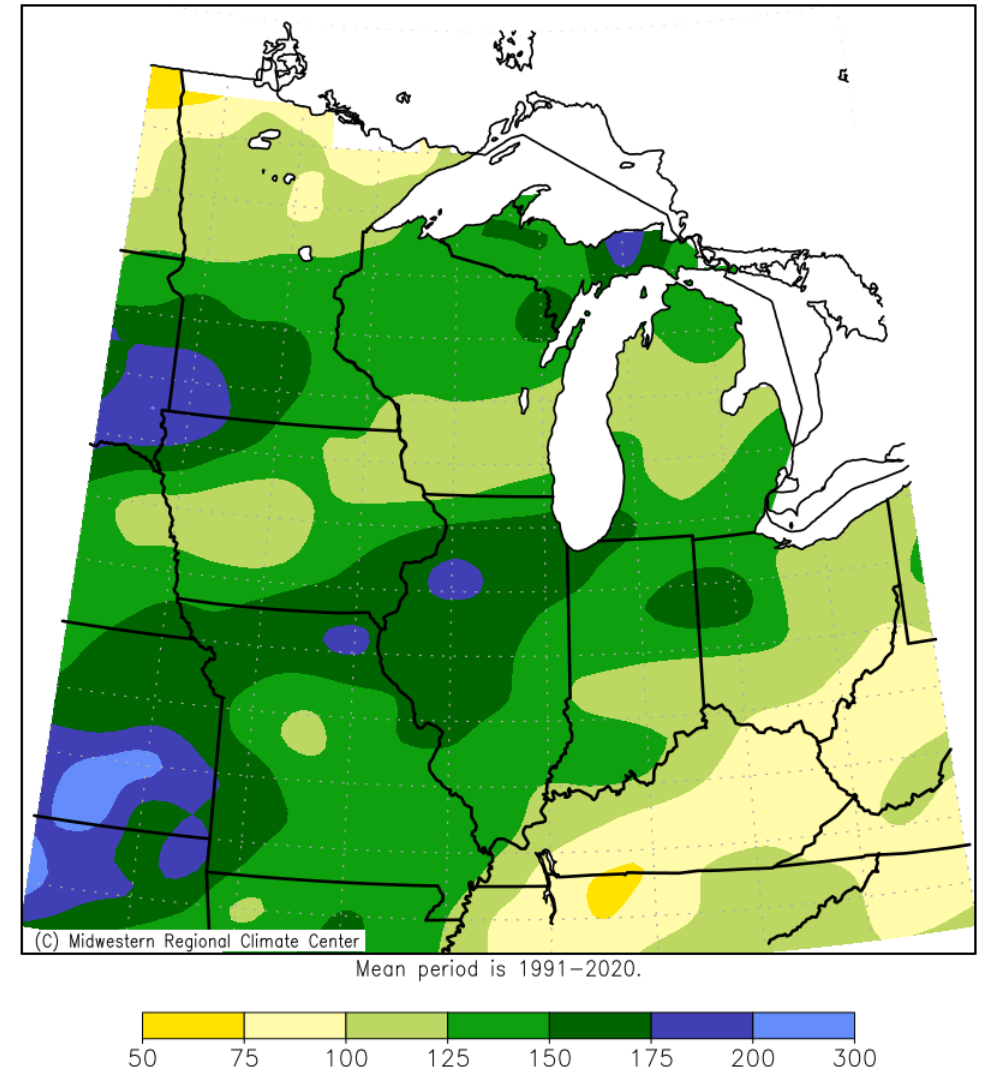
- Models expect springs like 2019 to become much more frequent in the future... 1-in-10 years by 2050

Impacts

- Spring fieldwork delays due to excessively wet soils, despite an expanded growing season (e.g., 2019, 2022)



2019 Total Spring Precipitation (% Normal)



Longer-Term Trends: Intense Summer Rainfall

- Heavy rainfall is becoming more frequent, especially in spring and summer

Impacts

- Crop inundation and standing water (e.g., 2019, 2020, 2021, 2022)
- Soil erosion
- Nutrient runoff
- Soil compaction, delayed planting/harvest



Flooded field in DeWitt County, June 2021

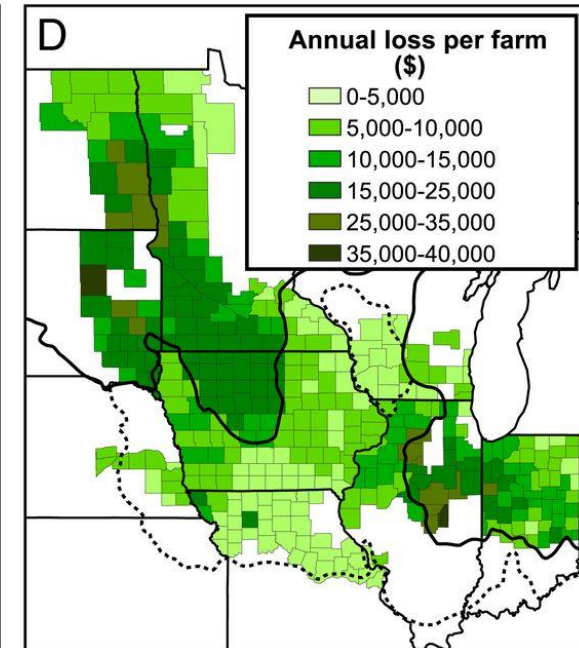
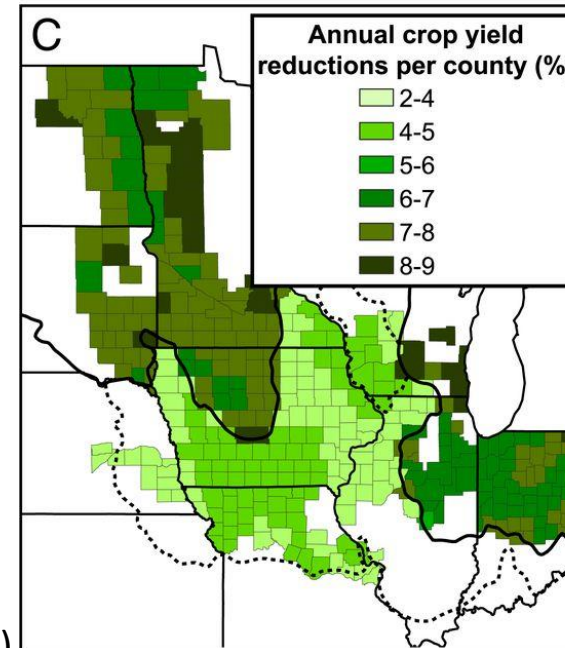
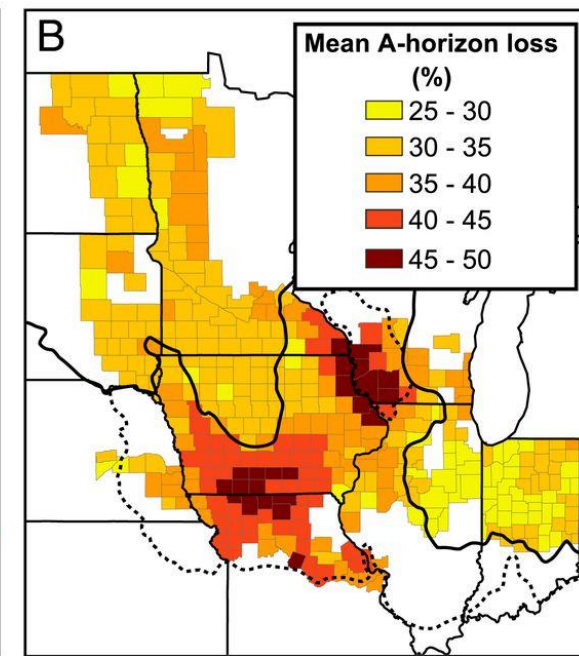
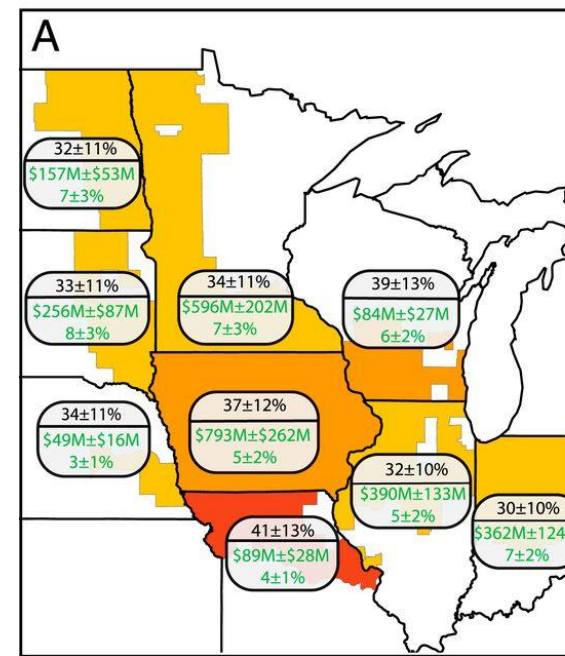
More Intense Precipitation

Event	Rainfall	2019 Estimate
June 2020, Quincy	6.85" in 4 days	10-year
July 2020, Peoria	5.80" in 6 hours	100-year
August 2020, Scott AFB	5.36" in 3 hours	125-year
June 2021, Bloomington	9.85" in 3 days	250-year
August 2021, Gibson City	> 10" in 3 hours	> 500-year
July 2022, Belleville	8" in 6 hours	500-year
July 2022, Lake Bluff	6.5" in 6 hours	100-year
August 2022, Newton	7" in 12 hours	200-year
August 2022, Freeport	11" in 2-days	500-year



Longer-Term Trends: Soil Erosion

- New estimates suggest 30 – 50% of A-horizon has been lost in the Midwest since 1800s
- Estimated annual crop losses related to soil erosion range from \$10,000 to \$40,000 per farm in Illinois
- Soil health degrades with erosion, economic losses difficult to quantify



Thaler *et al.* (2021)



Brass Tacks

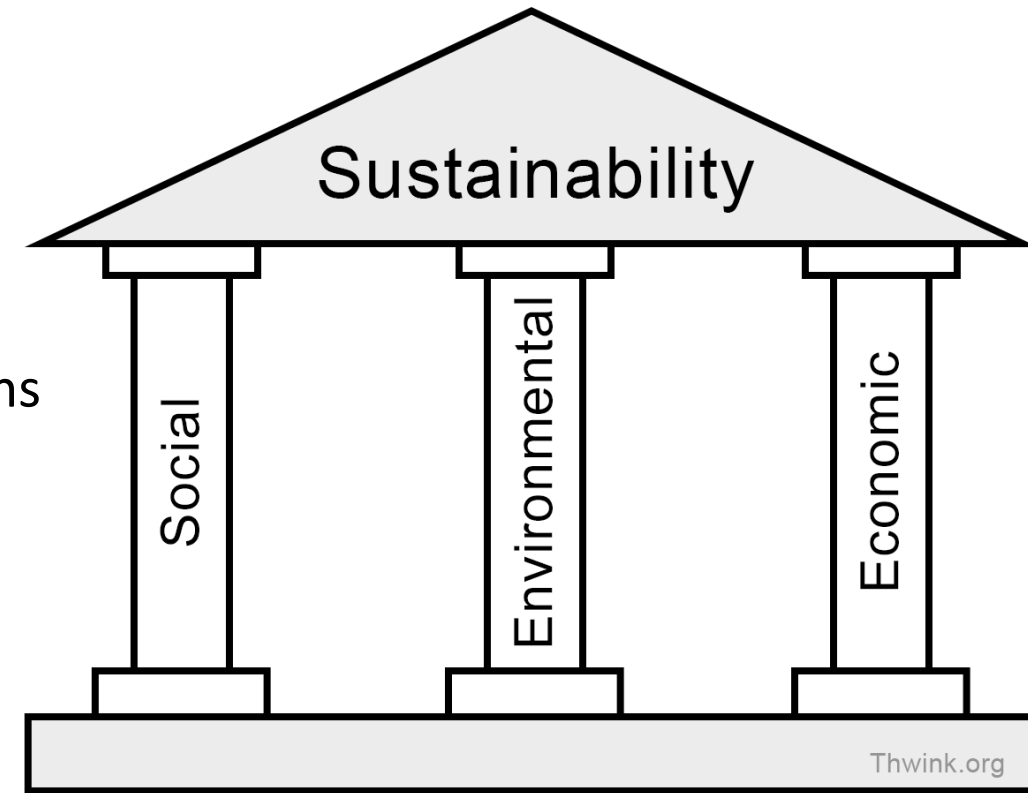
- Climate change is neither entirely destructive nor trivial to Midwest Ag... it's far more complicated
- Makes important decisions even more important
 - Pest/weed/disease management
 - Fertilizer application and timing
 - Crop and grazing rotation
 - Soil conservation practices (e.g., no/conservation tillage, cover crops)
 - Planting and harvesting
 - Marketing strategies
- Management and practice decisions need to account for weather extremes and a changing environment, just like accounting for any other challenge... “is this decision making my operation more or less vulnerable and profitable in the face of extreme weather and climate?”



Climate Resilient Agriculture

sustainable management practices that achieve long-term productivity and profitability

- Reduced, conservation, or no-till practices
- Expanded use of winter cover crops
- Integrating livestock grazing
- Incorporating small grains/forage into extended rotations
- Expanding bioenergy crops and agroforestry
- Increased use to edge of field nutrient loss reduction



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