



Midwest Climate Hub
U.S. DEPARTMENT OF AGRICULTURE

Weather/Climate Review/Outlook 2019

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Topics

- A brief Background of USDA Climate Hubs
 - The need, mission
 - More on the Midwest Climate Hub
- Current conditions
- Crop Impacts
- Outlooks
- Resources of the USDA Midwest Climate Hub
 - Website
 - For more Information

Intro to Climate Hub Work



Assessments and Syntheses

delivering relevant information

Outreach and Education

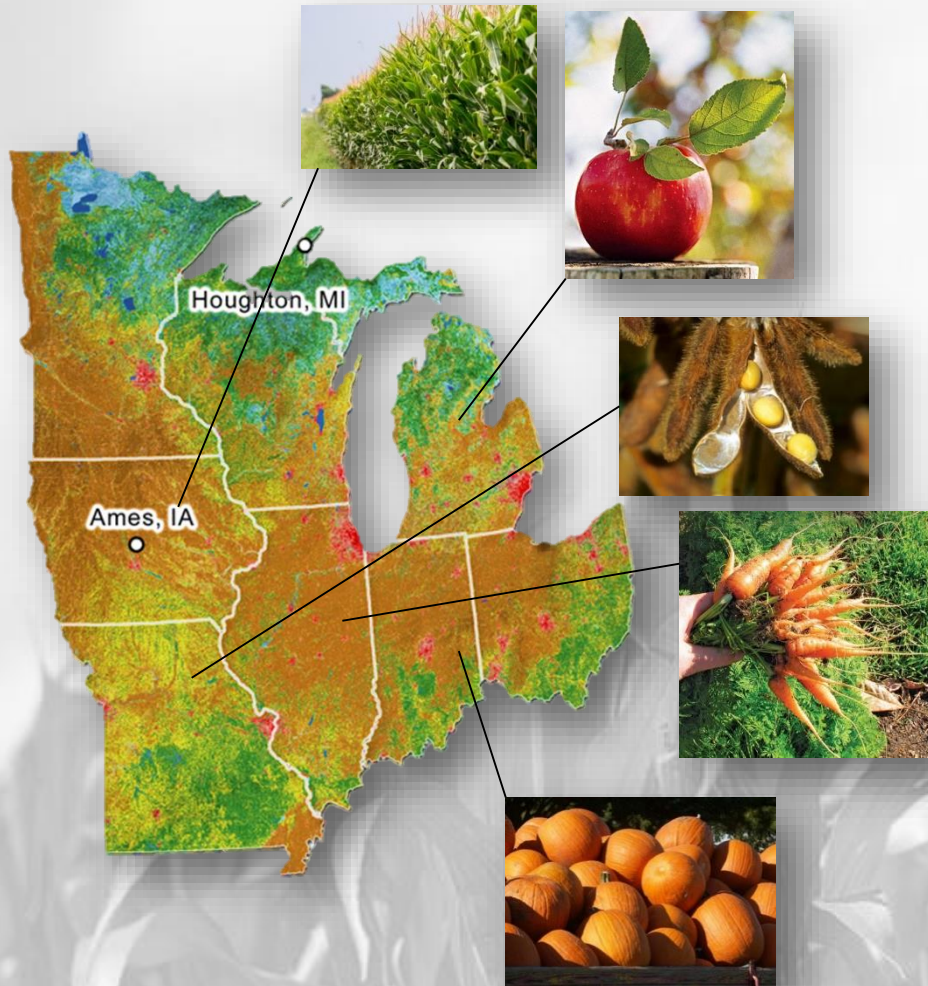
enabling climate-informed decisions

Technical Support

facilitating engagement, discovery and exchange



Here in the Midwest...



Our Goal

To provide information to help producers cope with climate change through **linkages of research, education and partnerships** in a region that represents one of the **most intense areas of agricultural production** in the world.

MCH Thematic Areas

Assessments and Syntheses

delivering relevant information



United States Department of Agriculture
National Institute of Food and Agriculture



AMERICAN
FRUIT GROWER



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



AMERICAN
**Vegetable
GROWER.**

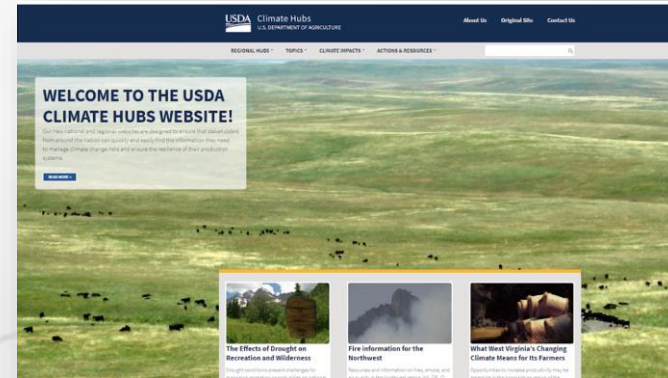
MCH Thematic Areas

Outreach and Education

enabling climate-informed decisions

MAC-T

Midwest Agriculture and Climate Team



USDA Midwest Climate Hub
U.S. DEPARTMENT OF AGRICULTURE
February 2, 2017

Midwest Ag Focus Climate Outlook

Current Conditions

The wider range of the Midwest's precipitation extremes were...
USDA Midwest Climate Hub

State	Current Conditions
Illinois	...
Indiana	...
Michigan	...
Minnesota	...
Ohio	...
Wisconsin	...

Michigan Ag Focus Climate Outlook
June 21, 2018

Drought Concerns Linger With Above-Normal Temperatures

- Recent rainfall has eased some immediate drought concerns. However, warmth and existing drought conditions will continue to pose potential problems for the region.
- Above-normal temperatures are likely to return in mid-summer, causing potential stress on crops during critical crop growth stages.

Current Conditions

- Searing extreme and consistently warm temperatures since early May over much of the central U.S. have exacerbated drought, and increased concerns for drought worsening across the area.
- The persistent above-normal temperatures have increased evapotranspiration for a broad area of the central U.S., resulting in reduced soil moisture and crop stress.
- The warm temperatures have been coupled with very dry conditions throughout much of the region. Over the last 30 days, rainfall has only been 10-75% of normal in several areas across the North Central U.S. (Figure 3).
- Recent additional rains have eased some near-term drought issues, however some areas in drought did not receive significant rainfall.

Drought Status Update
National Integrated Drought Information System
June 21, 2018

MIDWEST & NORTHERN PLAINS

Drought Concerns Linger With Above-Normal Temperatures

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Current Conditions

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- The persistent above-normal temperatures have increased evapotranspiration for a broad area of the central U.S., resulting in reduced soil moisture and crop stress.
- The warm temperatures have been coupled with very dry conditions throughout much of the region. Over the last 30 days, rainfall has only been 10-75% of normal in several areas across the North Central U.S. (Figure 3).
- Recent additional rains have eased some near-term drought issues, however some areas in drought did not receive significant rainfall.

Midwest and Great Plains Climate & Drought Outlook
16 August 2018

Im Angel
Illinois State Climatologist, University of Illinois
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Quarterly Climate Impacts and Outlook
Great Lakes Region
June 2018

Great Lakes Significant Events - for March - May 2018

Several strong weather events brought late season snow and damaging winds to much of the eastern portion of the basin. In April, an explosive low over the Great Lakes region brought the heaviest snowfall in over a decade to the region, with totals reaching 10-15 inches in some areas. This was followed by a period of above-normal temperatures and heavy rain in May, which helped to melt the snow and led to increased runoff into the lakes.

Regional Climate Overview - for March - May 2018

Precipitation and Temperature

Month	Temperature (°F)	Precipitation (in)
March
April
May

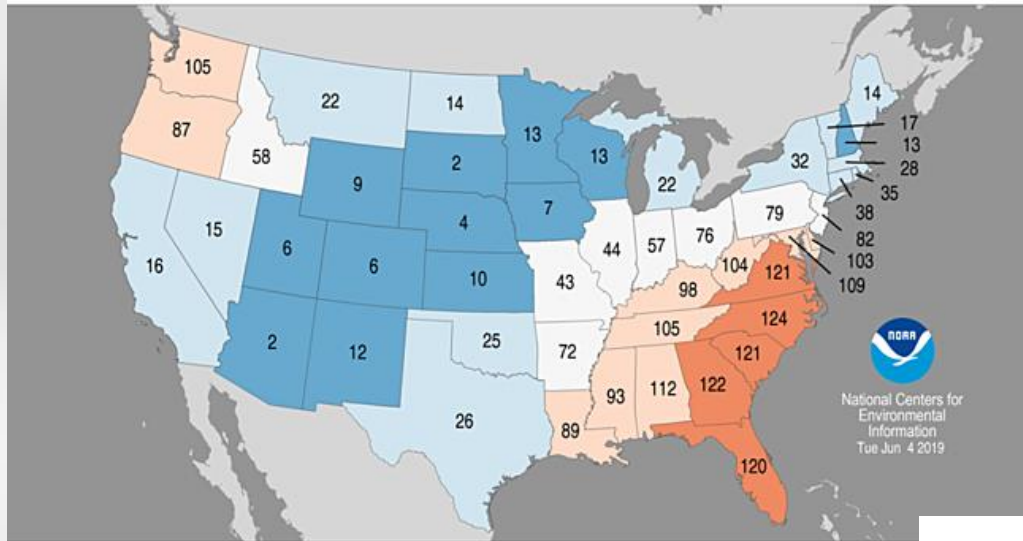
Great Lakes Water Levels

Lake	Current Level (ft)	Change (ft)
Superior
Michigan
St. Clair
St. Lawrence
Ontario
Erie
Huron
St. Mary
Ontario

Statewide Maximum Temperature Ranks

May 2019

Period: 1895–2019



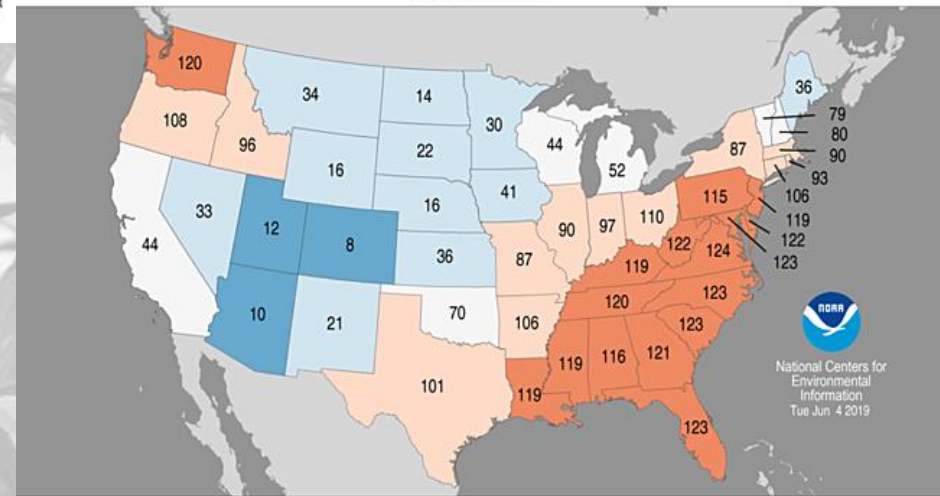
May

Temperature

Statewide Minimum Temperature Ranks

May 2019

Period: 1895–2019



- May temperatures mostly colder than average. Signal more in the max temps.
- Top 10 coldest average highs central/western US.
- Warmer minimums eastern US

Statewide Maximum Temperature Ranks

May 2019

Period: 1895-2019

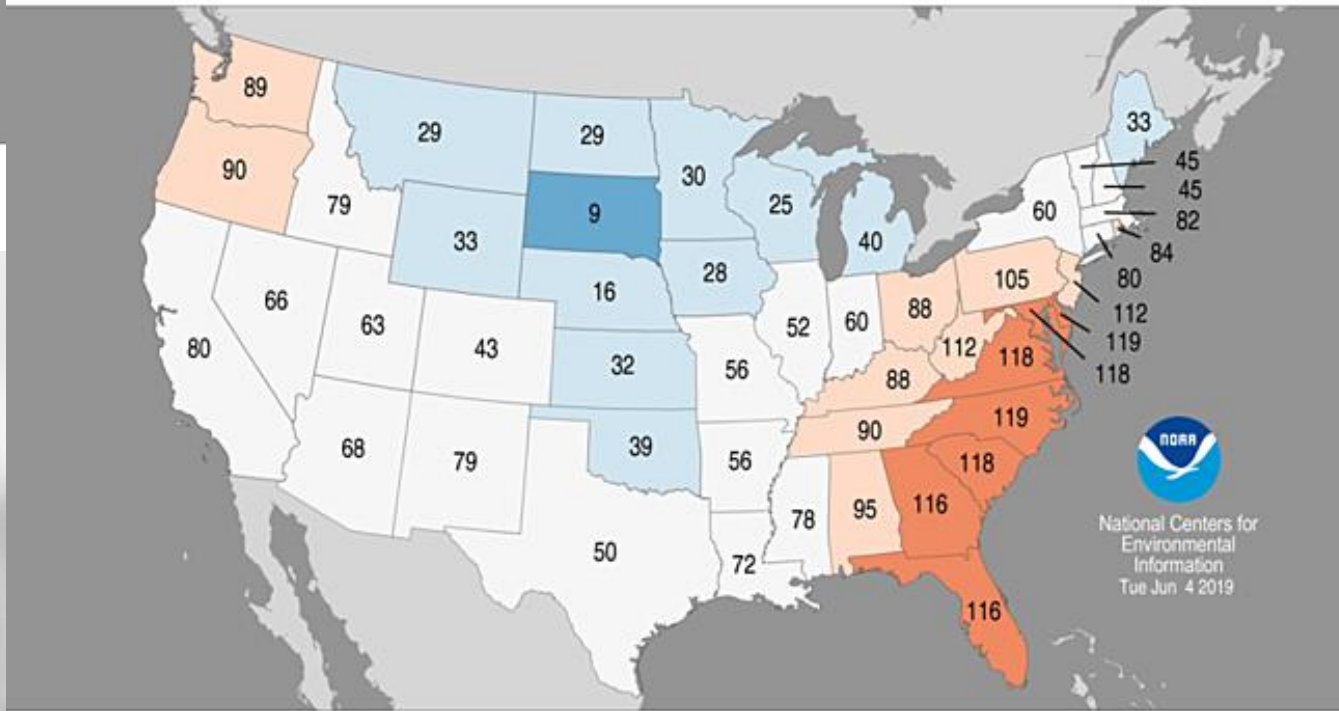


Spring Temperature

Statewide Average Temperature Ranks

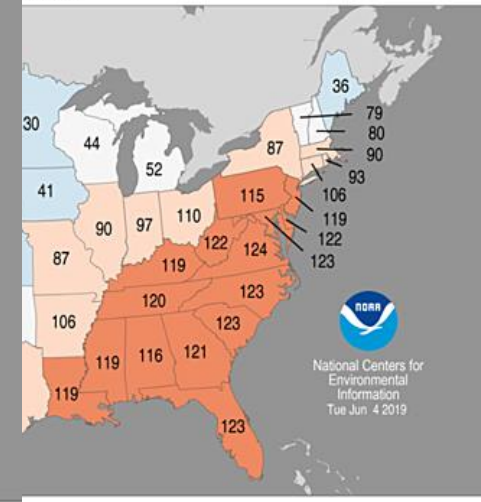
March-May 2019

Period: 1895-2019



Temperature Ranks

May 2019
Period: 1895-2019



Record Coldest
(1)

Much Below Average

Below Average

Near Average

Above Average

Much Above Average

Record Warmest
(125)

Near Average

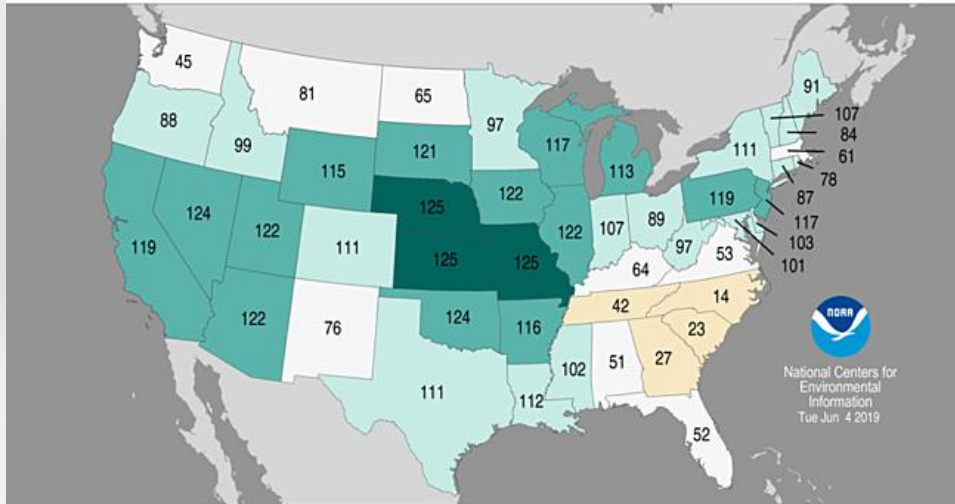
Above Average

Much Above Average

Record Warmest
(125)

Statewide Precipitation Ranks

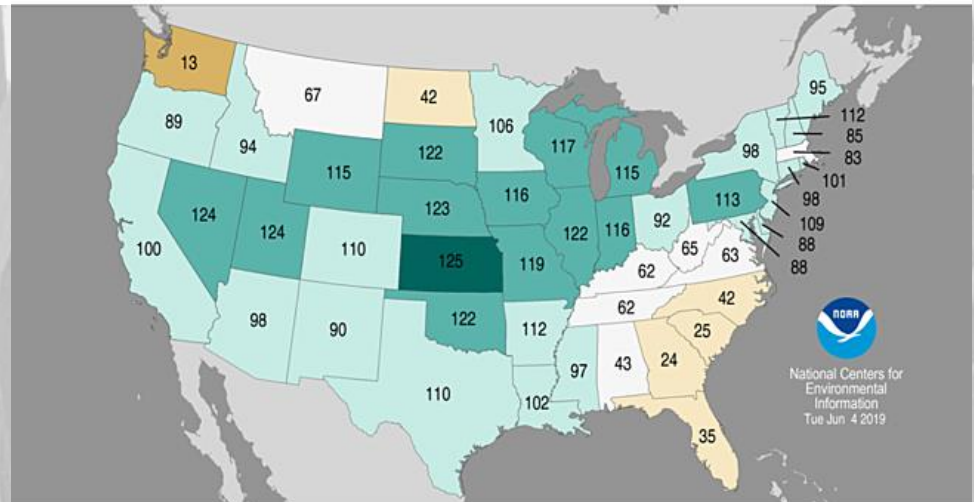
May 2019
Period: 1895–2019



May/Spring Precipitation

Statewide Precipitation Ranks

March–May 2019
Period: 1895–2019

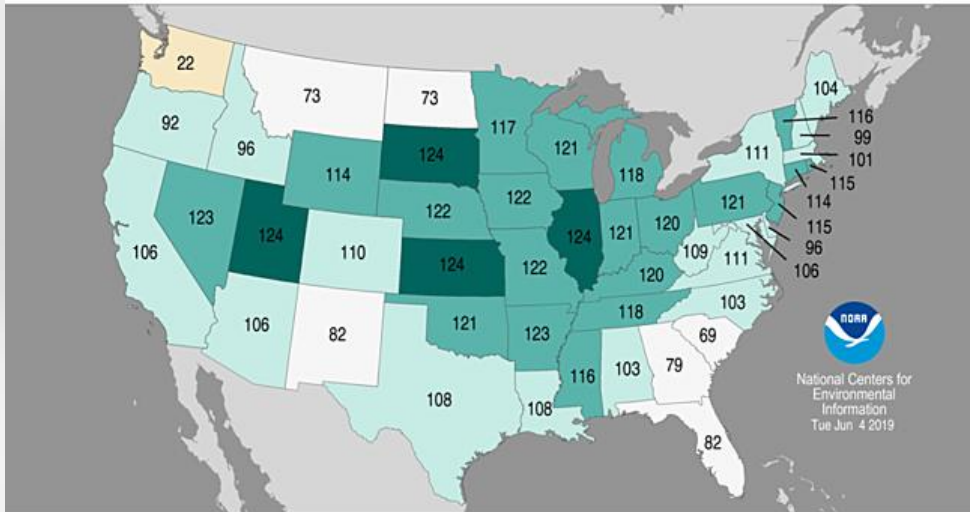


- May and spring precipitation well above average through middle US
- Top 10 and wettest all time for a few states at these time scales

Statewide Precipitation Ranks

December 2018–May 2019

Period: 1895–2019

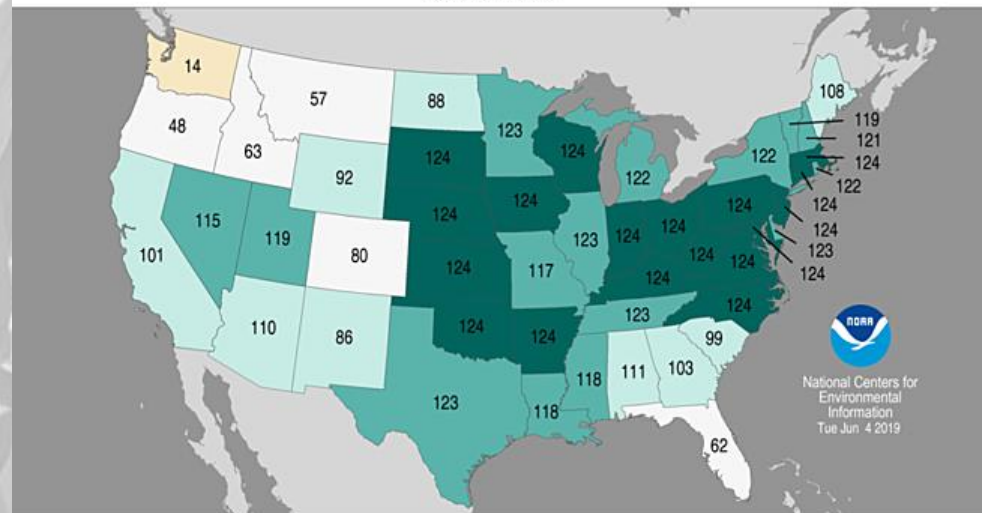


6/12 Month Precipitation

Statewide Precipitation Ranks

June 2018–May 2019

Period: 1895–2019

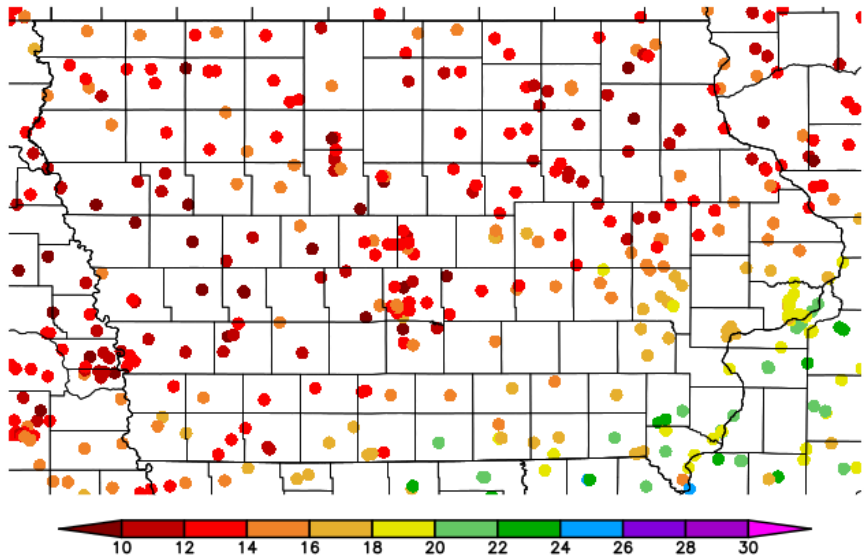


- Extended period of wetness back to a year.
- Top 10/record wettest in states back to a year.
- Wetness problems are long term issues.
- Iowa wettest June-May period on record (124 years)

<https://www.ncdc.noaa.gov/temp-and-precip/us-maps/>

90 Day Precip. Total/% Avg.

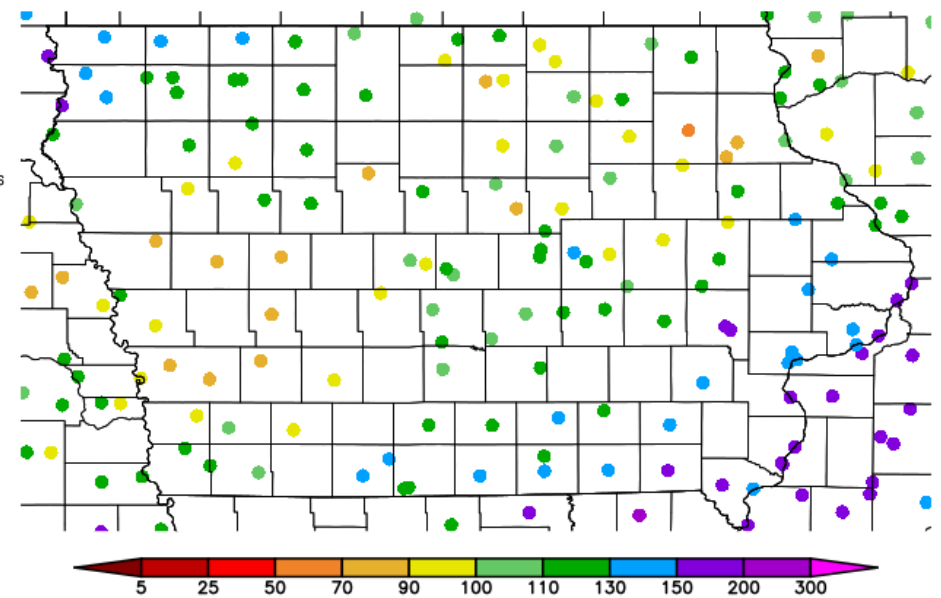
Precipitation (in)
3/25/2019 - 6/22/2019



Generated 6/23/2019 at HPRCC using provisional data. NOAA Regional Climate Centers

10-22" last 90 days. West central to north – pockets less than 70% average. Around 150% SE.

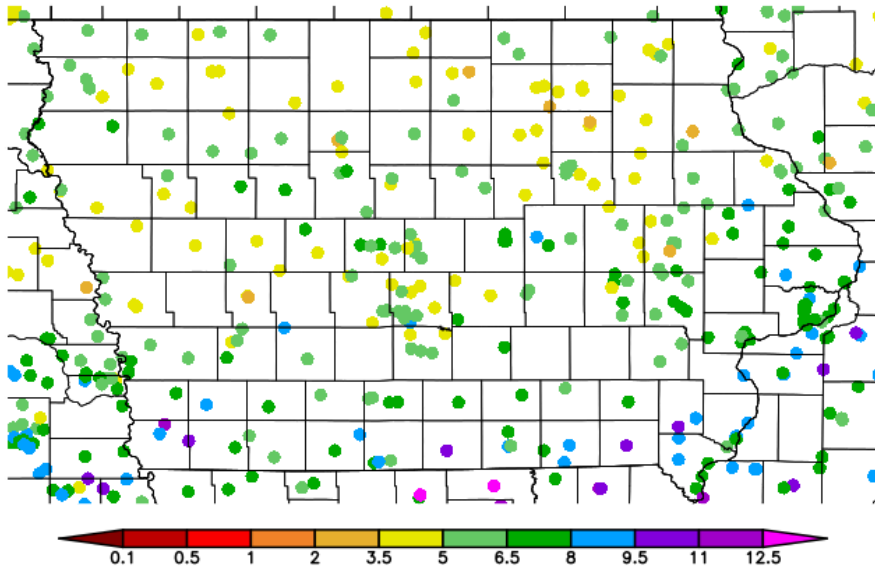
Percent of Normal Precipitation (%)
3/25/2019 - 6/22/2019



Generated 6/23/2019 at HPRCC using provisional data. NOAA Regional Climate Centers

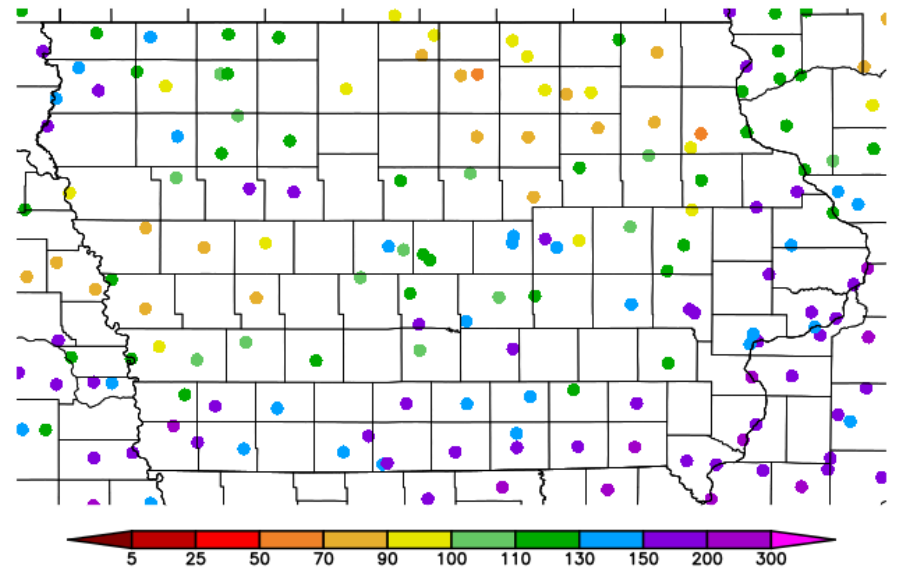
30 Day Precip. Total/% Avg.

Precipitation (in)
5/24/2019 - 6/22/2019



Totals less than 5" across northern IA to near 11" in the SE and SW. 150-200% of average in the south and far NW. Pockets below 70% avg. WC and NE.

Percent of Normal Precipitation (%)
5/24/2019 - 6/22/2019



Generated 6/23/2019 at HPRCC using provisional data.

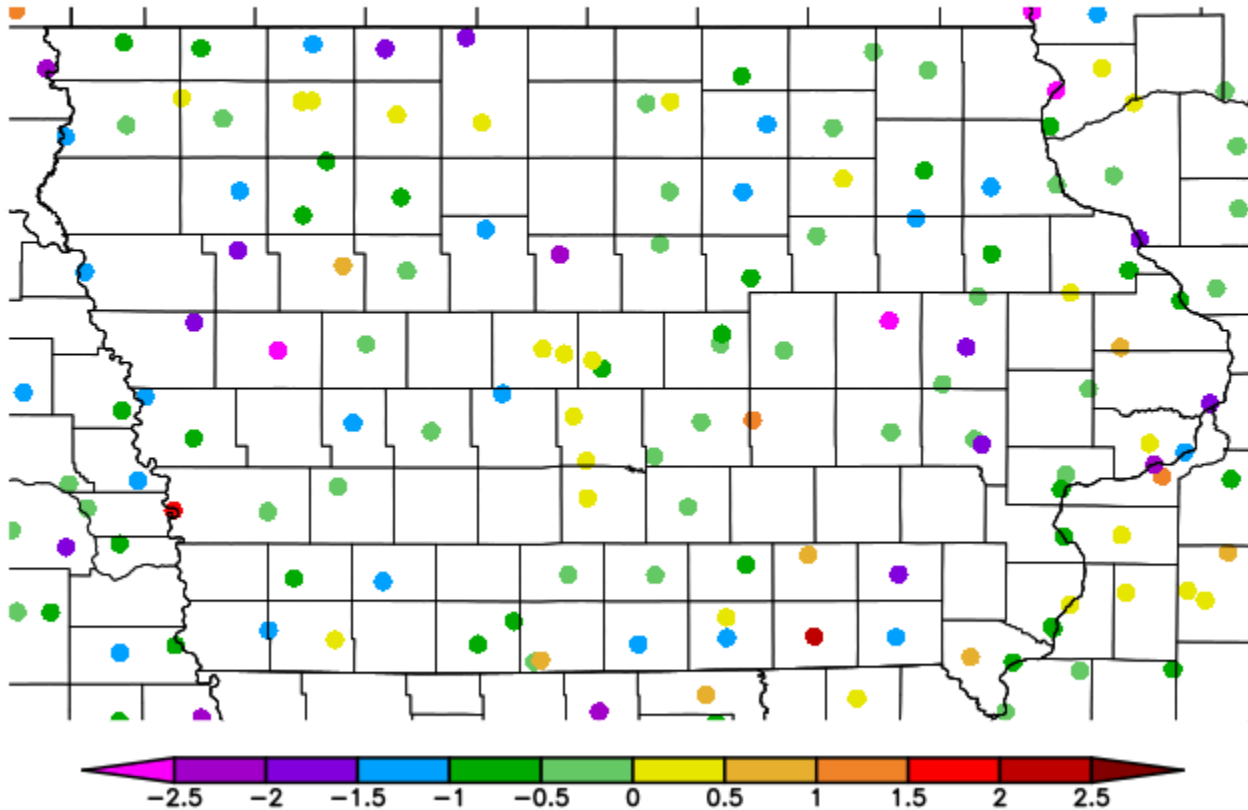
NOAA Regional Climate Centers

Generated 6/23/2019 at HPRCC using provisional data.

NOAA Regional Climate Centers

30 Day Temperatures

Departure from Normal Temperature (F)
5/24/2019 – 6/22/2019



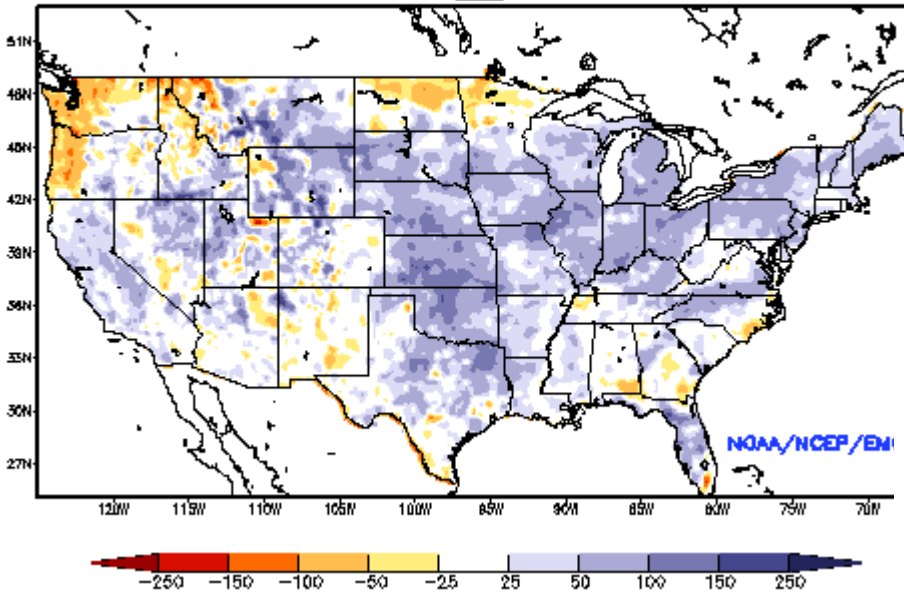
Close to average (+/- 1 F)
for much of the state.
Mostly slightly below avg.

Generated 6/23/2019 at HPRCC using provisional data.

NOAA Regional Climate Centers

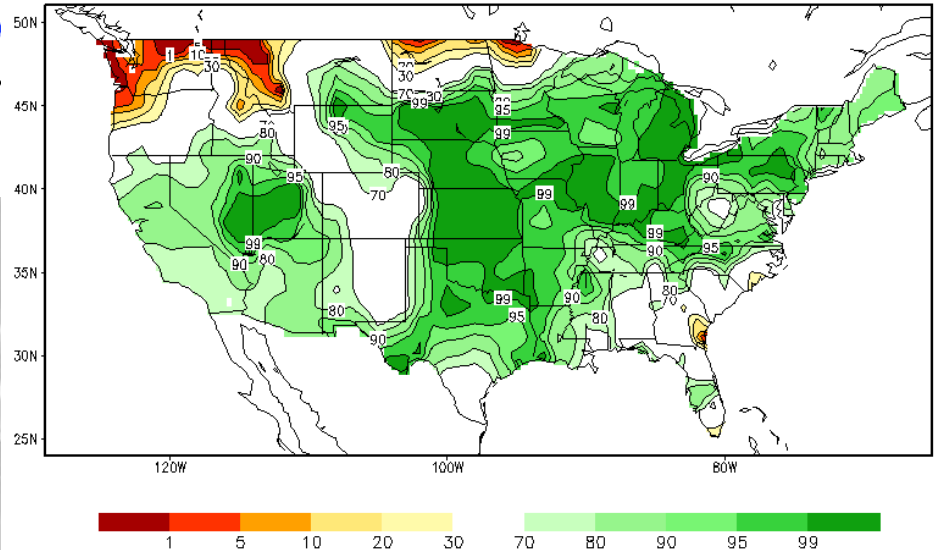
Soil Moisture

Ensemble-Mean - Current Total Column Soil Moisture Anomaly (mm)
NCEP NLDAS Products Valid: JUN 21, 2019



Soil moisture several inches above average – 95th percentile (basically still very wet)

Calculated Soil Moisture Ranking Percentile
JUN 24, 2019



<https://www.emc.ncep.noaa.gov/mmb/nldas/drought/>

https://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml

US Drought Monitor

U.S. Drought Monitor North Central

June 18, 2019

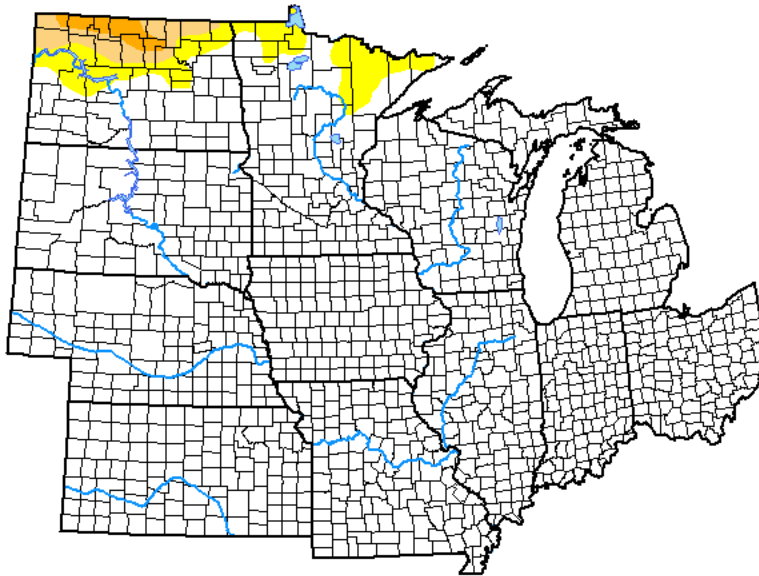
(Released Thursday, Jun. 20, 2019)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	94.22	5.78	2.00	0.63	0.00	0.00
Last Week <i>06-11-2019</i>	95.25	4.75	1.60	0.00	0.00	0.00
3 Months Ago <i>03-19-2019</i>	99.84	0.16	0.00	0.00	0.00	0.00
Start of Calendar Year <i>01-01-2019</i>	95.93	4.07	1.43	0.00	0.00	0.00
Start of Water Year <i>09-25-2018</i>	73.15	26.85	12.92	4.07	0.97	0.05
One Year Ago <i>06-19-2018</i>	69.73	30.27	13.70	5.63	0.77	0.00

D0 pockets in Minnesota.
Northern North Dakota in D1/D2.



Intensity:



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:

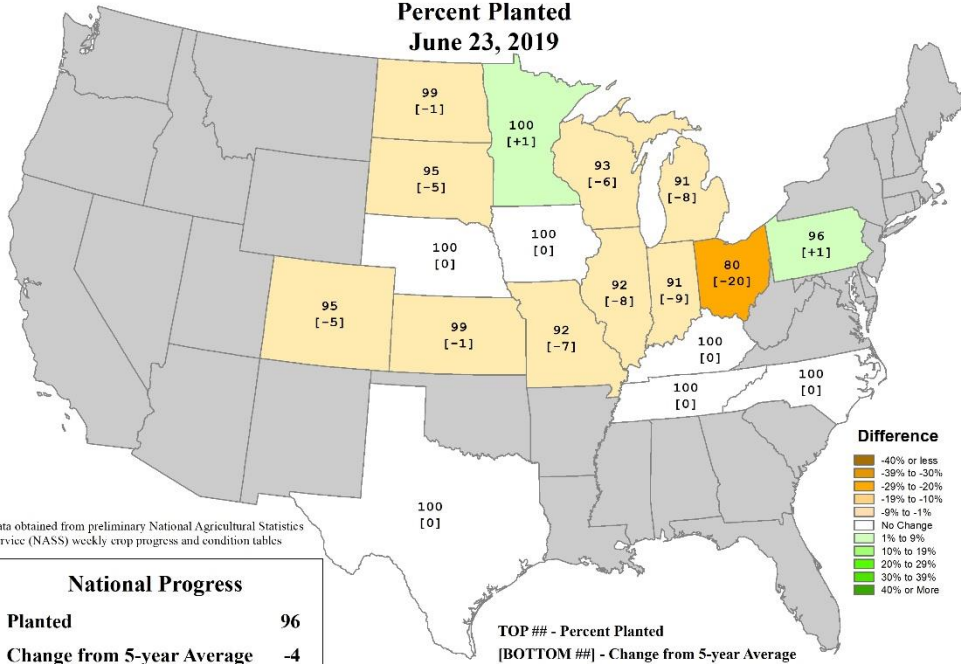
Brad Pugh
CPC/NOAA



droughtmonitor.unl.edu

U.S. Corn Progress

Percent Planted
June 23, 2019



Data obtained from preliminary National Agricultural Statistics Service (NASS) weekly crop progress and condition tables

National Progress

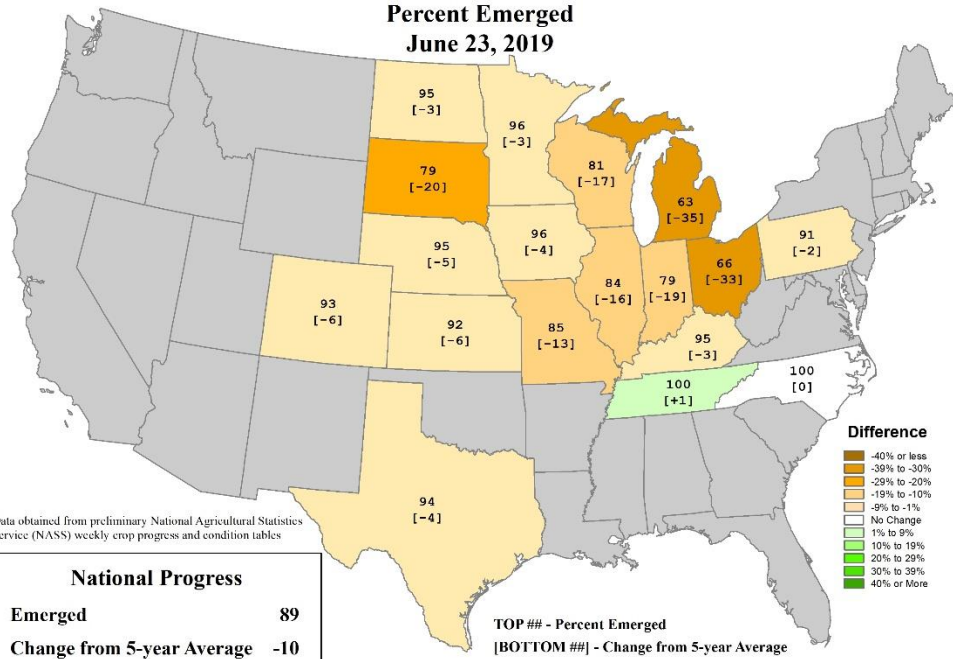
Planted	96
Change from 5-year Average	-4

TOP ## - Percent Planted
[BOTTOM ##] - Change from 5-year Average

USDA NASS Crop Progress (through June 23)

U.S. Corn Progress

Percent Emerged
June 23, 2019



Data obtained from preliminary National Agricultural Statistics Service (NASS) weekly crop progress and condition tables

National Progress

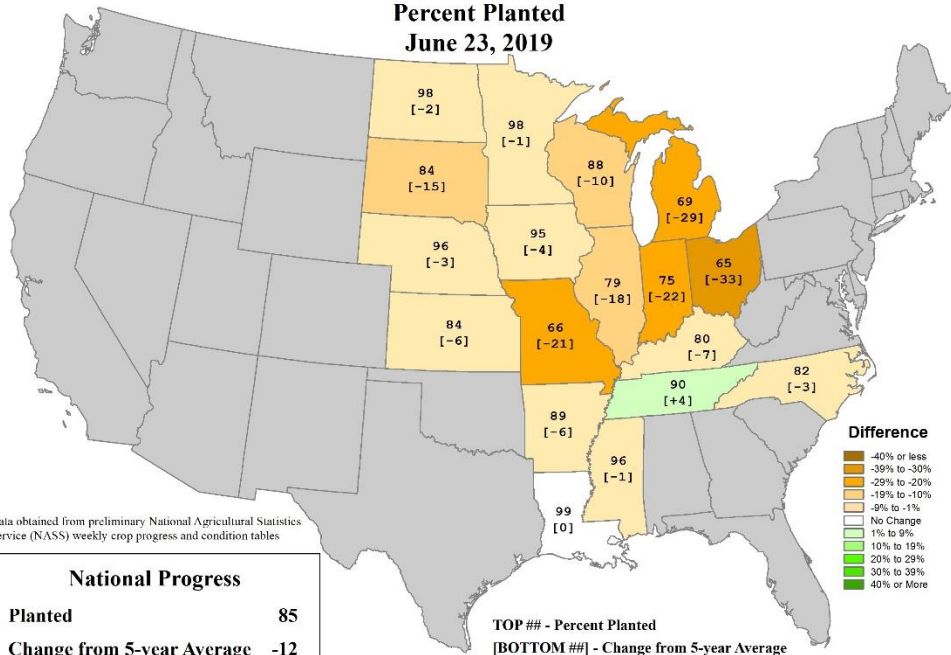
Emerged	89
Change from 5-year Average	-10

TOP ## - Percent Emerged
[BOTTOM ##] - Change from 5-year Average

Corn progress nationally through June 23 (96% planted -4%; 89% -10%). Iowa better than many states (100%; 96% -4%).

U.S. Soybeans Progress

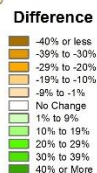
Percent Planted
June 23, 2019



Data obtained from preliminary National Agricultural Statistics Service (NASS) weekly crop progress and condition tables

National Progress	
Planted	85
Change from 5-year Average	-12

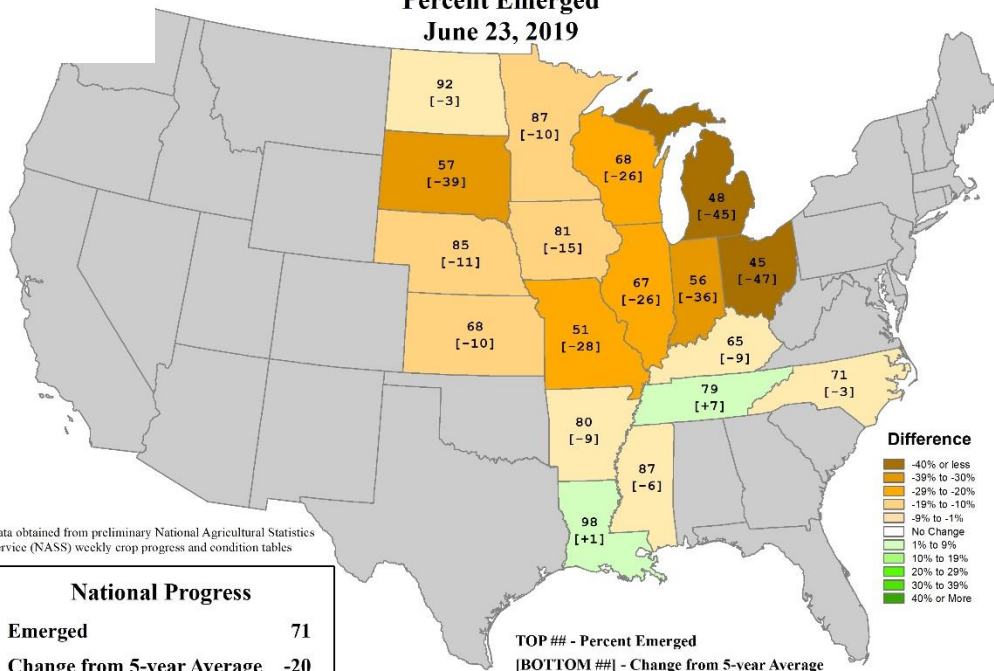
TOP## - Percent Planted
[BOTTOM##] - Change from 5-year Average



USDA NASS Crop Progress (through June 23)

U.S. Soybeans Progress

Percent Emerged
June 23, 2019



Data obtained from preliminary National Agricultural Statistics Service (NASS) weekly crop progress and condition tables

National Progress	
Emerged	71
Change from 5-year Average	-20

TOP## - Percent Emerged
[BOTTOM##] - Change from 5-year Average

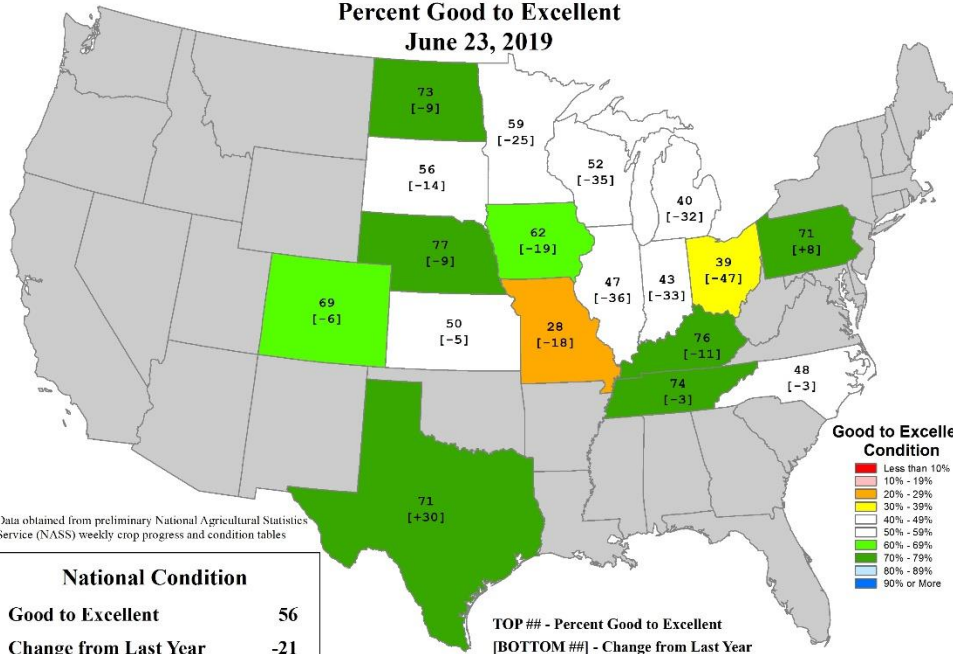


Bean progress nationally through June 23 (85% planted -12%; 71% - 20%). Iowa still better than many states (95% - 4%; 81% -15%).

U.S. Corn Conditions

Percent Good to Excellent

June 23, 2019



Data obtained from preliminary National Agricultural Statistics Service (NASS) weekly crop progress and condition tables

National Condition	
Good to Excellent	56
Change from Last Year	-21

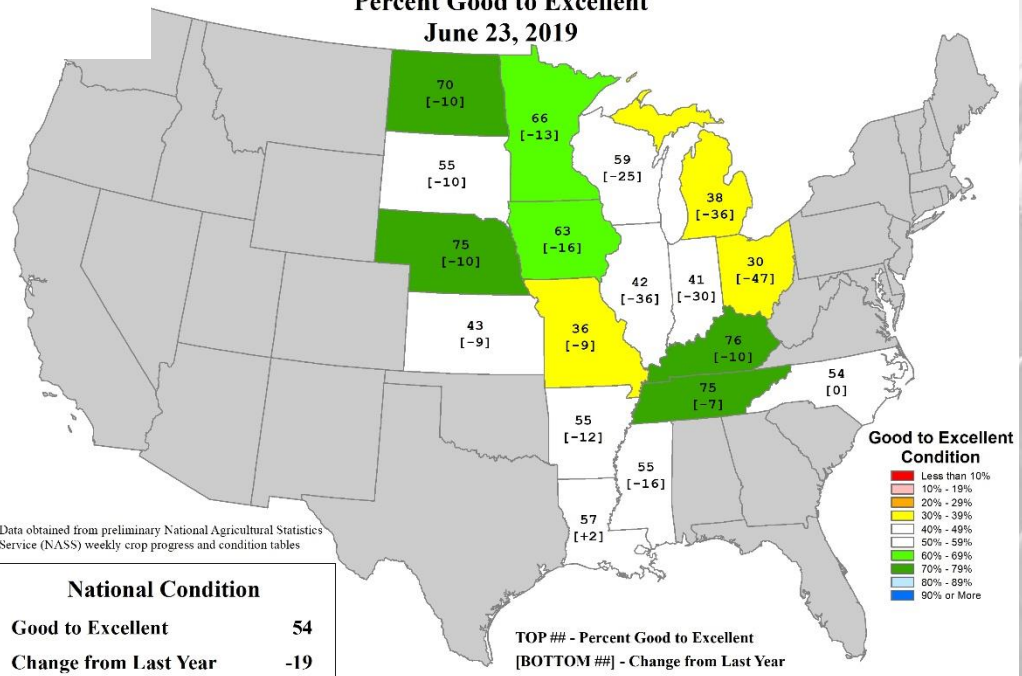
TOP## - Percent Good to Excellent
[BOTTOM##] - Change from Last Year

USDA NASS Crop Condition (through June 23)

U.S. Soybean Conditions

Percent Good to Excellent

June 23, 2019



Data obtained from preliminary National Agricultural Statistics Service (NASS) weekly crop progress and condition tables

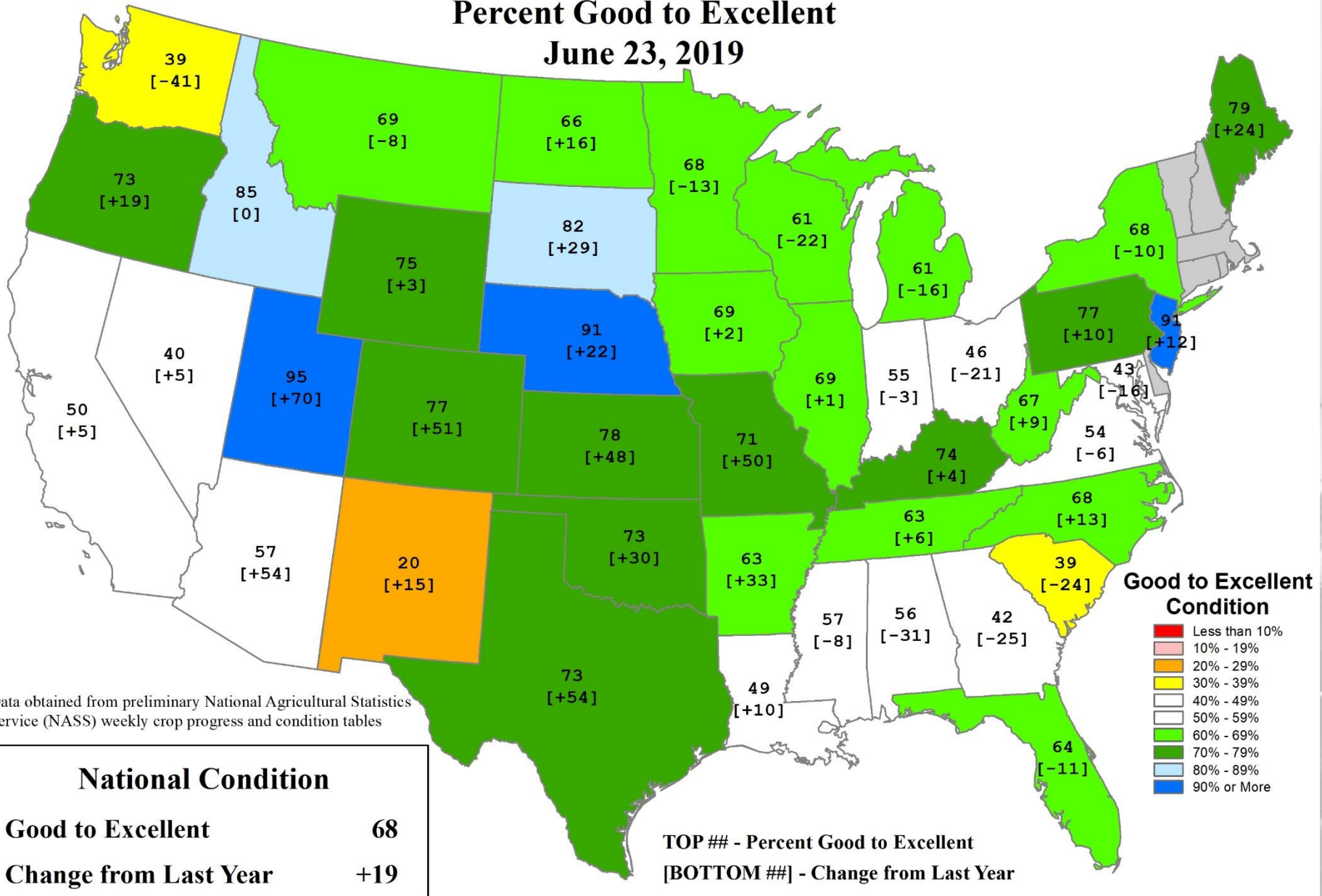
National Condition	
Good to Excellent	54
Change from Last Year	-19

TOP## - Percent Good to Excellent
[BOTTOM##] - Change from Last Year

Condition indexed similar to 2012 and 1993 at this point. 2012 was dropping quickly.

U.S. Pasture and Range Conditions

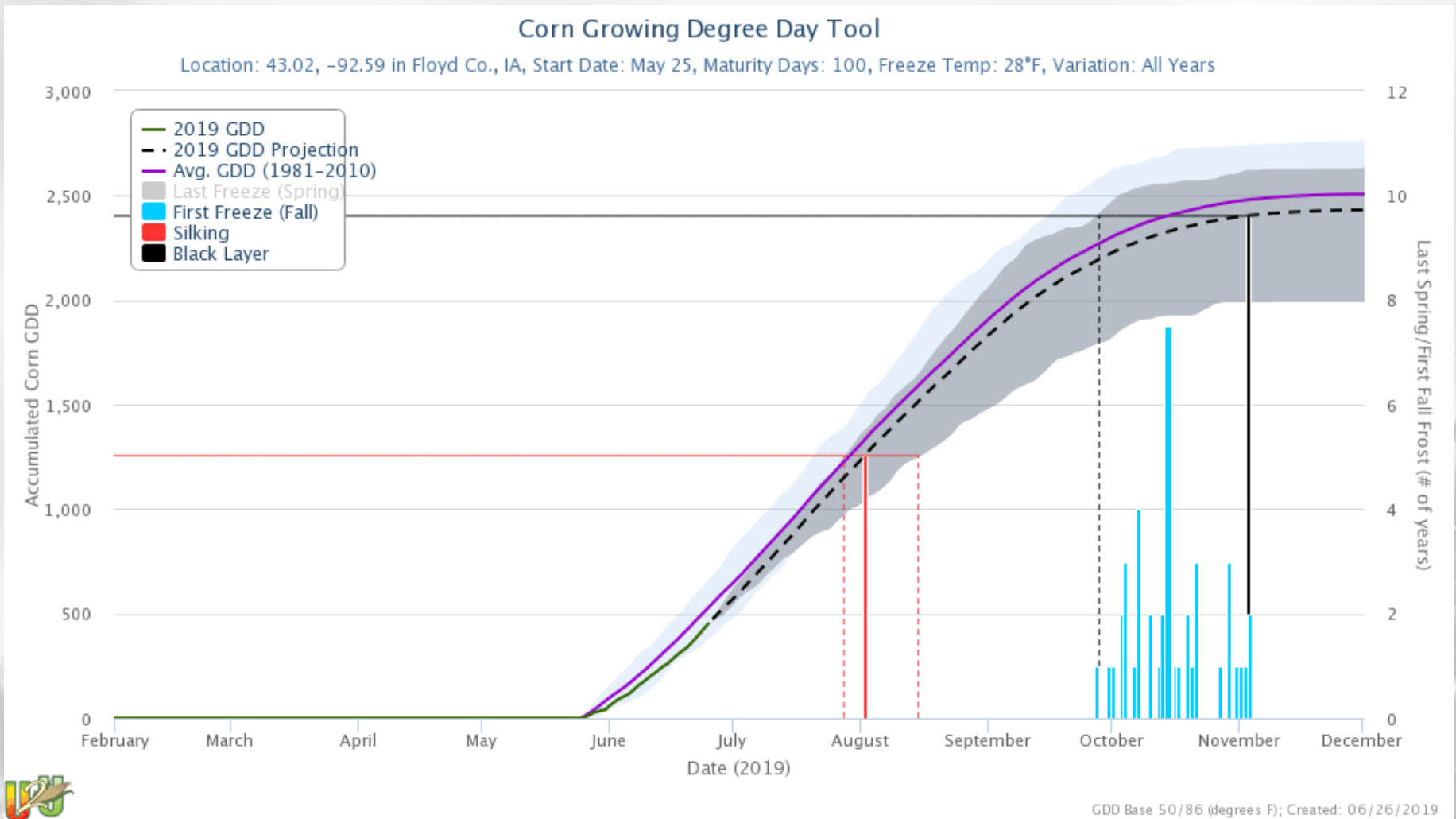
Percent Good to Excellent
June 23, 2019



Data obtained from preliminary National Agricultural Statistics Service (NASS) weekly crop progress and condition tables

TOP ## - Percent Good to Excellent
[BOTTOM ##] - Change from Last Year

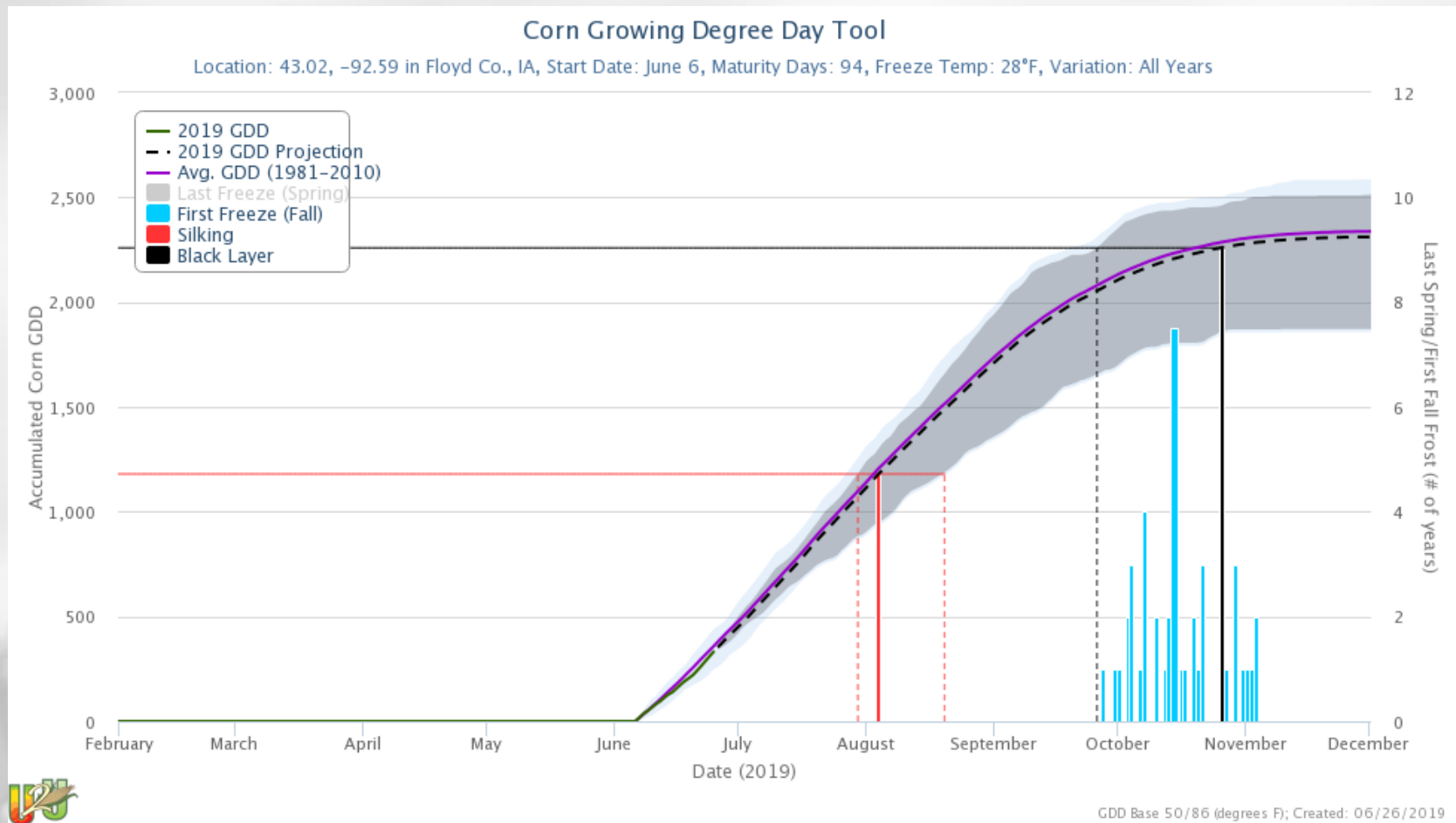
GDD Accumulation – Floyd County



Note: Both versions working.

<http://mrcc.isws.illinois.edu/U2U/gdd/> or <https://hprcc.unl.edu/gdd.php>

GDD Accumulation – Floyd County



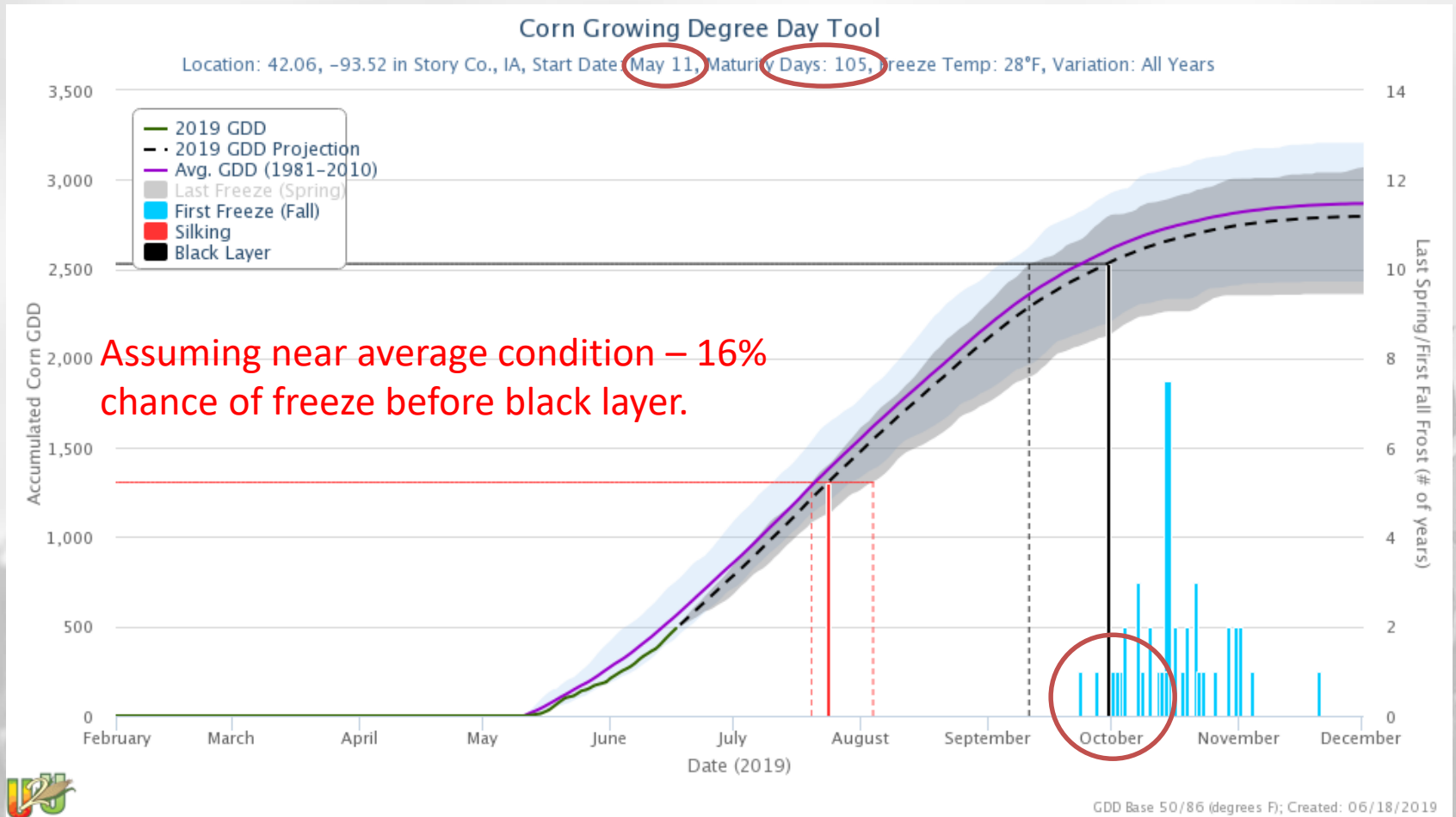
Note: Both versions working.

<http://mrcc.isws.illinois.edu/U2U/gdd/> or <https://hprcc.unl.edu/gdd.php>

Assumptions

- Assumes avg. GDD accumulation rest of season (that is a big question right now)
- Does not incorporate shortening of GDD requirement for late planted corn.

GDD Accumulation – Story County



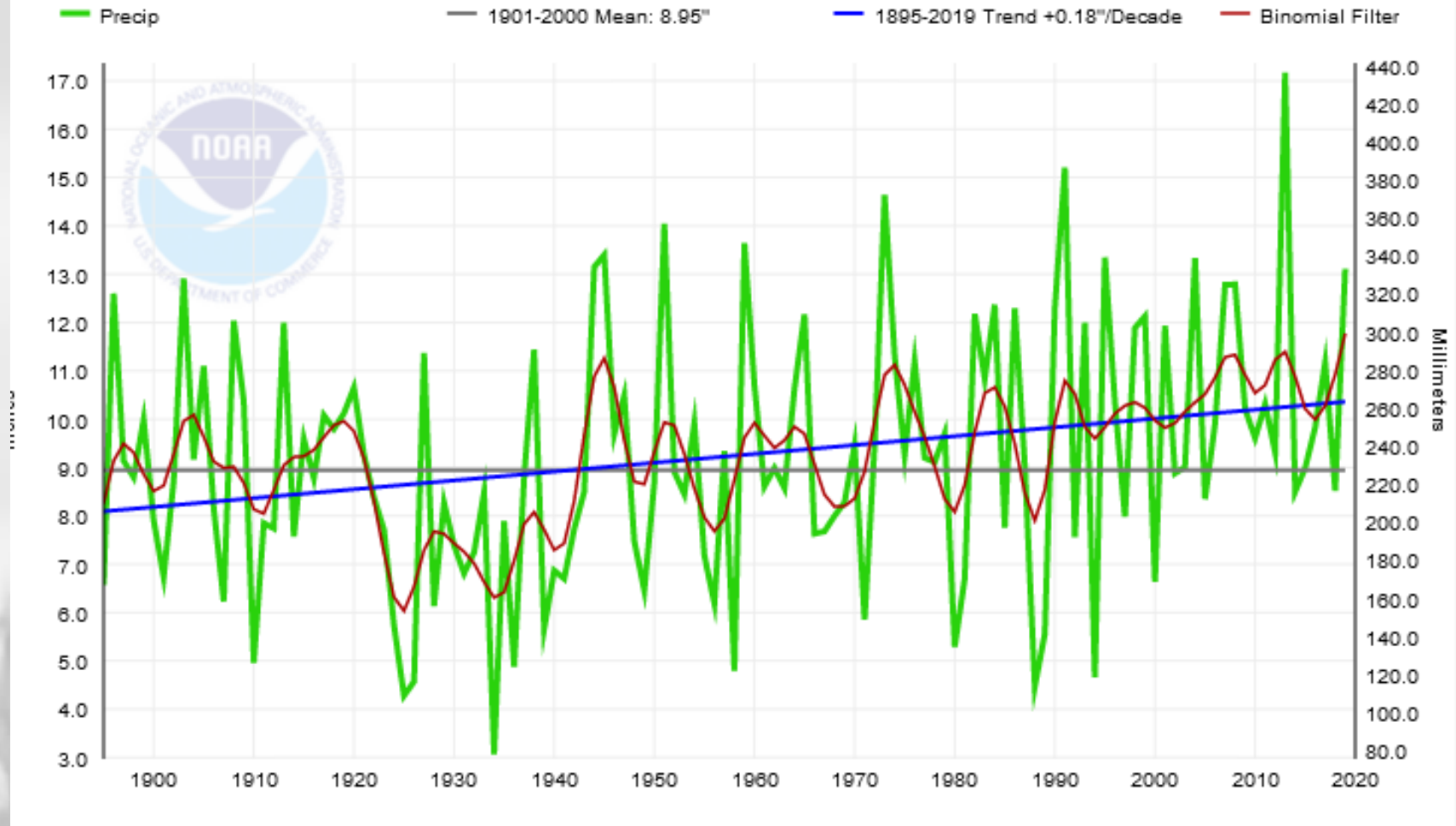
<http://mrcc.isws.illinois.edu/U2U/gdd/> or <https://hprcc.unl.edu/gdd.php>

Crop/Harvest issues

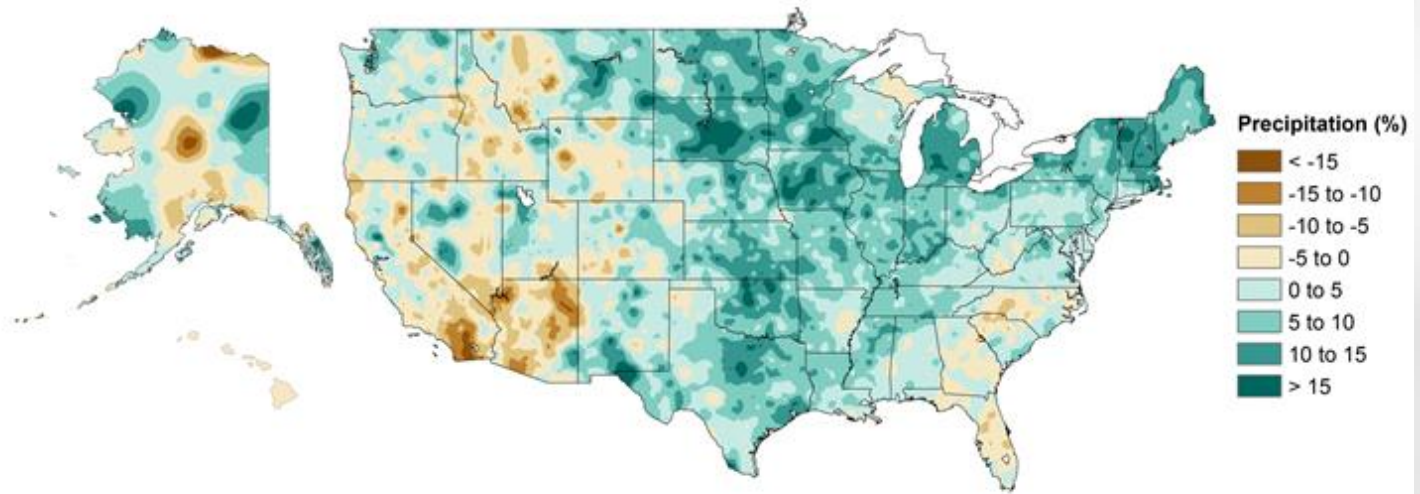
- Growing season:
 - Slow development
 - Disease
 - Weed issues
 - Lack of sunlight (don't have good data on this)
- Harvest:
 - Some potential freeze concerns
 - More likely lots of immature high moisture corn
- GDD Tool - Keep checking back on progress

Crop/Harvest issues

Iowa, Precipitation, March-May



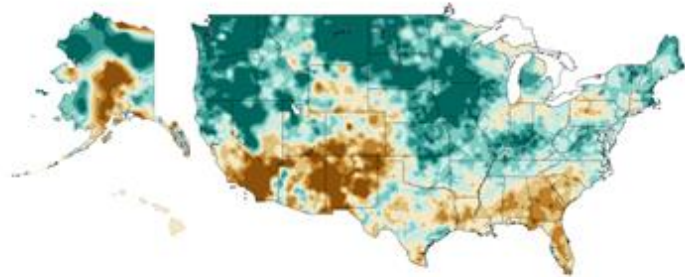
Annual Precipitation



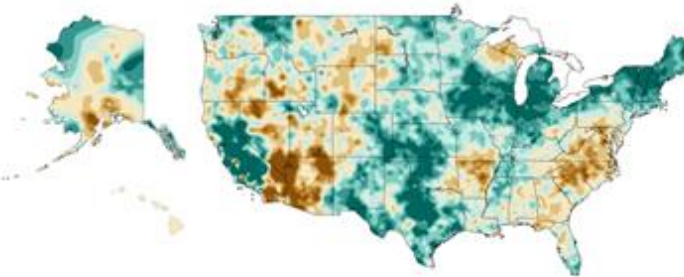
Winter Precipitation



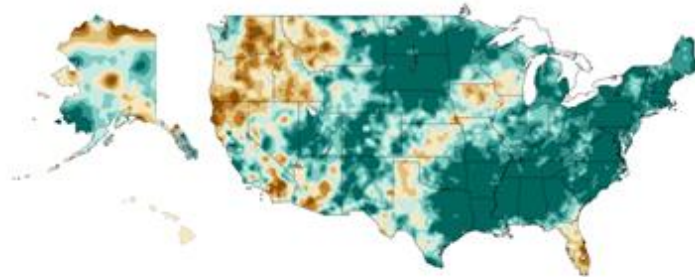
Spring Precipitation



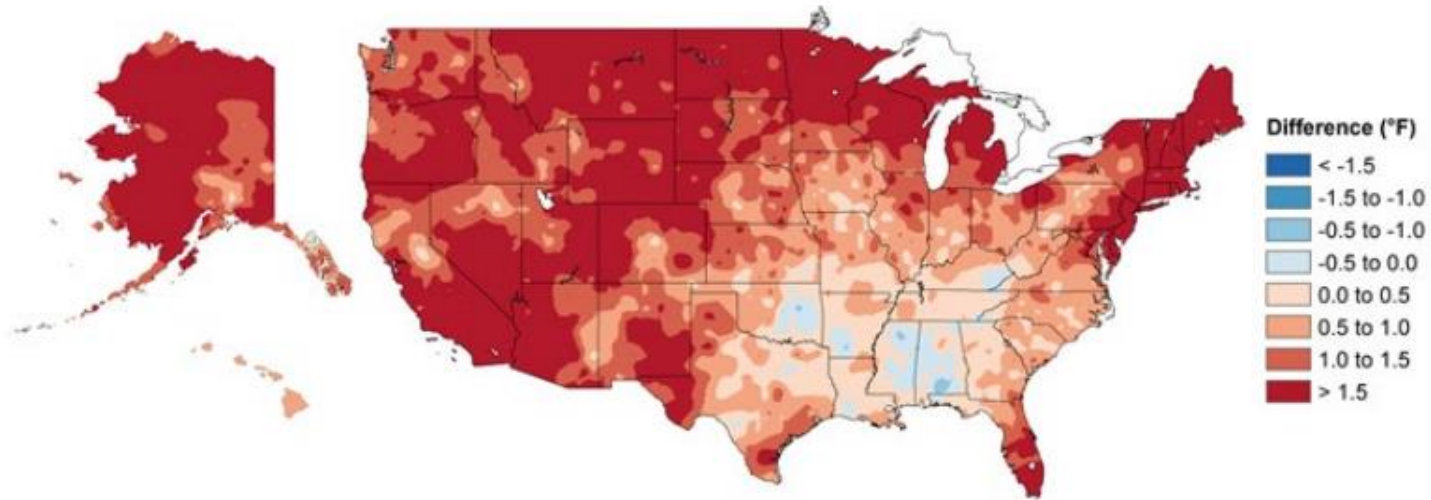
Summer Precipitation



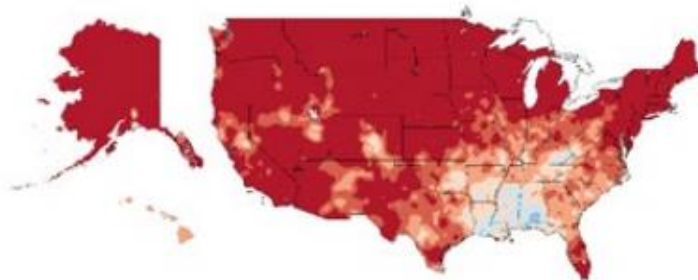
Fall Precipitation



Annual Temperature



Winter Temperature



Summer Temperature

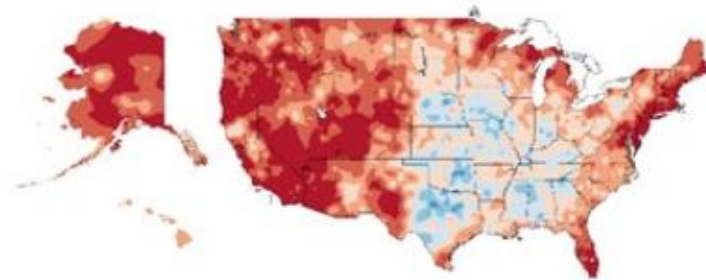
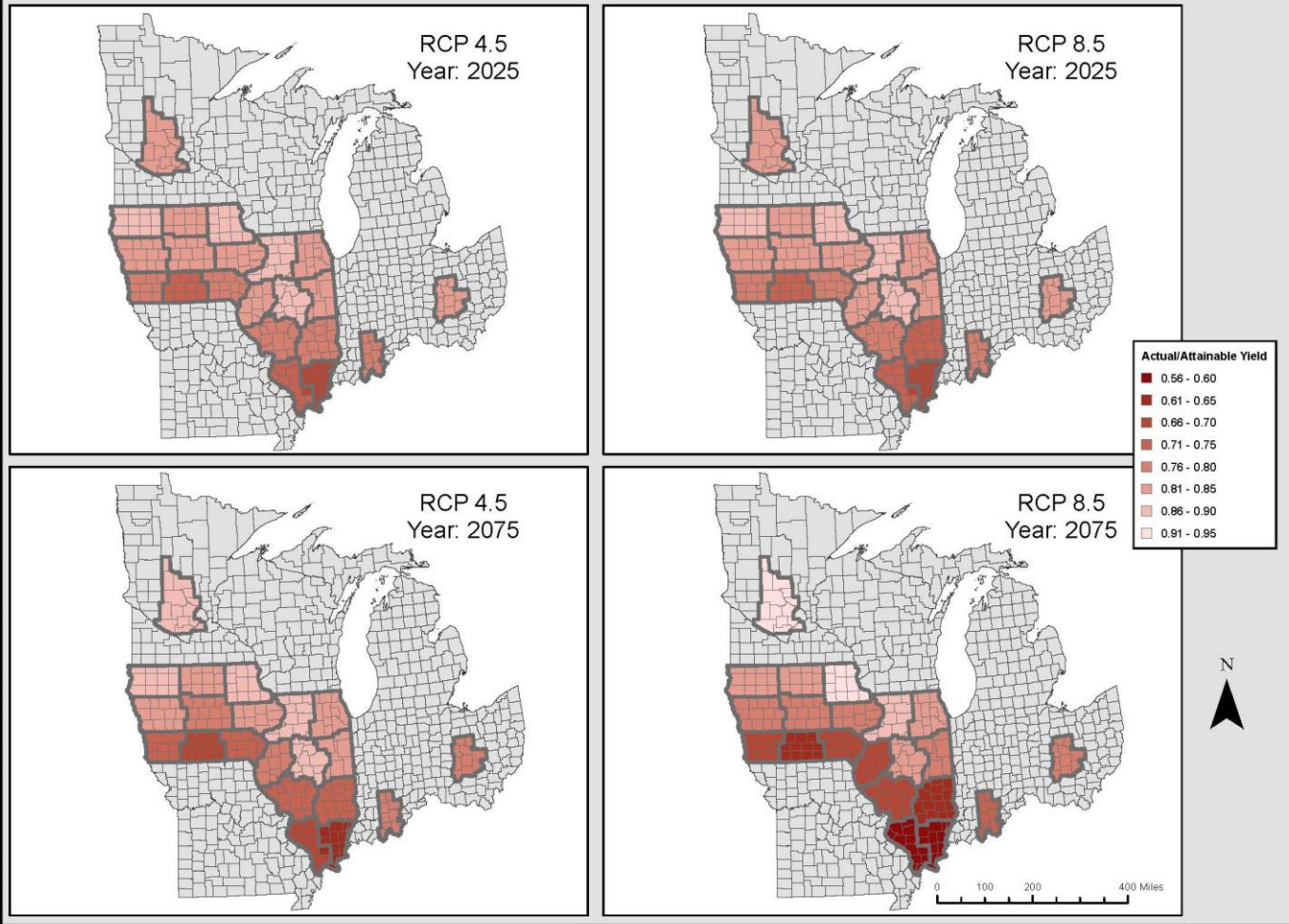
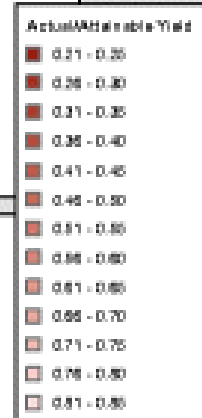
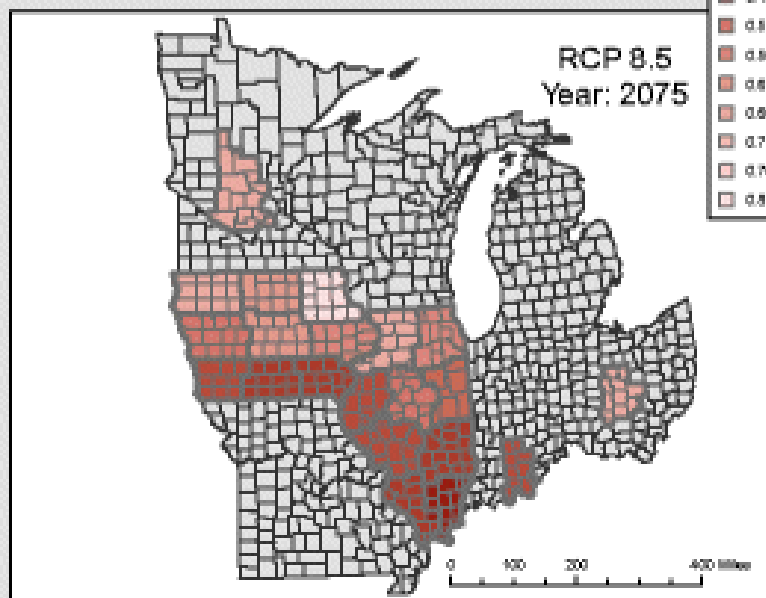
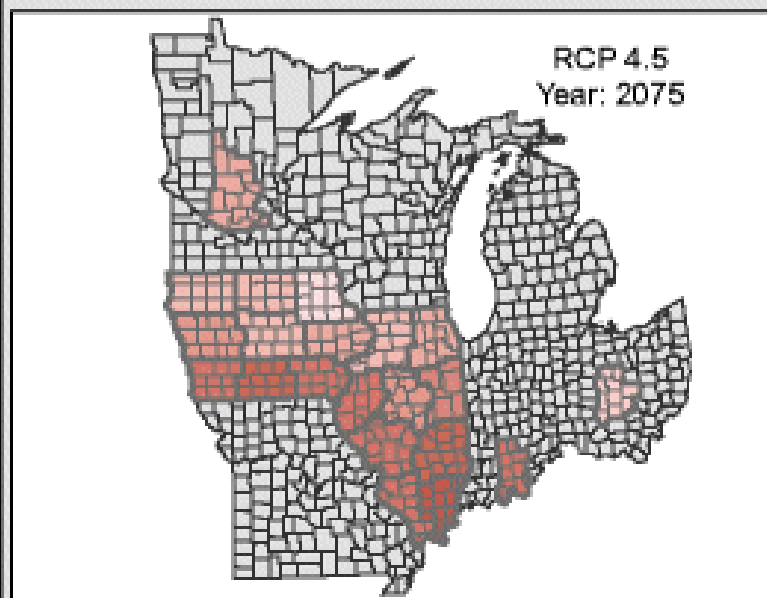
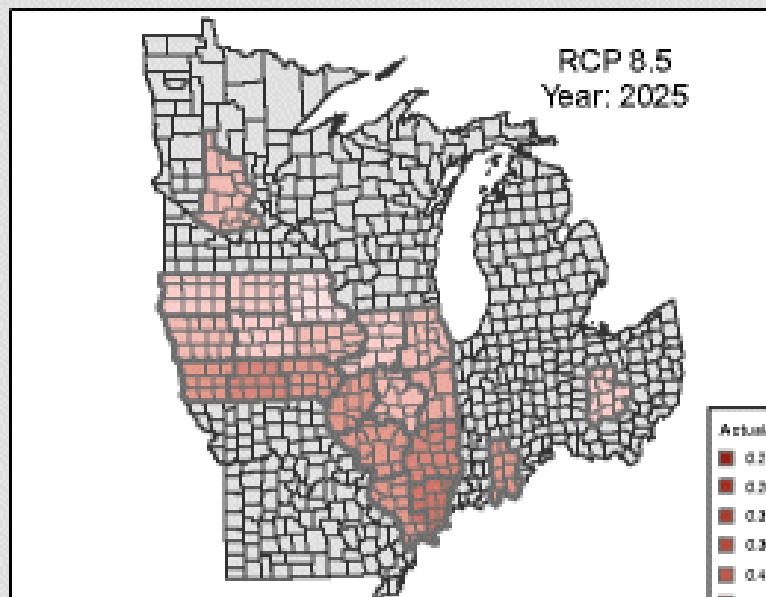
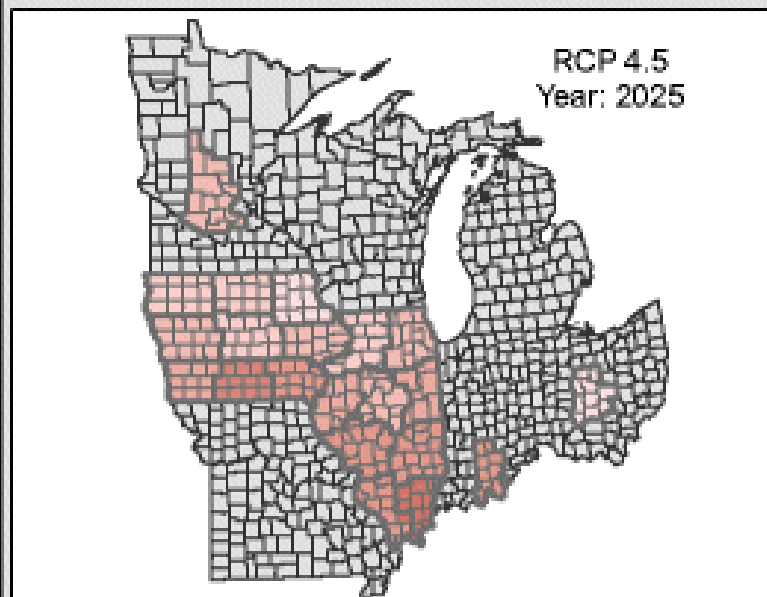


Figure 6.1. Observed changes in annual, winter, and summer temperature (°F). Changes are the difference between range for present-day (1986–2016) and the average for the first half of the last century (1901–1960 for the con-United States, 1925–1960 for Alaska and Hawai'i). Estimates are derived from the nClimDiv dataset.^{1,2} (Figure NOAA/NCEI).

Fraction of Actual/Attainable Yield for Midwest Soybean



Fraction of Actual/Attainable Yield for Midwest Maize



Climate Change and Agricultural Pests



1) Expanding geographic ranges northward

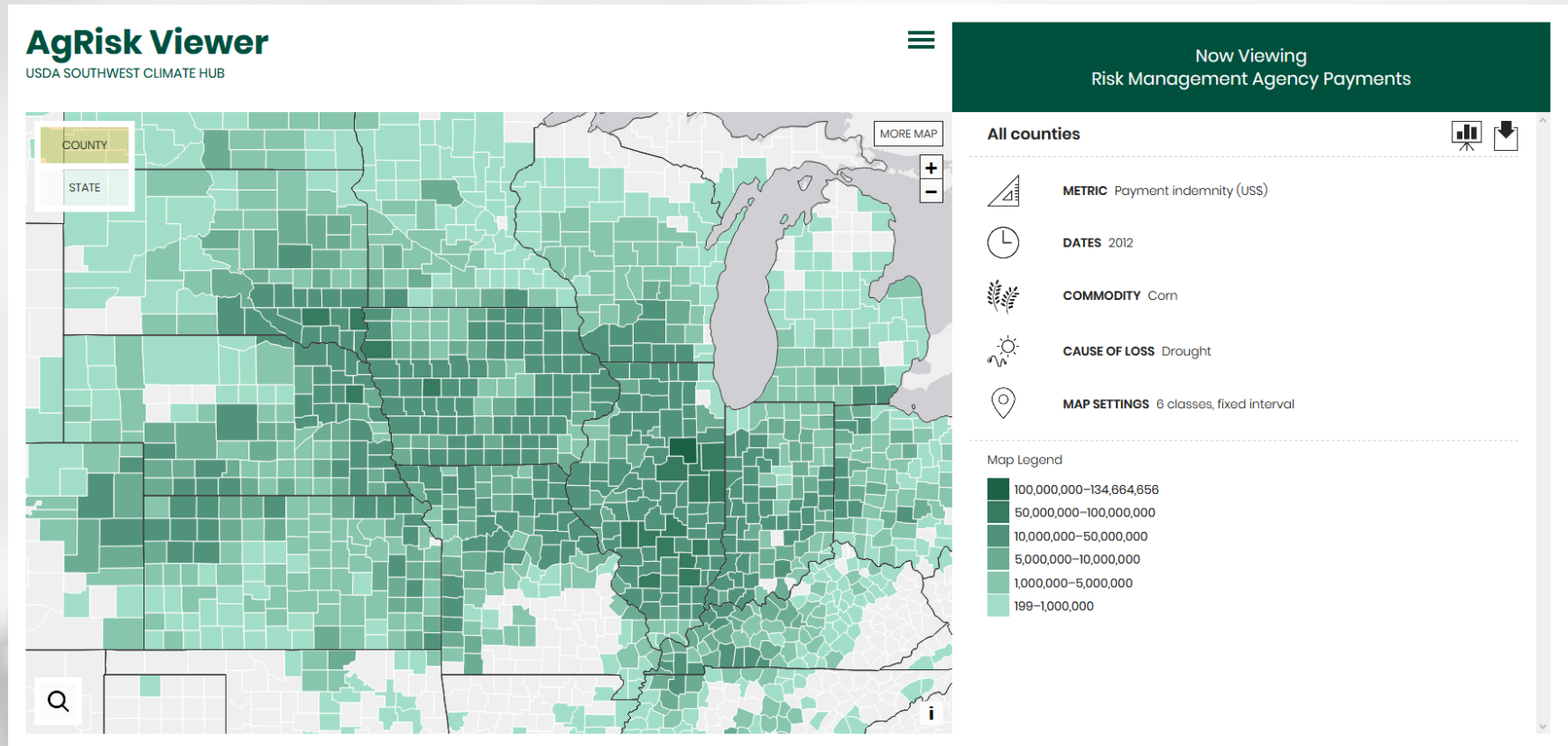
2) Reducing winter die offs

3) Earlier spring emergence

4) Increased generations per year

- Invasive insects are of particular concern since they often limited more by climate in their non-native ranges (no natural enemies and abundant food)**

AG Risk Viewer – Cause of Loss Data

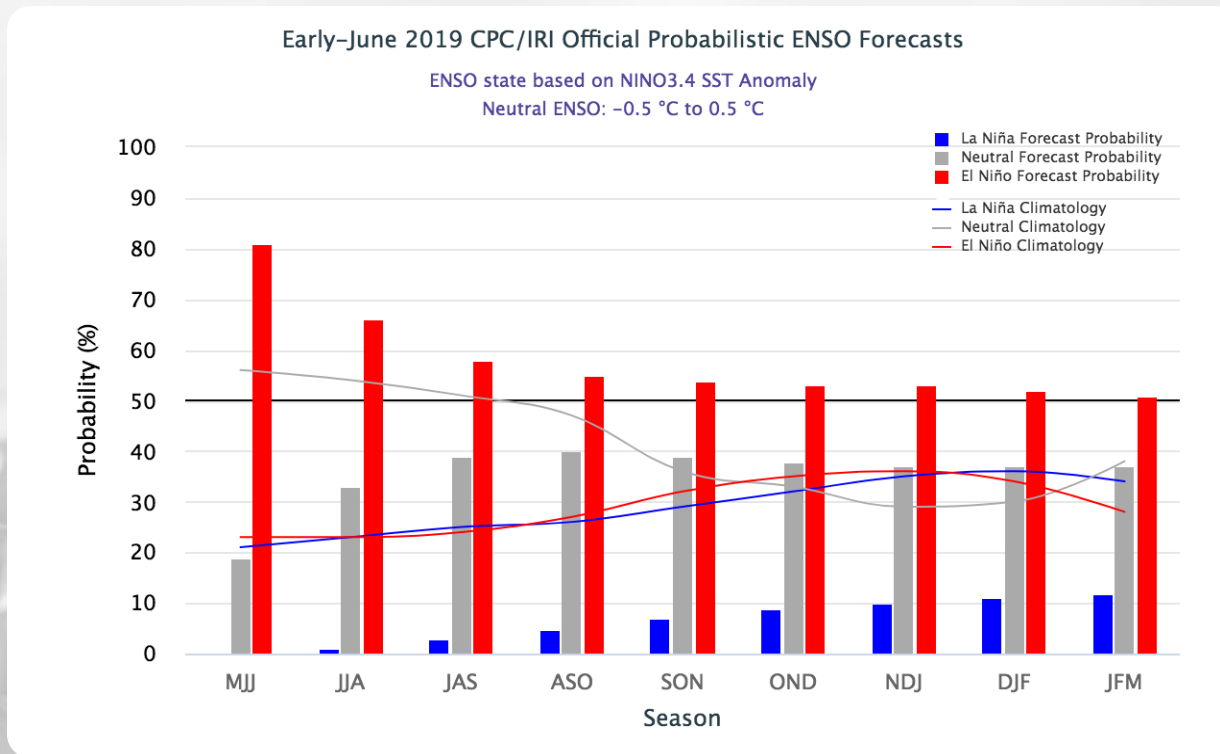


<https://swclimatehub.info/rma/rma-data-viewer.html>

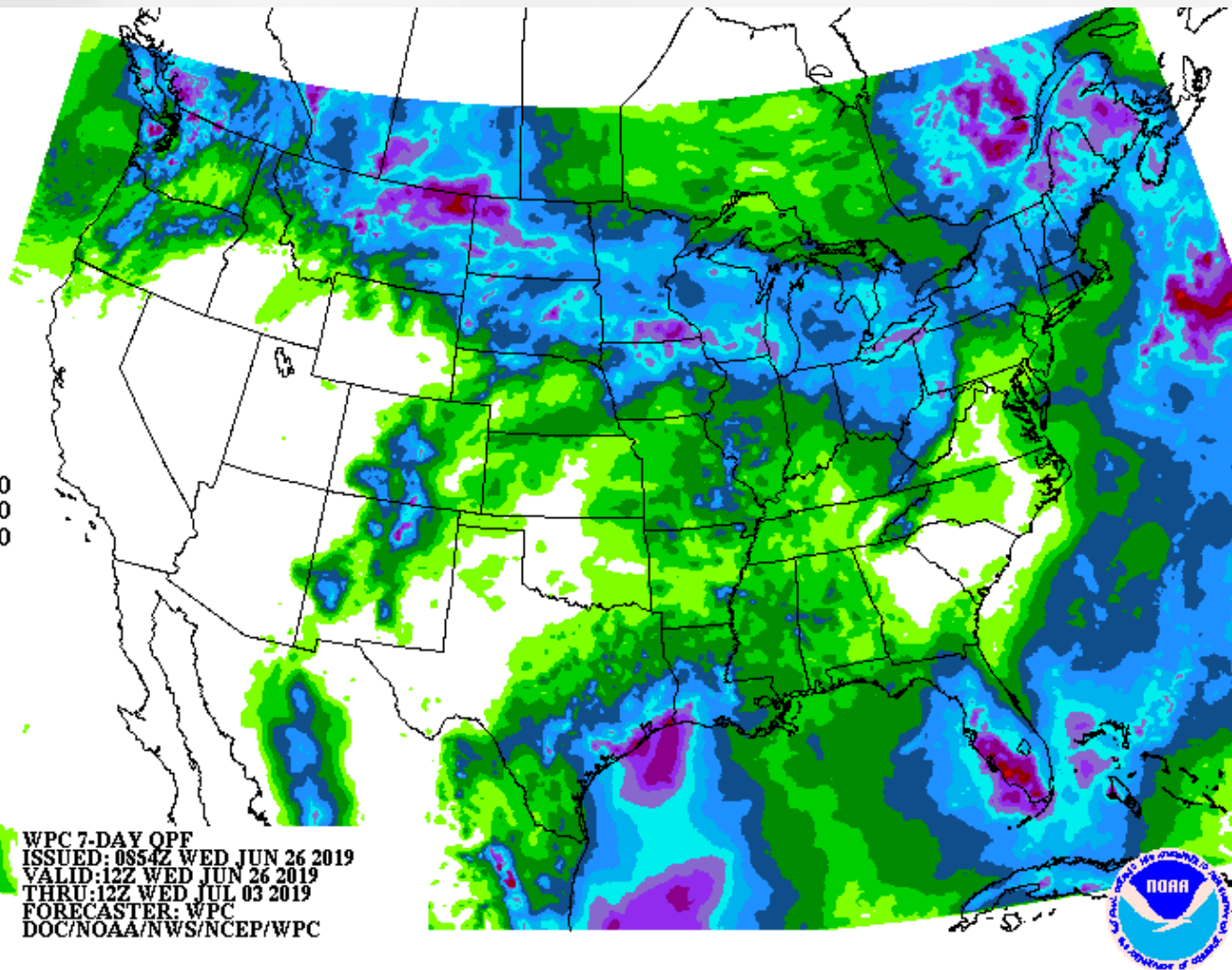
CPC/IRI Probabilistic ENSO Outlook

Updated: 13 June 2019

El Niño is favored to continue with chances nearing 50% in Northern Hemisphere fall and winter.

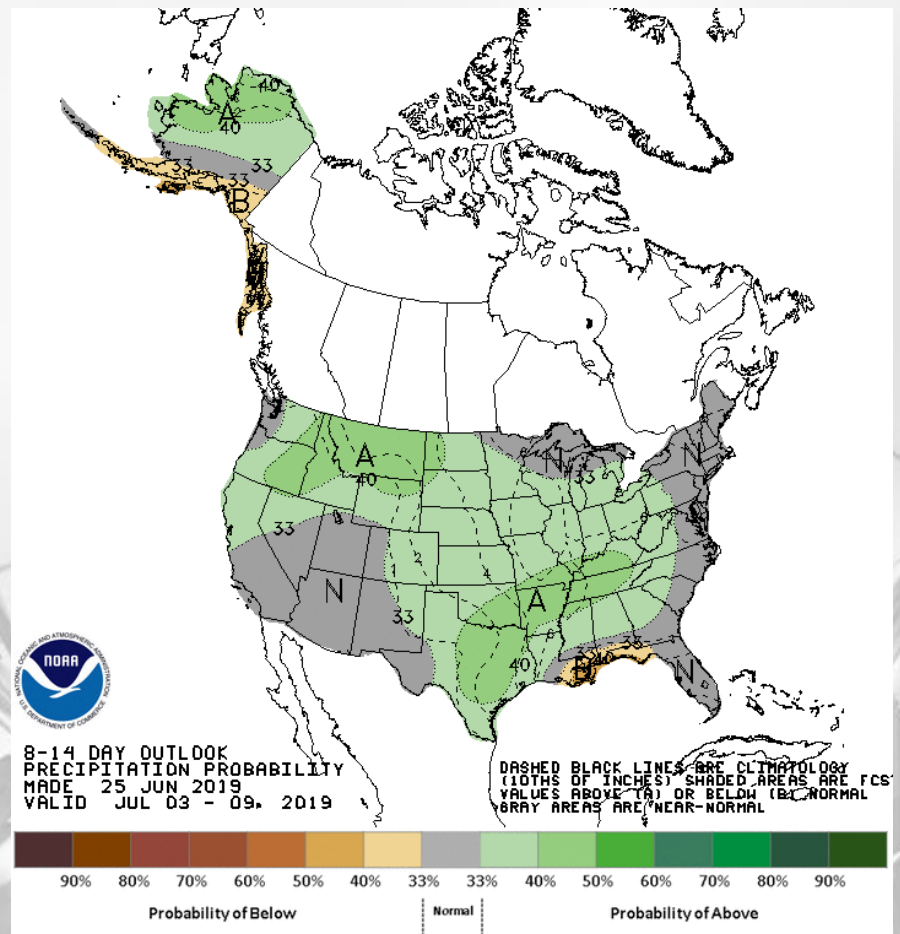
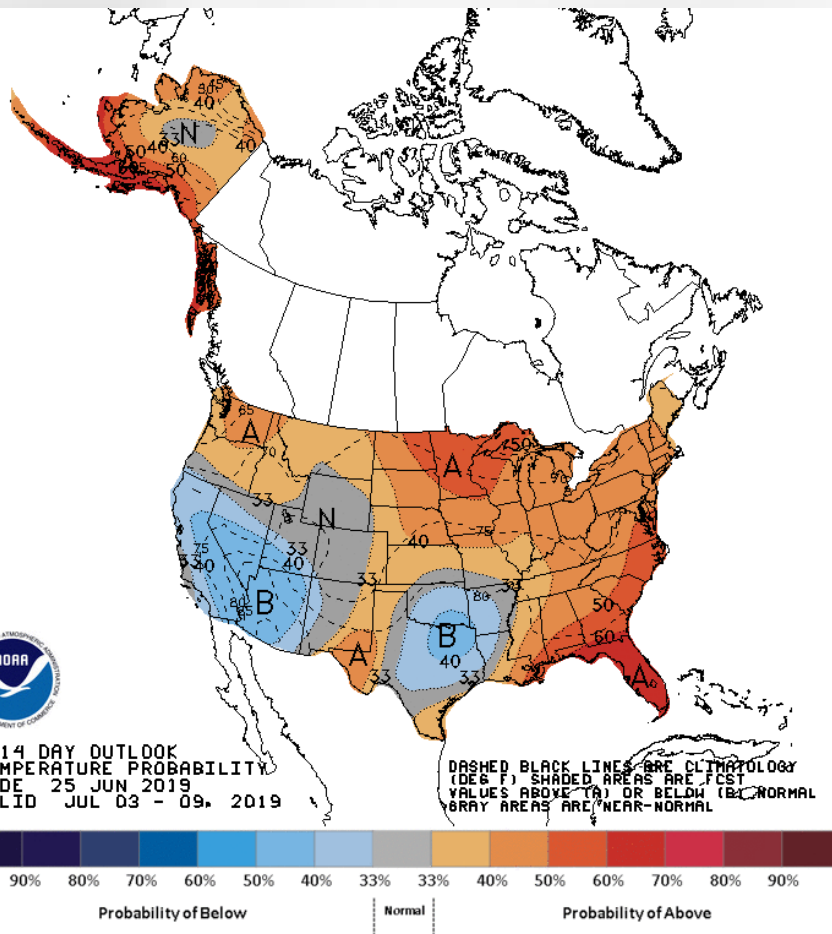


7 Day Forecast Precip.



Smaller areas of rains
(up to 2") – more
northern Midwest.

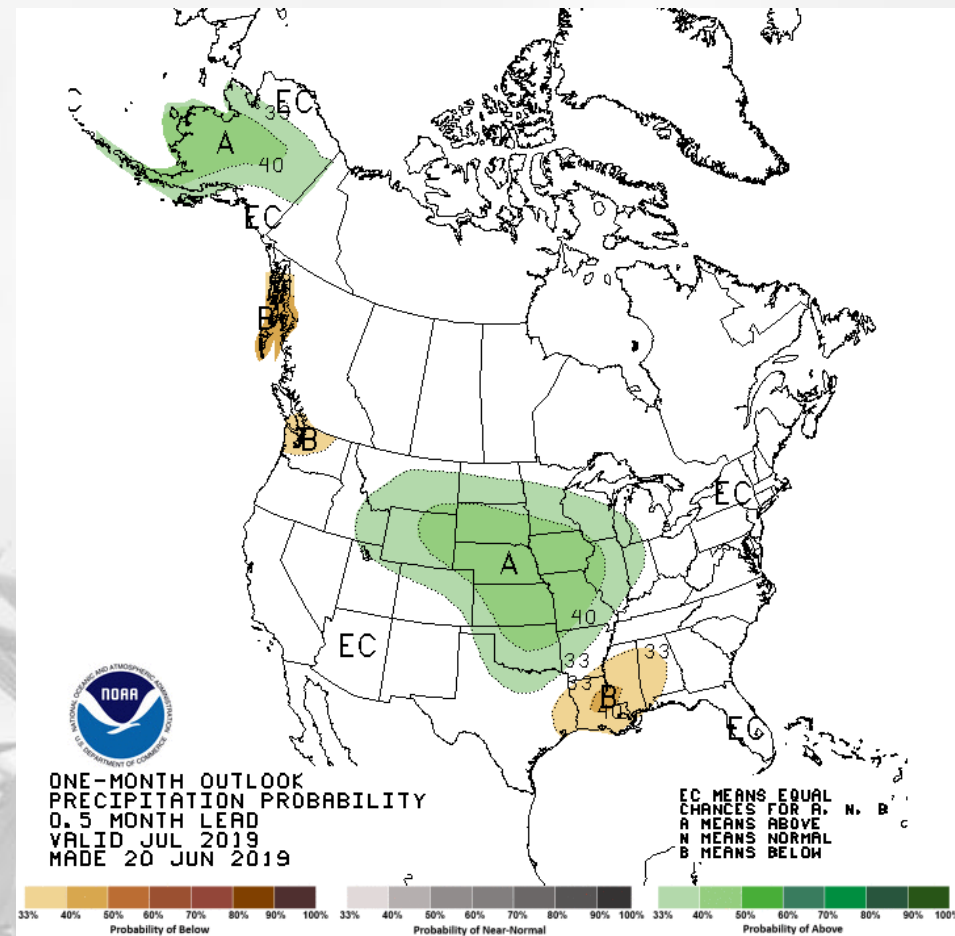
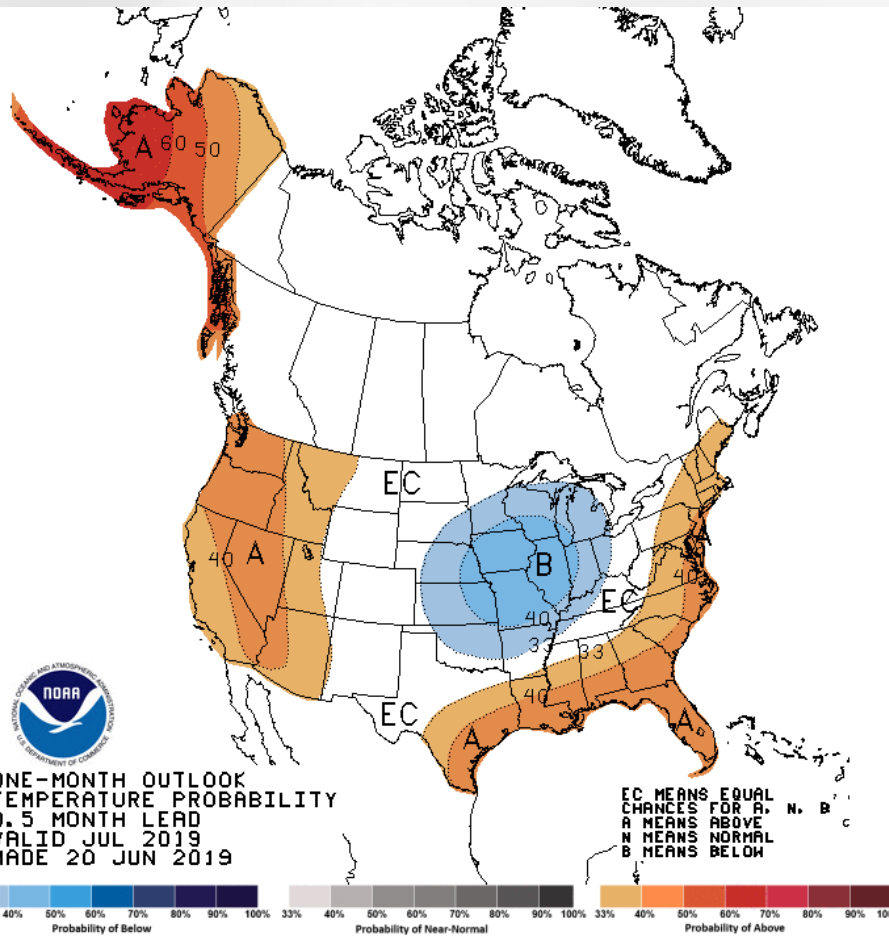
8-14 Day Temp and Precip. Outlook



Early July – above average precip chances continue. Likely warmer than average temperatures good news for crops.

<http://www.cpc.ncep.noaa.gov/>

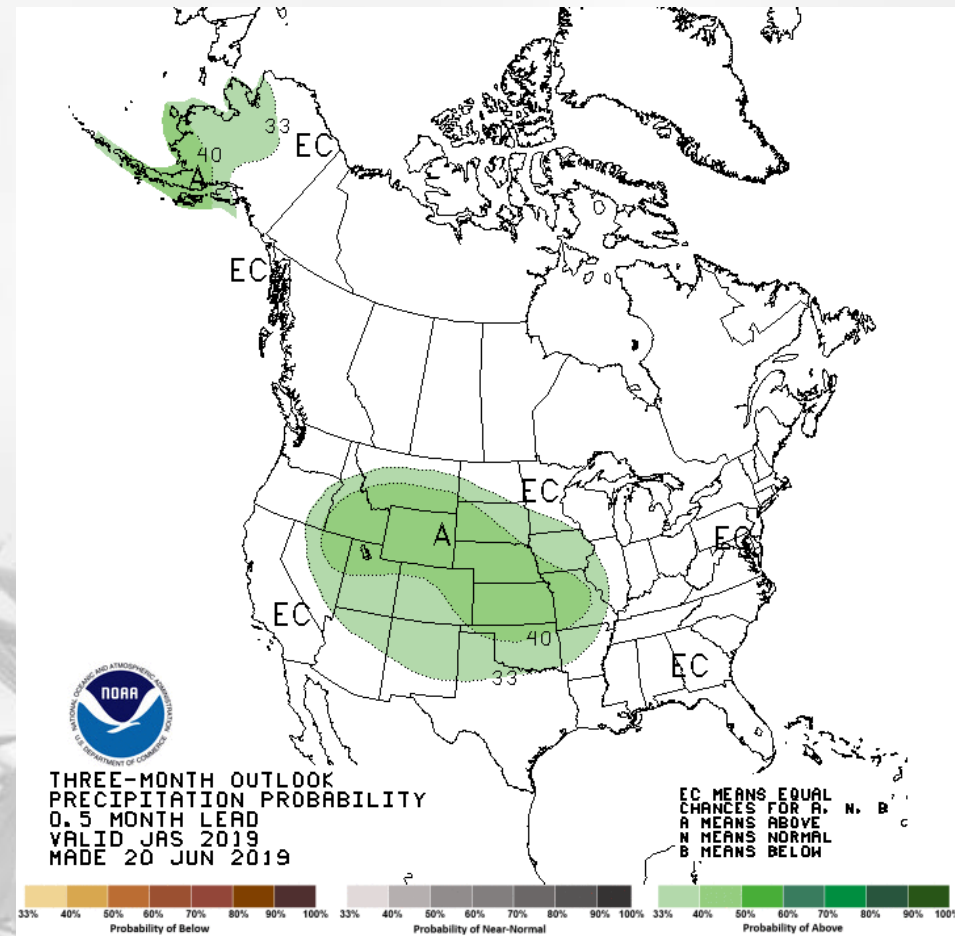
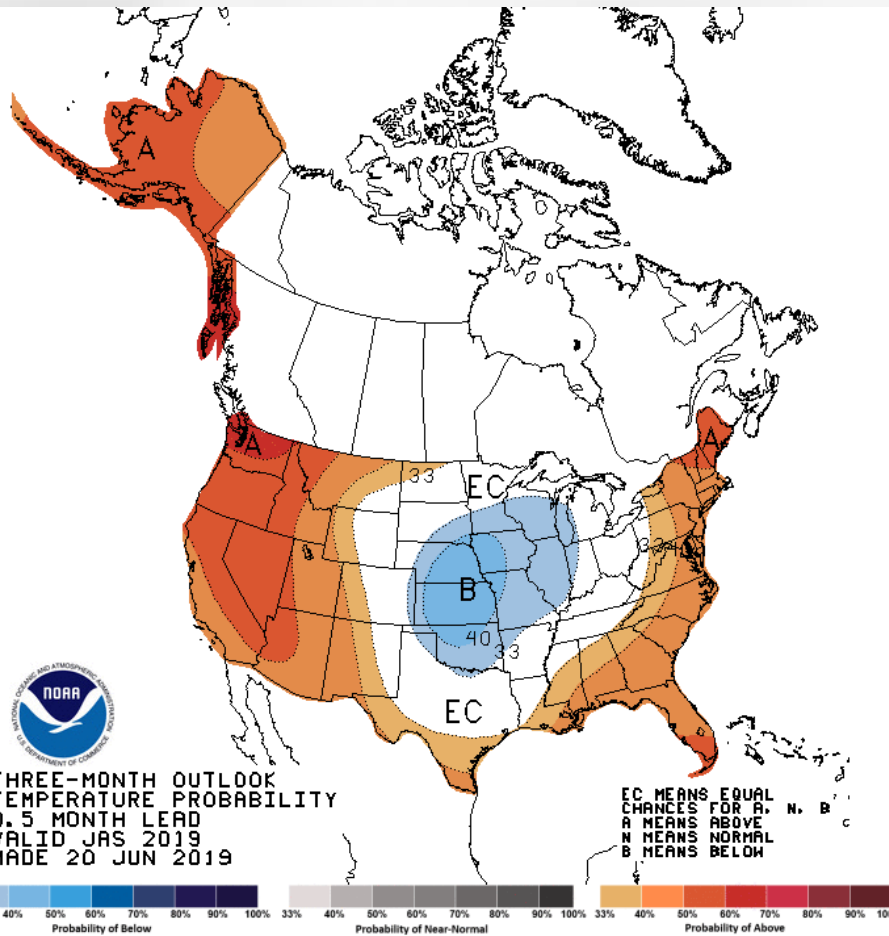
30 Day Temp and Precip. Outlook



Persistence of cooler and wetter more likely through July.

<http://www.cpc.ncep.noaa.gov/>

90 Day Temp and Precip. Outlook

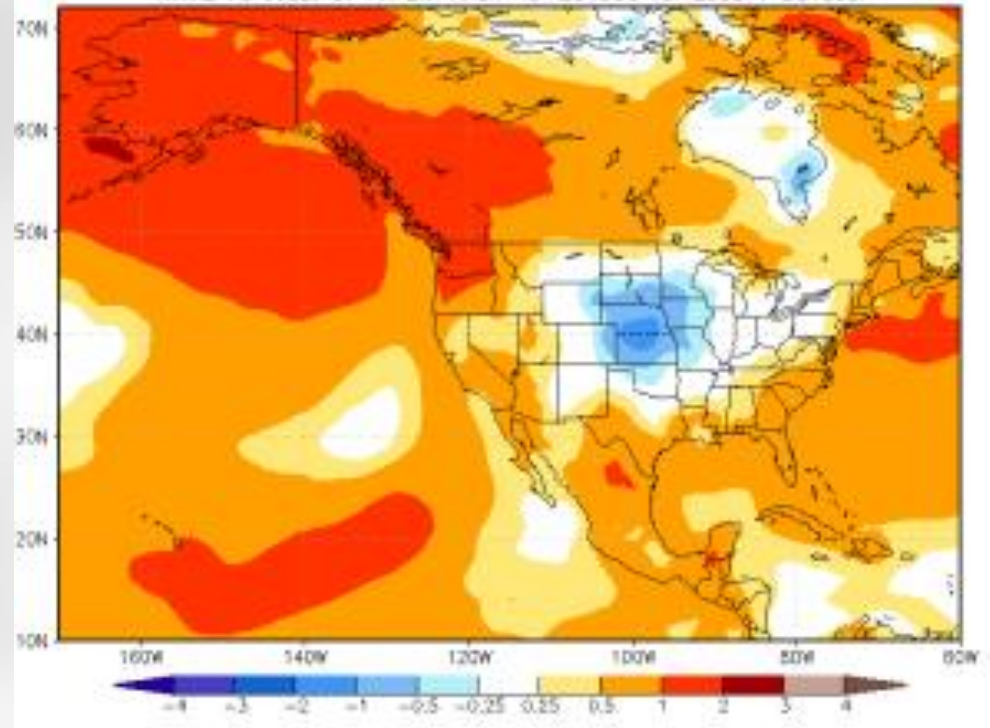


<http://www.cpc.ncep.noaa.gov/>

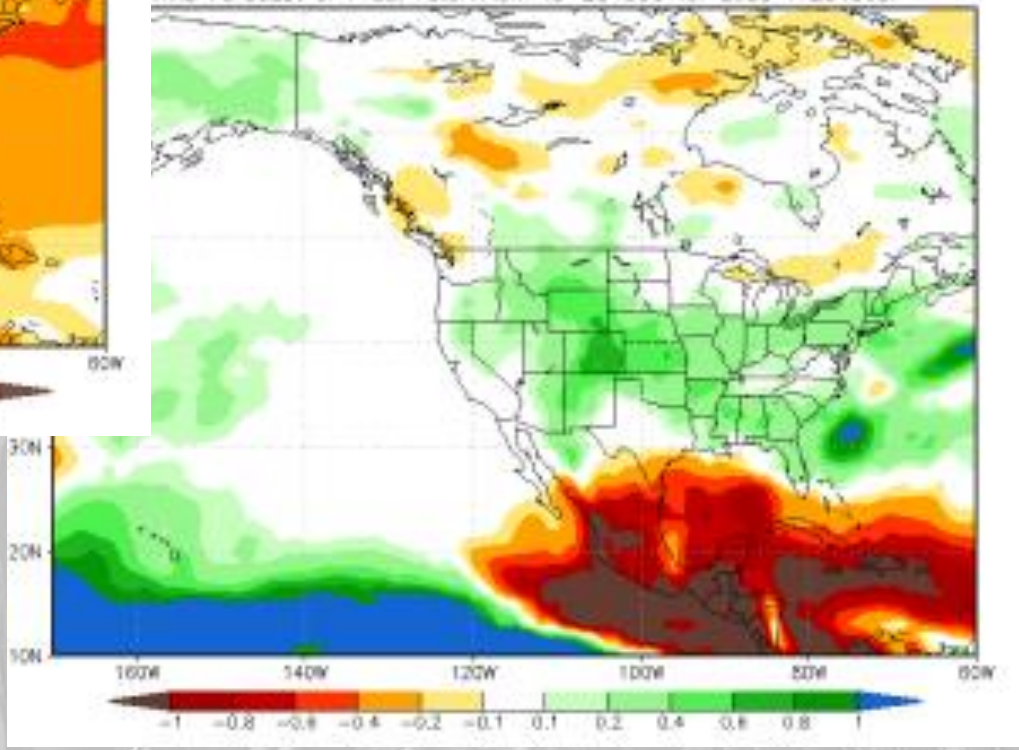
Persistence of cooler and wetter still more likely through the summer.
Soil moisture, El Niño and persistence from spring are main drivers.

July Temp./Precip. Outlook (model)

NMME Forecast of TMP2m Anom IC=201906 for Lead 1 2019Jul



MME Forecast of Prec. rate Anom IC=201906 for Lead 1 2019Jul



<http://www.cpc.ncep.noaa.gov/>

Take Home

- Current conditions:
 - Lighter rains during last week.
 - Some additional crop progress
 - Mostly wetter than average in the state but some slightly drier areas west central
- Outlook info:
 - Rain issues should continue this week and likely into the end of June. Some heavier amounts possible. But wet soils cannot handle too much.
 - Temperatures mostly moderate. Need some above average to push crop development.
 - New longer range outlooks will be released Thursday June 20
 - Crop issues still developing

Midwest and Great Plains Climate- Drought Outlook 15 September 2016

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Sign up:

<https://www.drought.gov/drought/dews/midwest>

Archives:

<http://mrcc.isws.illinois.edu/multimedia/webinars.jsp>.



United States Department of Agriculture
Midwest Climate Hub

For More Information



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<https://www.climatehubs.ocs.usda.gov/hubs/midwest>



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