

# North Central U.S. Climate & Drought Outlook

## June 18, 2020

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State Climate Office of Ohio (SCOO)

OSU Extension – College of Food, Agricultural, and  
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Byrd Polar and Climate Research Center





## General Information

### Providing climate services to the North Central US

Collaboration Activity Among:

NOAA NCEI/NWS/OAR/NIDIS/

USDA Climate Hubs

American Association of State Climatologists

Midwest and High Plains Regional Climate Centers

National Drought Mitigation Center

### Next Regular Climate/Drought Outlook Webinar

*July 16, 2020 (1 PM CDT) Martha Shulski – Nebraska State Climatologist*

### Access to Future Climate Webinars and Information

<http://www.drought.gov/drought/content/regional-programs/regional-drought-webinars>

<https://mrcc.illinois.edu/multimedia/webinars.jsp>

<http://www.hprcc.unl.edu/webinars.php>

**Open for questions at the end**



## Agenda

### **Climate Recap & Recent Conditions**

**Impacts:** Hydrological, Snow/Water, Agricultural, Other

**Outlooks:** Short-term, July, and Summer Updates



# RECENT CLIMATE CONDITIONS

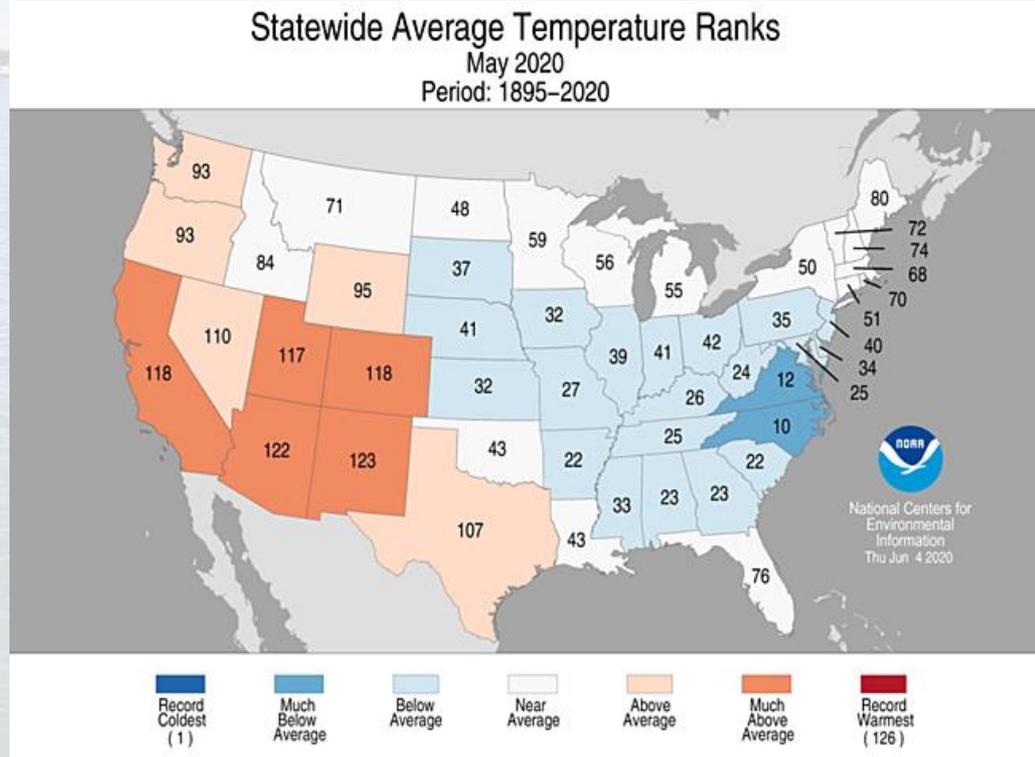
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# May Temperature Recap

- Following in April's footsteps, generally near to below average temperatures across the region
- 27<sup>th</sup> coldest in MO; many top 40 coldest
- Colorado/Wyoming exceptions – 9<sup>th</sup> warmest for CO

# Recent Climate Conditions

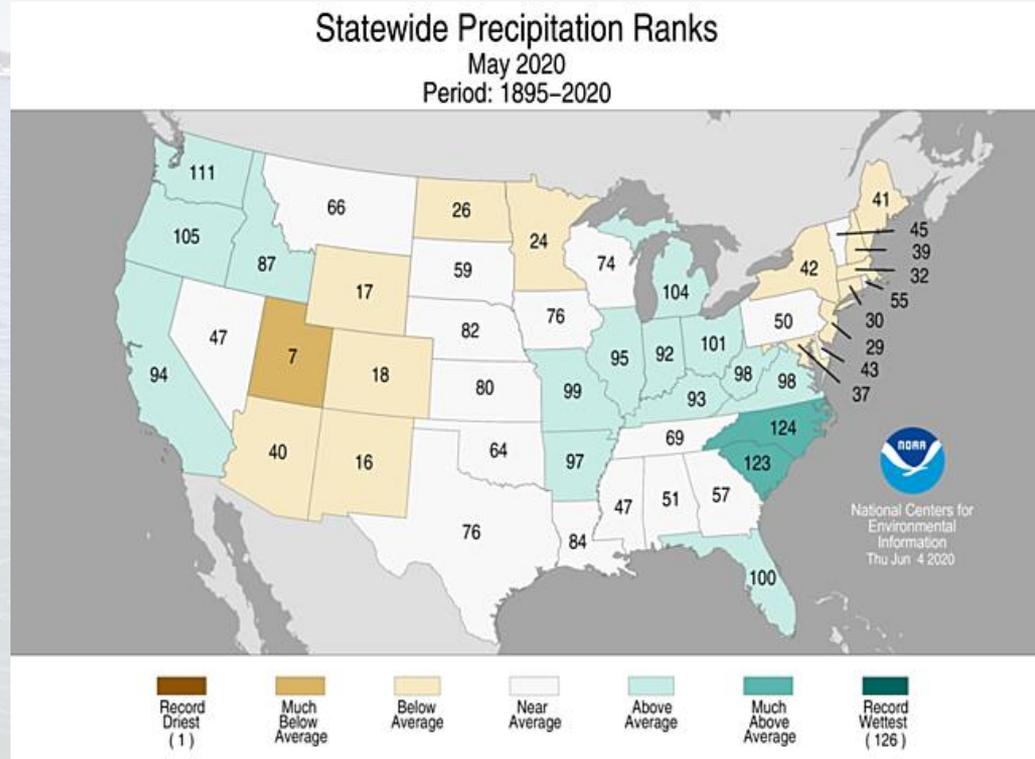




# May Precipitation Recap

- Mixed conditions across the region
- Dry in the west and north (17<sup>th</sup> and 18<sup>th</sup> driest, respectively for WY and CO)
- Wetter than average across the eastern states (top 20-30)

# Recent Climate Conditions

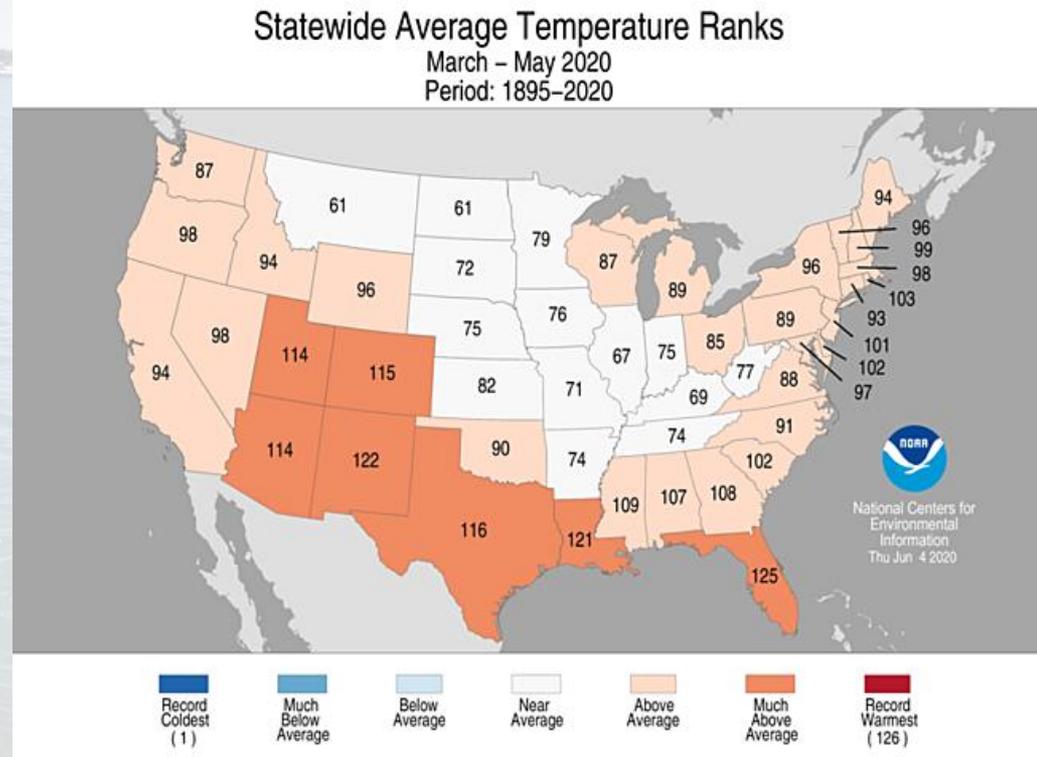




## March - May Temperature Recap

- Despite a chilly April and May, temperatures were near to above average for much of the region
- 12<sup>th</sup> warmest for CO
- ~Top 40<sup>th</sup> warmest in the east

## Recent Climate Conditions

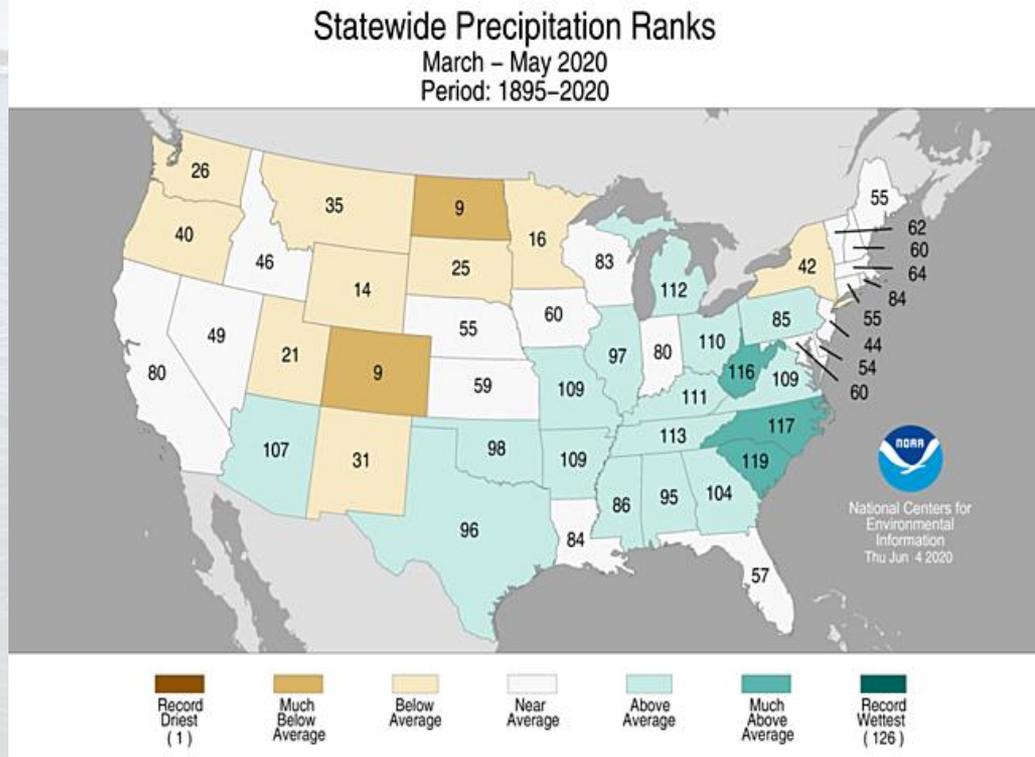




## March - May Precipitation Recap

- Dry West / Wet East
- 9<sup>th</sup> driest for CO and ND; Below average across the Northern Great Plains
- Top 20 wettest for MI, OH, and MO; IN sticks out in the East

## Recent Climate Conditions

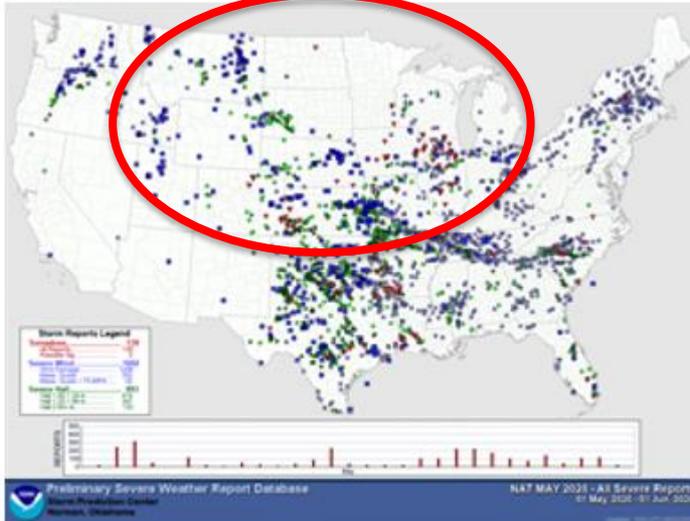




# Lack of Severe Weather Across the U.S.

# Recent Climate Conditions

## Fewest May Severe Weather Reports (2,627) since 2014 (2,406)



## Fewest May Tornado Watches in Recorded History (1970-present)



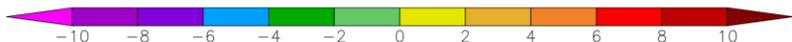
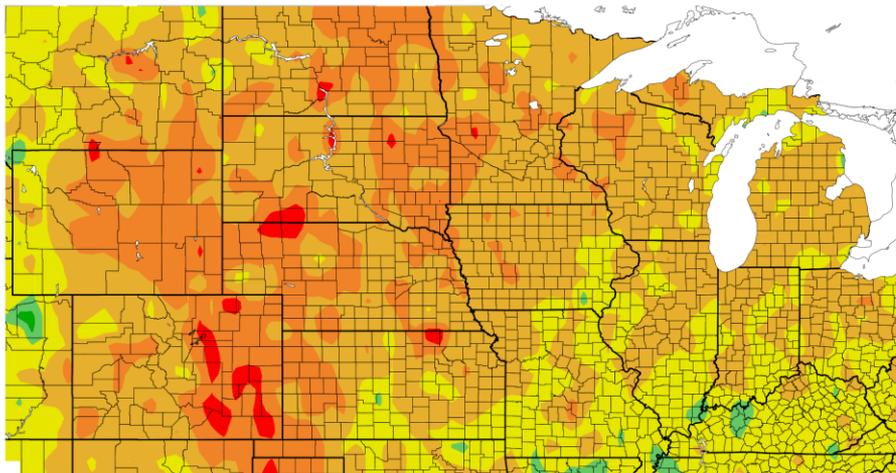
Number of May Tornado Watches	Year
10	2020
12	2018
15	2014
16	2012
22	2016
24	1979



## Recent Climate Conditions

### Last 30 Days: Temperature

Departure from Normal Temperature (F)  
5/18/2020 – 6/16/2020



Generated 6/17/2020 at HPRCC using provisional data.

NOAA Regional Climate Centers

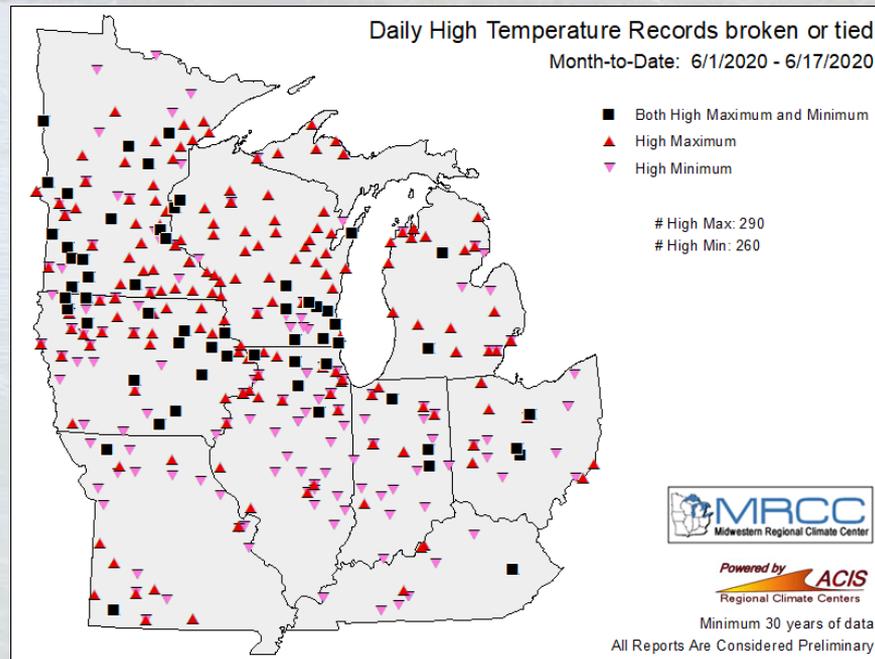
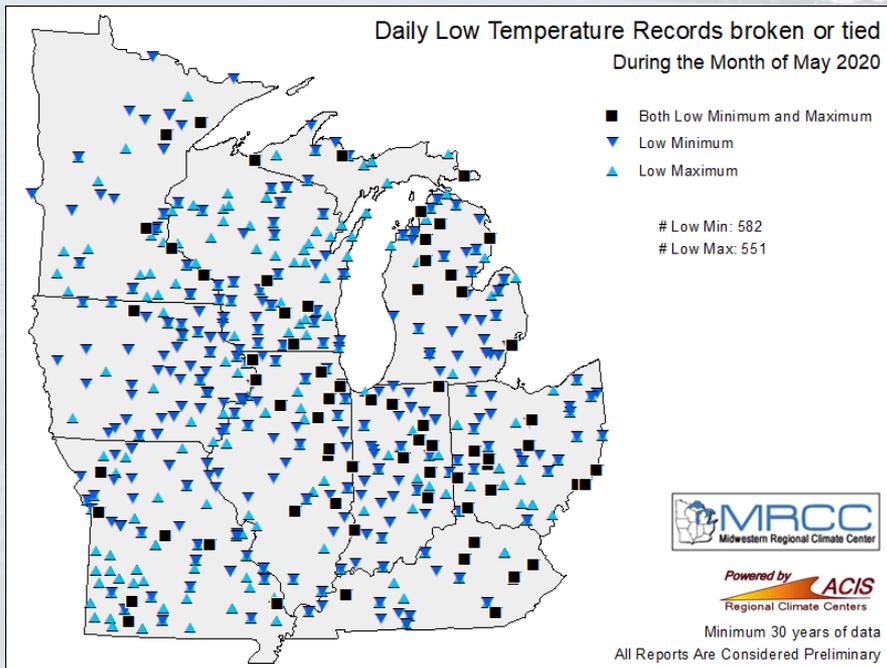
- Well above average (4-8°F) across the western states and northern Great Plains
- Multiple locations setting records for most days 90°F or greater (e.g., Sioux Fall, Sioux City)
- Not as hot in the east - a couple of degrees above average



# Recent Climate Conditions

## Daily Records

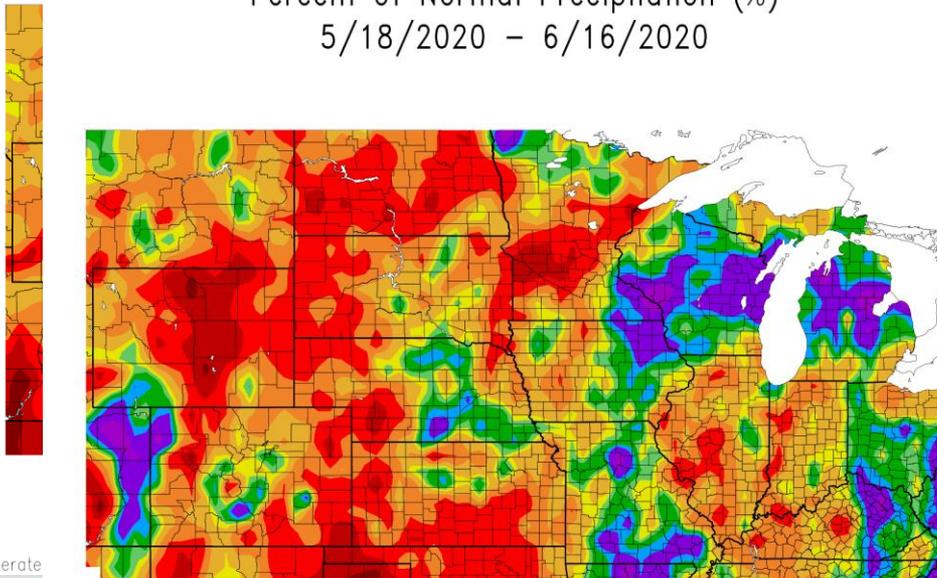
**May Cold** → **June Heat**



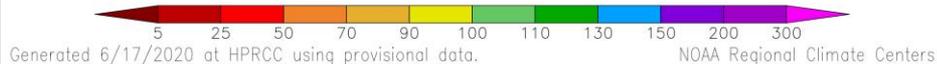


Precipitation (in)  
5/18/2020 – 6/16/2020

Percent of Normal Precipitation (%)  
5/18/2020 – 6/16/2020



Generate



## Recent Climate Conditions

### Last 30 Days: Precipitation

- Heavy rainfall (>5”) from MO northward through parts of IA and WI; also in KY and Southern/Central OH
- Less than 2” from West Central MN, through Dakotas, Western NE/KS, WY and CO
- Dry conditions also concentrated in Western KY, IL, and IN



# Hydrology

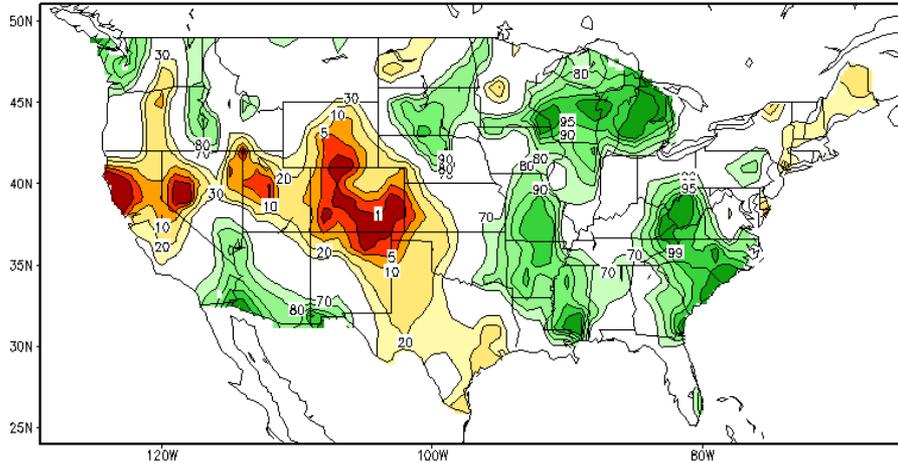
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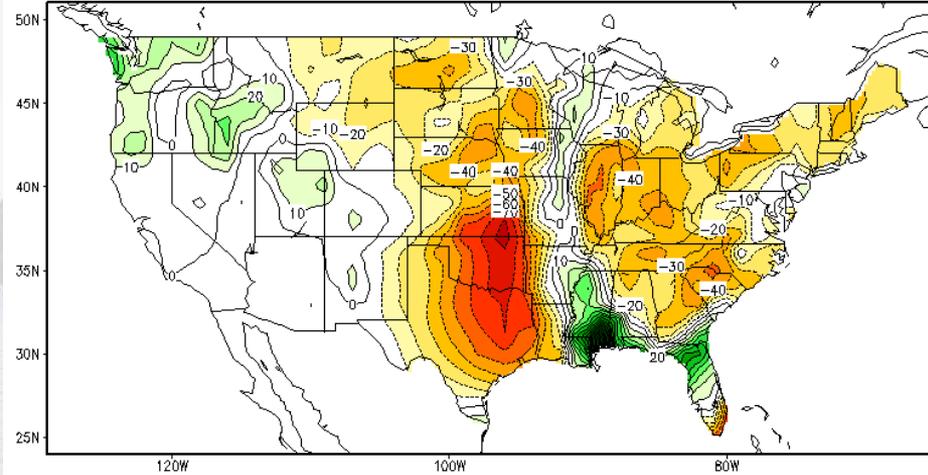
# Hydrology

## Soil Moisture

Calculated Soil Moisture Ranking Percentile  
JUN 16, 2020



Calculated Soil Moisture Anomaly Change  
JUN 16, 2020 from MAY 31



Source: [https://www.cpc.ncep.noaa.gov/products/Soilmst\\_Monitoring/US/Soilmst/Soilmst.shtml](https://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml)

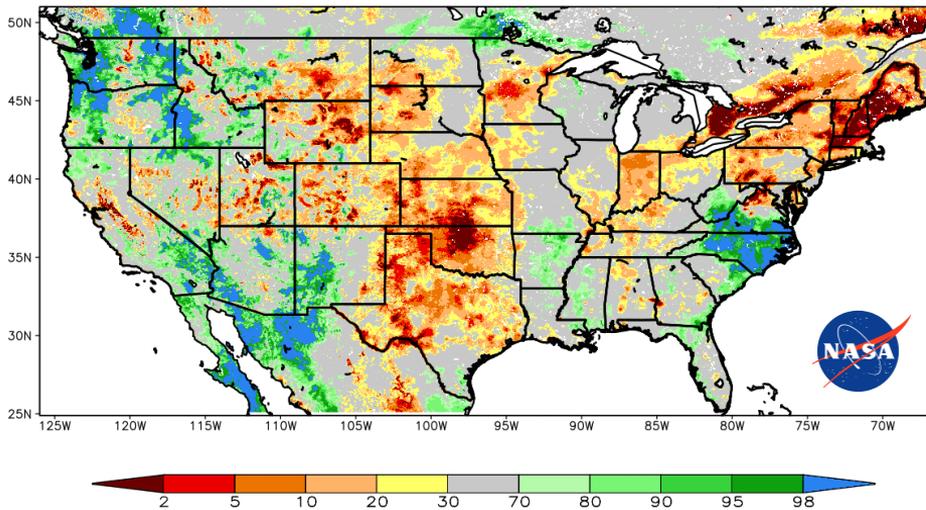
- Recent path of T.S. Cristobal clearly stands out (MO-WI)
- Elsewhere – rapidly drying soils; especially in S. KS



# Hydrology

## Soil Moisture

SPoRT-LIS 0-40 cm Soil Moisture percentile valid 17 Jun 2020

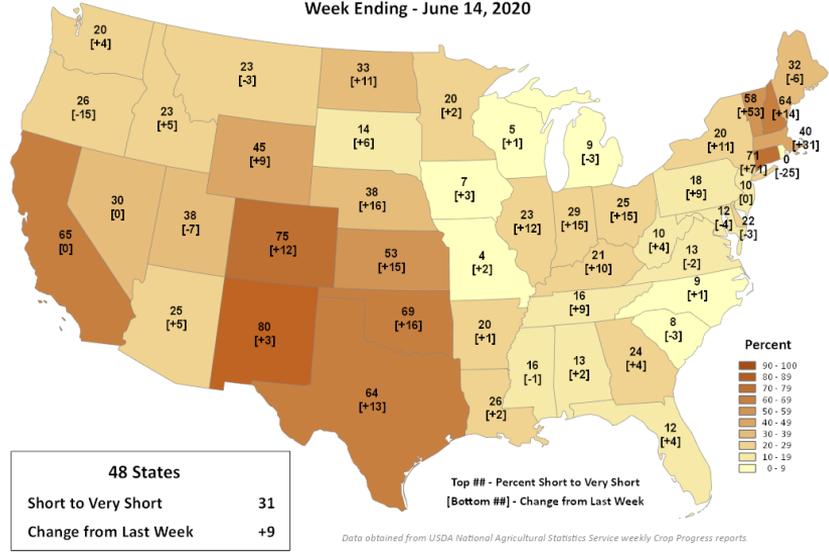


Source: [https://weather.msfc.nasa.gov/sport/case\\_studies/lis\\_CONUS.html](https://weather.msfc.nasa.gov/sport/case_studies/lis_CONUS.html)

- Very dry in the upper portion of the soils across S. KS, western Dakotas, Central MN
- Drying rapidly across IN and NW OH, NE, KS, CO



**Topsoil Moisture**  
Percent Short to Very Short  
Week Ending - June 14, 2020

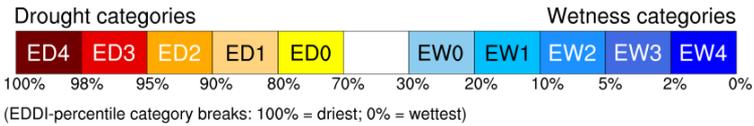
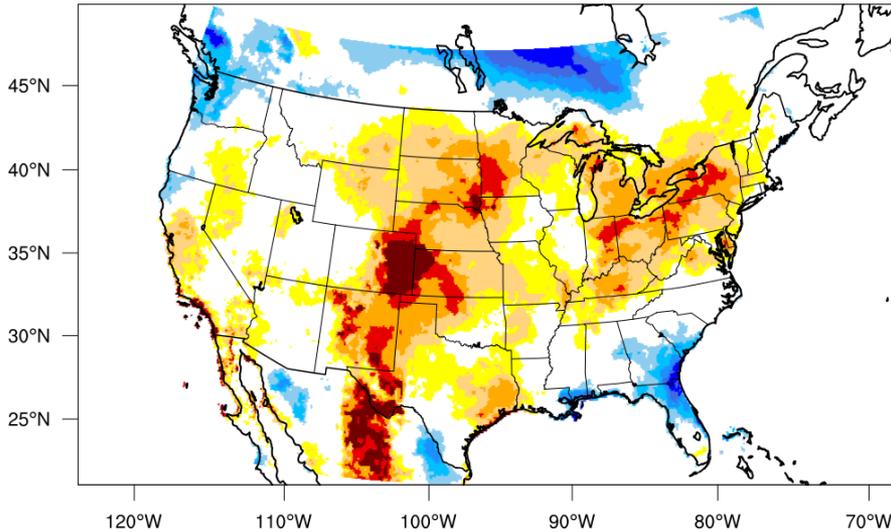




# Hydrology

## Evaporative Demand Drought Index

1-week EDDI categories for June 11, 2020



Generated by NOAA/ESRL/Physical Sciences Division

- “Thirst of the atmosphere” or precursor for water stress
- 1-month: Strong indication of drying-conditions across the west, northern Great Lakes, and parts of OH/KY
- 1-week: Rapidly increasing demand due to dry air, sunny skies, and heat: CO-western KS-southwest NE; southeast SD-southwest MN; northern IN-northwest OH
- Heat and very windy conditions leading to intense evaporation rates across Central and Northern Plains



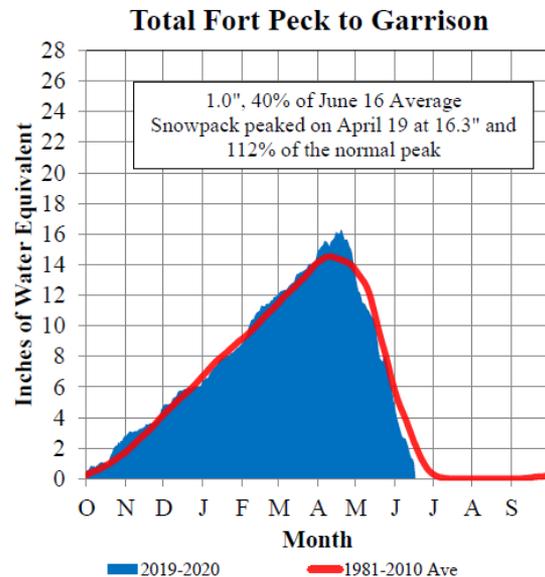
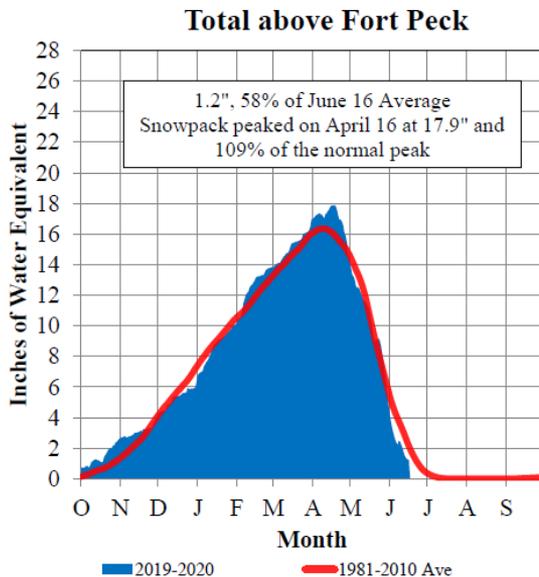
# Hydrology

## Missouri River Snowpack

- Above average temperatures led to rapid snowmelt and some early flooding of upstream tributaries

### Mountain Snowpack

16-Jun-2020



Thanks to Kevin Grode, P.E.  
Northwestern Division  
MRBWM Reservoir Regulation Team Lead

The Missouri River Basin mountain snowpack normally peaks near April 15.



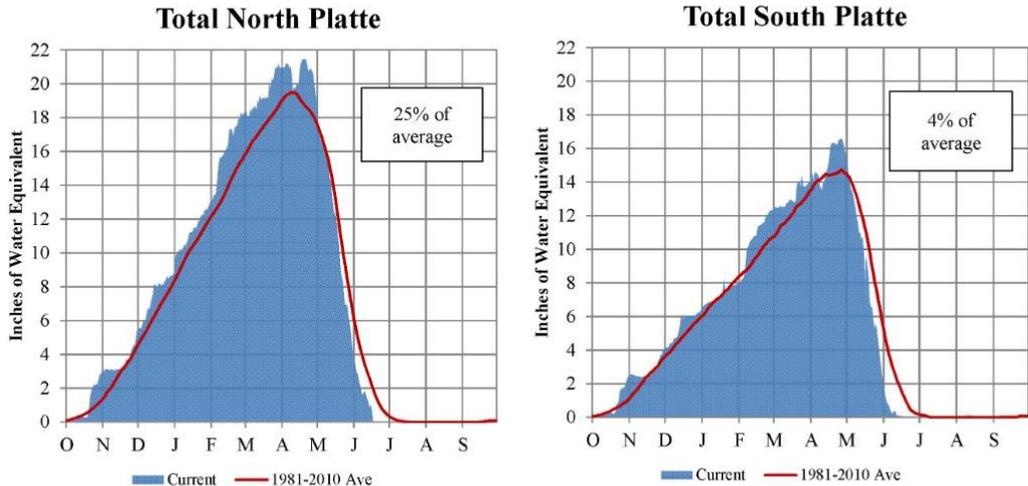
# Hydrology

## Platte River Snowpack

- Snowpack melted very quickly – note the higher than average peaks but rapid loss through May and June
- Flows on tributaries lower than normal for this time of year

### Platte River Basin - Mountain Snowpack Water Content Water Year 2019-2020

June 17, 2020



The North and South Platte River Basin mountain snowpacks normally peak near April 15 and the end of April, respectively. As of June 16, 2020, the mountain snowpack SWE in the "Total North Platte" reach is currently 0.5", 25% of average. The mountain snowpack SWE in the "Total South Platte" reach is currently 0.1", 4% of average.

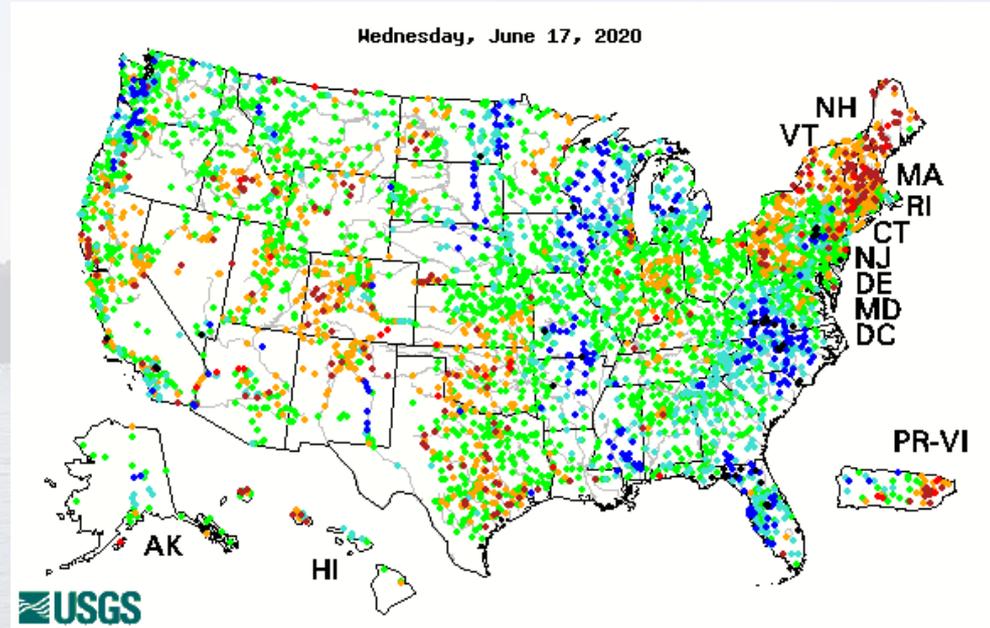
Thanks to Kevin Grode, P.E.  
Northwestern Division  
MRBWM Reservoir Regulation Team Lead



# Hydrology

## 7-Day Stream Flows

- Stream Flows generally falling across the region
- Below normal for parts of IN/OH, southern KS, central MN, and western ND
- Above the 90<sup>th</sup> percentile in central MO northward through IA, WI, and MI



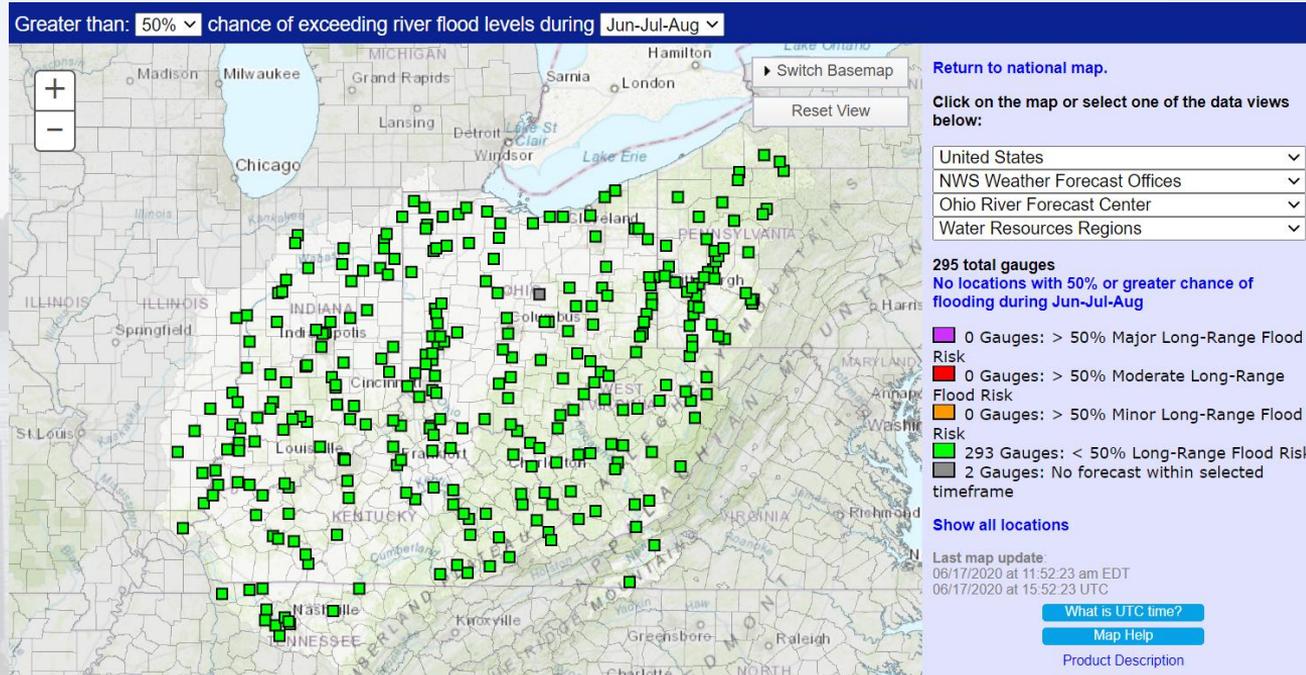
Explanation - Percentile classes						
Low	<10 Much below normal	10-24 Below normal	25-75 Normal	76-90 Above normal	>90 Much above normal	High



# Hydrology

## River Forecasts (Jun-Aug): Ohio River Valley

- No immediate concerns here for flooding
- Stream flows are dropping in this basin

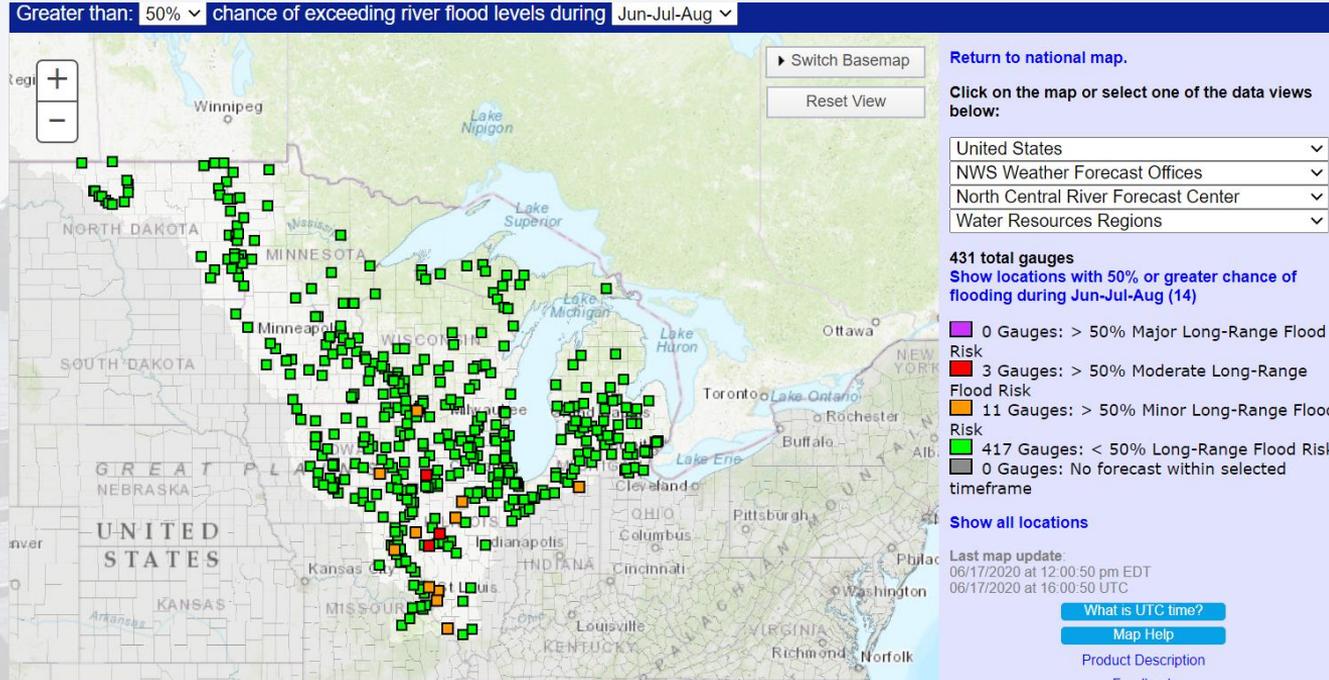




# Hydrology

## River Forecasts (Jun-Aug): Upper Mississippi

- Peaked last week from early June rains
- Fall below flood levels next week and not likely to return soon

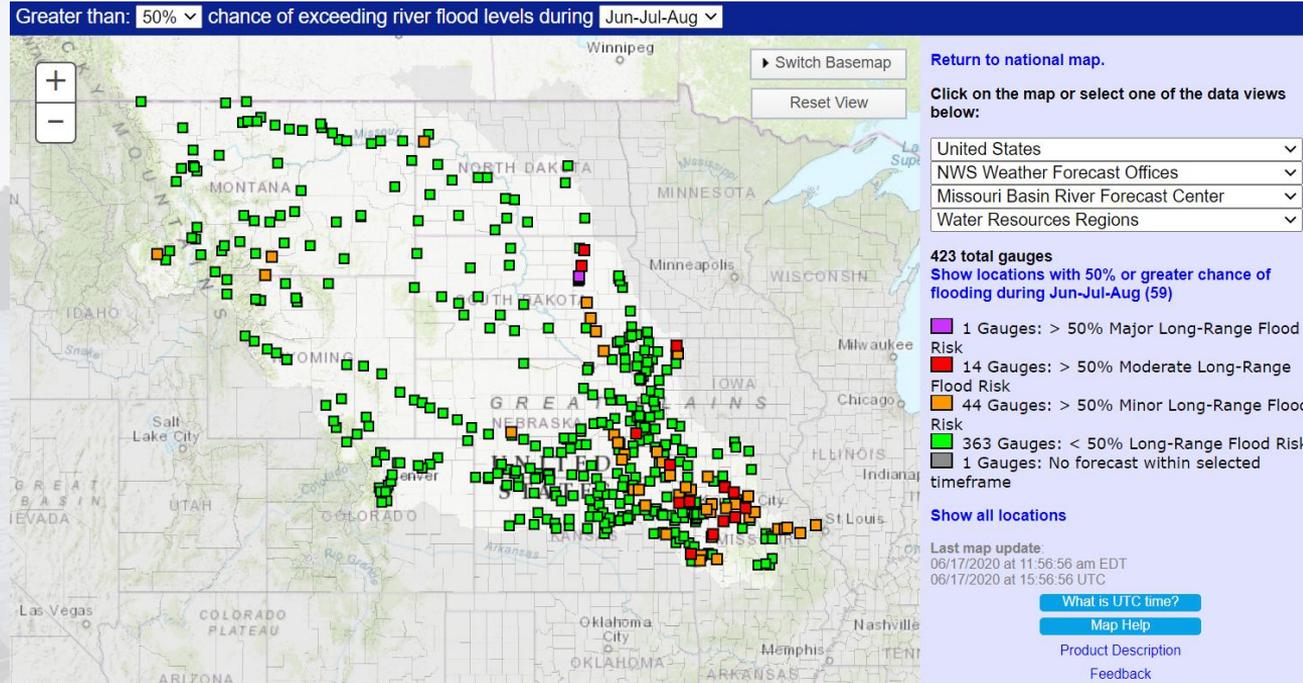




# Hydrology

## River Forecasts (Jun-Aug): Missouri River Valley

- Past peak mountain snowmelt
- Flood potential is normal as drier conditions have allowed soils to dry out
- Episodic minor-to-moderate flood in the lower third of the basin



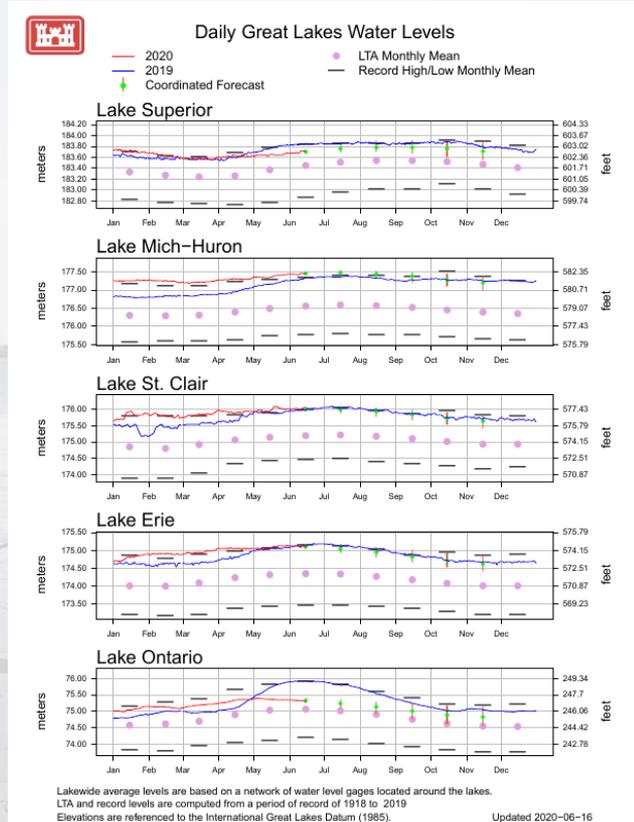


# Hydrology

## Great Lakes

- Lakes Superior and Michigan-Huron are slowly climbing
- Lakes St. Clair and Erie are maintaining near-record levels
- Lake Ontario dropping a bit and below 2019
- Navigation problems (strong currents when high flow pulses move through) and flooding, erosion
- Forecasts show levels peaking in June/July then falling, but staying near record levels

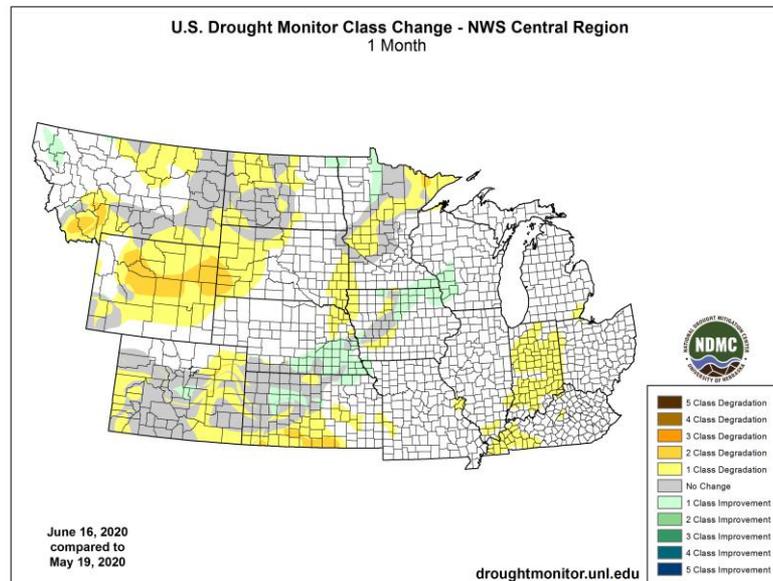
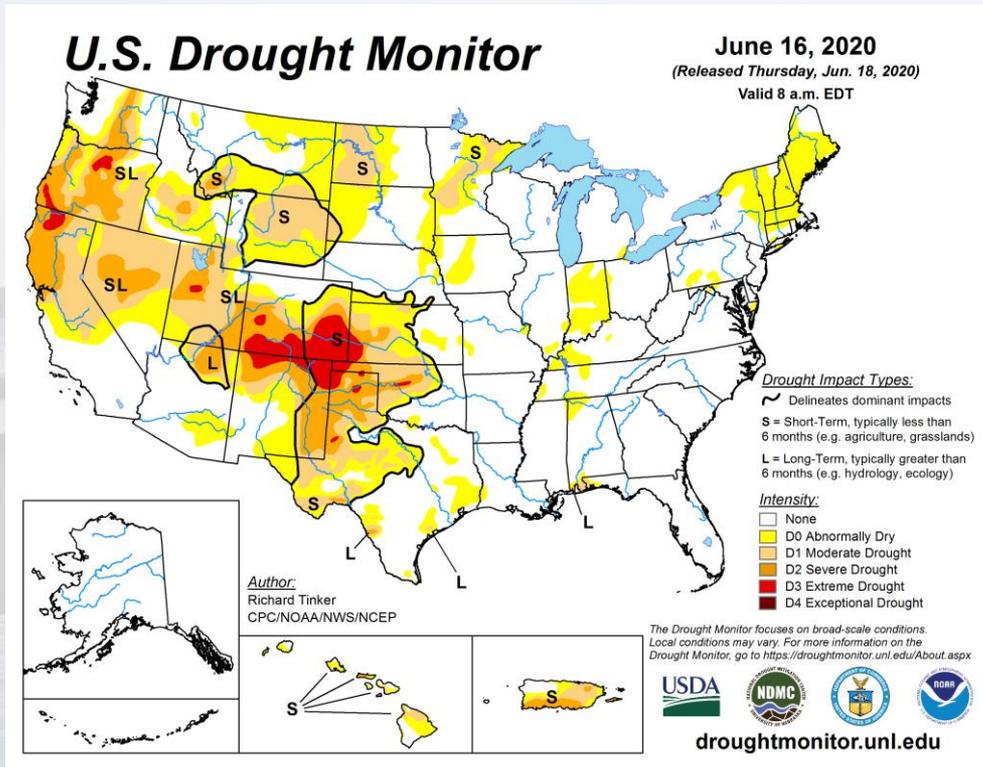
<https://www.lre.usace.army.mil/Missions/Great-Lakes-Information/Great-Lakes-Information-2/Basin-Conditions/>





# Hydrology

## U.S. Drought Monitor



- Share impacts with local experts and/or the Drought Impact Reporter (<https://droughtreporter.unl.edu/map/>)



# Agriculture

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**Top and Right Pictures reflecting the contrasting conditions across Kansas (Top): Romulo Lollato (Wheat Specialist, KSRE); (Right): Ignacio Ciampitti (Crop Specialist, KSRE).**



**Background Picture courtesy of Kenzie Johnston with OSU Extension**



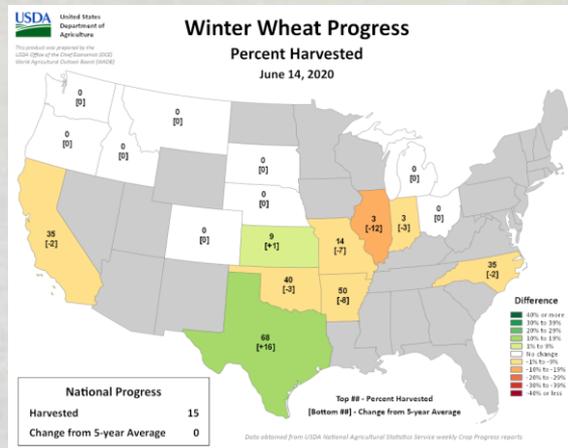
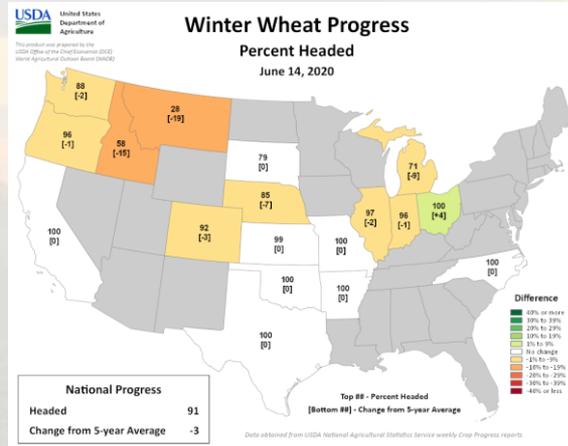
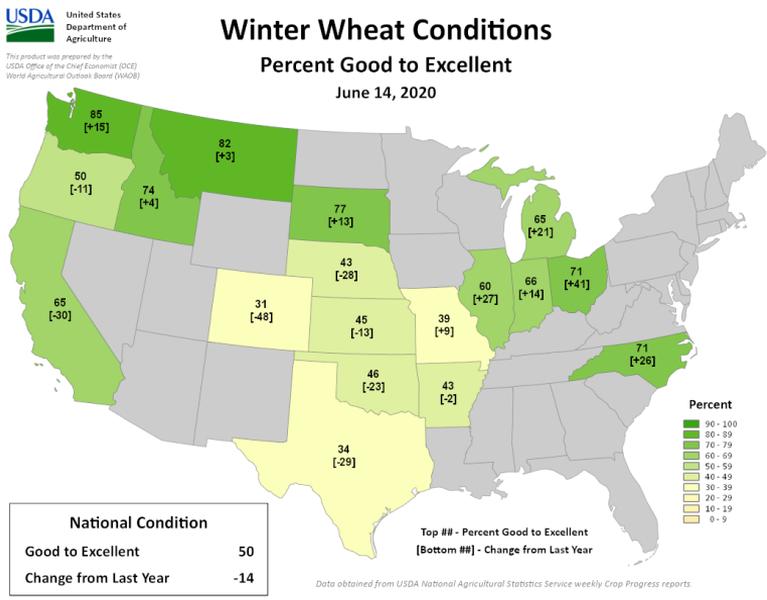
# USDA NASS Crop Progress: Winter Wheat

## Agriculture

- Progress a little behind 5-year average (-3%)

- Harvest behind in MO-IL-IN

- Crop conditions in Good-to-Excellent ~50%; down from 2019



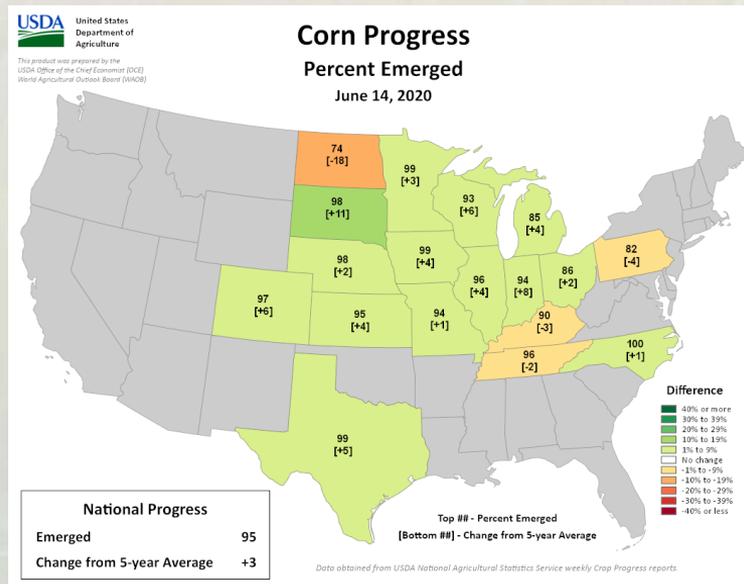
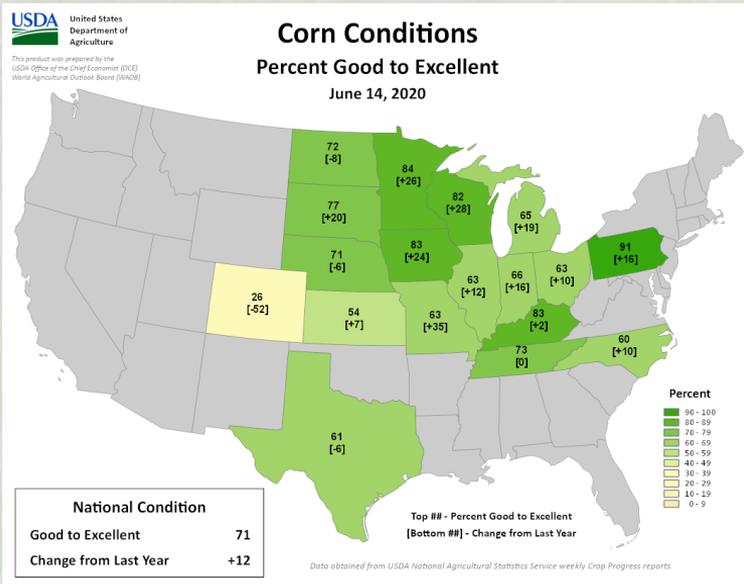
Thanks to Brad Rippey – USDA OCE Washington D.C.



# Agriculture

## USDA NASS Crop Progress: Corn

- Corn progress is ahead of 5-year average (well behind in ND as residual 2019 issues continue – dry surface but too wet below)
- Corn conditions much improved over 2019



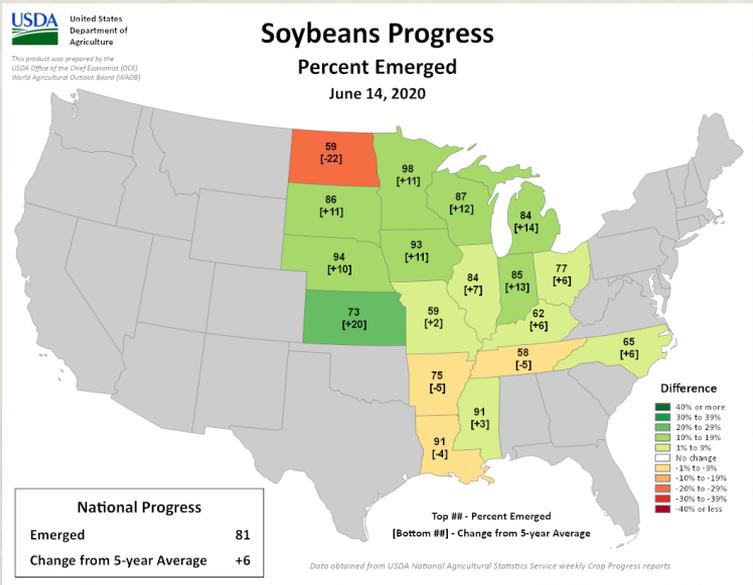
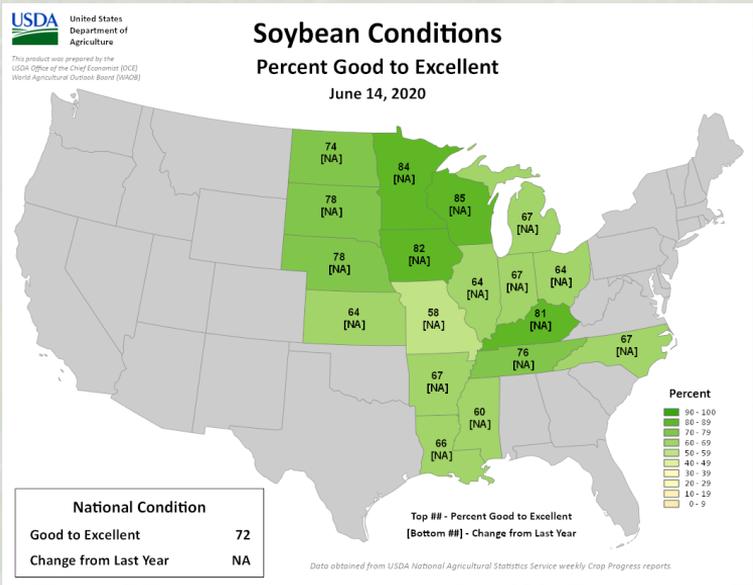
Thanks to Brad Rippey – USDA OCE Washington D.C.



# Agriculture

## USDA NASS Crop Progress: Soybean

- Soybean progress is ahead of 5-year average (well behind in ND as residual 2019 issues continue – dry surface but too wet below)
- Soybeans are fairing well (72% Good to Excellent)



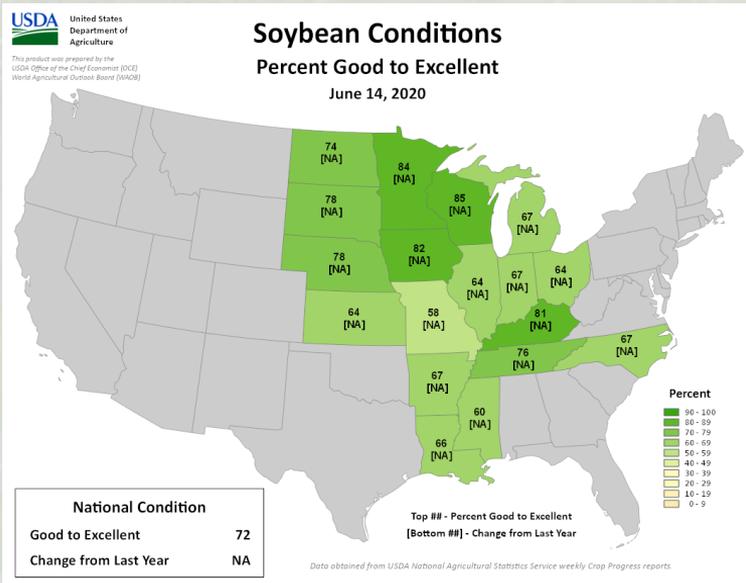
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# Agriculture

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- Soybeans are fairing well (72% Good to Excellent)



Far Right: Soybean field near the Twin Cities. Courtesy of Pete Boulay - Climatologist MNDNR Ecological and Water Resources

Thanks to Brad Rippey – USDA OCE Washington D.C.

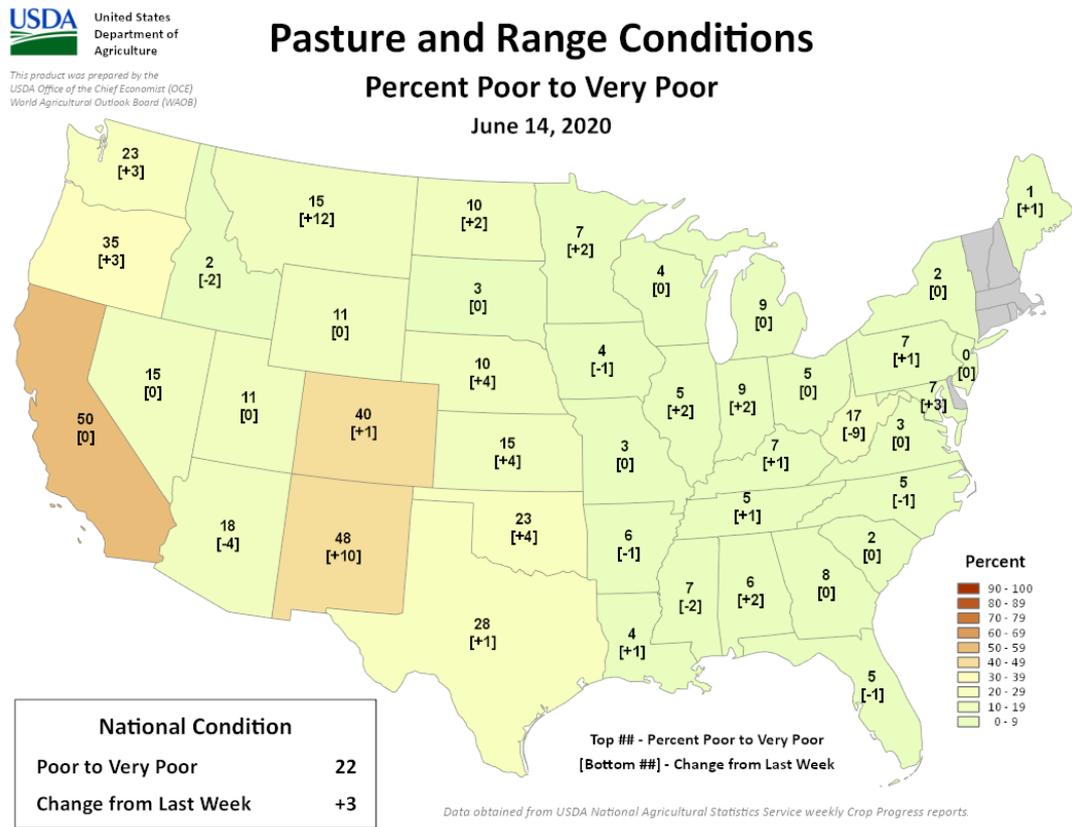


# Agriculture

## USDA NASS Crop Progress: Pasture/Rangeland

- Deteriorating conditions across the western states (CO, KS, NE, ND)
- Worse conditions compared to last year (+16% Poor to very poor – not shown)

Thanks to Brad Rippey – USDA OCE Washington D.C.





## Pasture/Rangeland (Montana)

## Agriculture



Photos Courtesy of Michael Downey, Water Planning Section Supervisor - MT DNRC

- No green-up on mid-to-low elevation cool season grasses
- Hot, dry, and windy weather does not bode well



## Agriculture

### Other Issues

- 50% hay yields in western SD due to dry spring conditions; similar conditions in western KS/NE – future cuttings in jeopardy; better in the east
- Some cattle being sold in the west; hauling water for livestock (e.g., in Colorado)
- Reduced alfalfa in spots as well (e.g., IA and SD – alfalfa weevil pressure)
- Michigan tart cherry loss of 65 million lbs compared to 2019
  - Using 5-year (2015-2019) average Michigan tart cherry production of 189 million pounds, the state alone has lost about 66 million pounds of production potential – worth about \$13.2 million.
  - Early season heat has also led to poor pollination in stonefruits/apples
  - Large fruit drop from combined impacts – likely low yields



## Agriculture

### Other Issues

- Replant taking place in some of the wetter areas but close to wrapping up
- Driest areas starting to stress crops – may help others develop good root structure
- Heat and wind are making conditions worse – large demand for moisture

**Pictures: Corn in NE Guthrie County, Iowa mostly hilltops and poorer soils. Courtesy of Craig Cogil Senior Forecaster-National Weather Service**





# Major Events

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# Rare Western Derecho

# Major Events

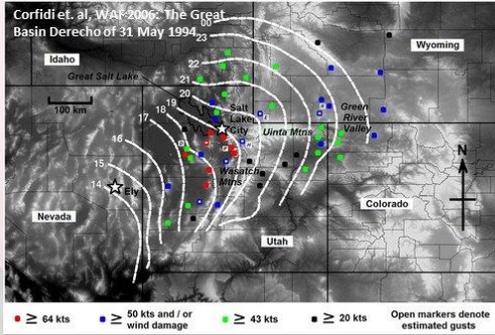
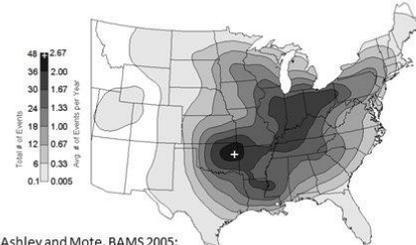


Figure 1. The frequency of U.S. derechos 1986-2003. Symbol indicates the maximum value before interpolation.



June 6, 2020 derecho event is exceedingly rare.

\* Only two other Western U.S. events well-documented in literature: May 31, 1994 and June 1, 2002.

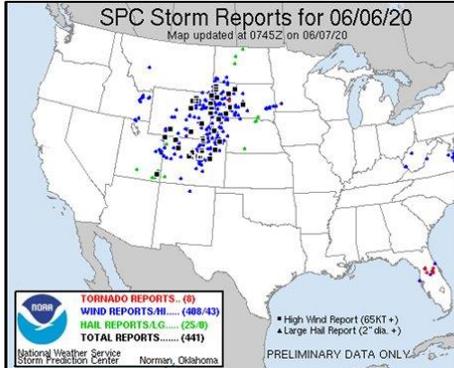
June 6, 2020 Derecho stats (based on prelim data):

Began in southern UT around 15Z (9am MDT). Last severe wind report received at 25Z (852pm MDT).

Severe wind reports span at least 750 miles from far southeast Utah to southwest North Dakota.

Produced severe wind reports for nearly 12 hours and tracked northeast at an average pace near 60 mph.

Highest measured gust: 110 mph from the Winter Park Ski Area in Grand County, CO.

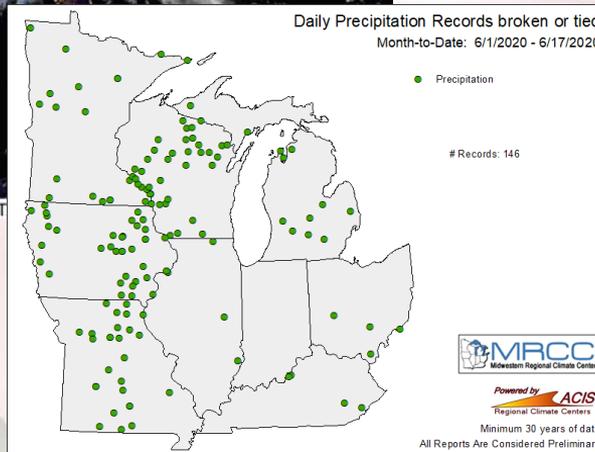
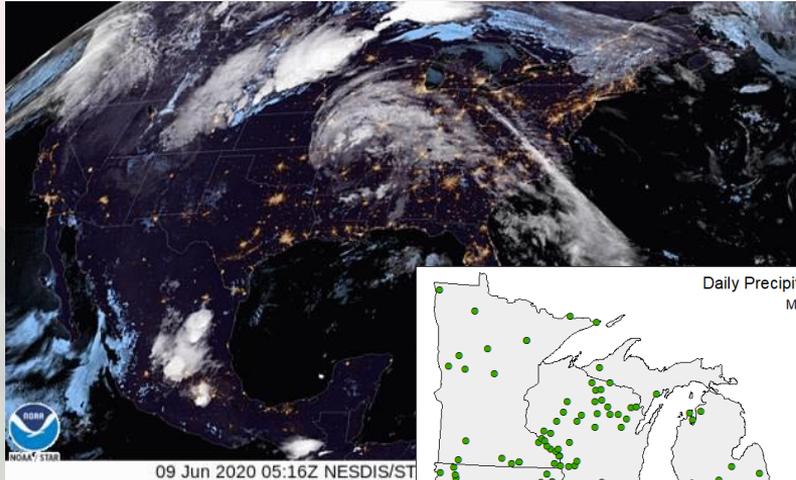


- The most significant wind gusts (75+ mph) in a single day (44)
- Exceptionally rare occurrence for this region
- 110 mph wind gust at Winter Park Ski Area in Grand County, CO



## Early Tropical Activity

## Major Events



- T.S. Cristobal (June 8-10) Swath of locally heavy rain from LA northward into WI and MI
- T.S. Cristobal is the second tropical system on record to move through Iowa. The last was an unnamed T.S. that made landfall in Galveston, TX and entered Iowa on September 11th, 1900.
- Power outages numerous throughout the region; Mudslides reported in MN; Floods and inundated fields in Iowa (band of 3-6" of rain)



## Major Events

### Springtime in the Rockies!

- June 8: 7 to 8 inches in the Laramie Valley.
- The event broke the daily snowfall record as well as the June monthly snowfall record, both of which had been set in 1974.
- Around 10,000 were without power for about 12 hours.
- More snow in the high country of NW Wyoming





# Outlooks

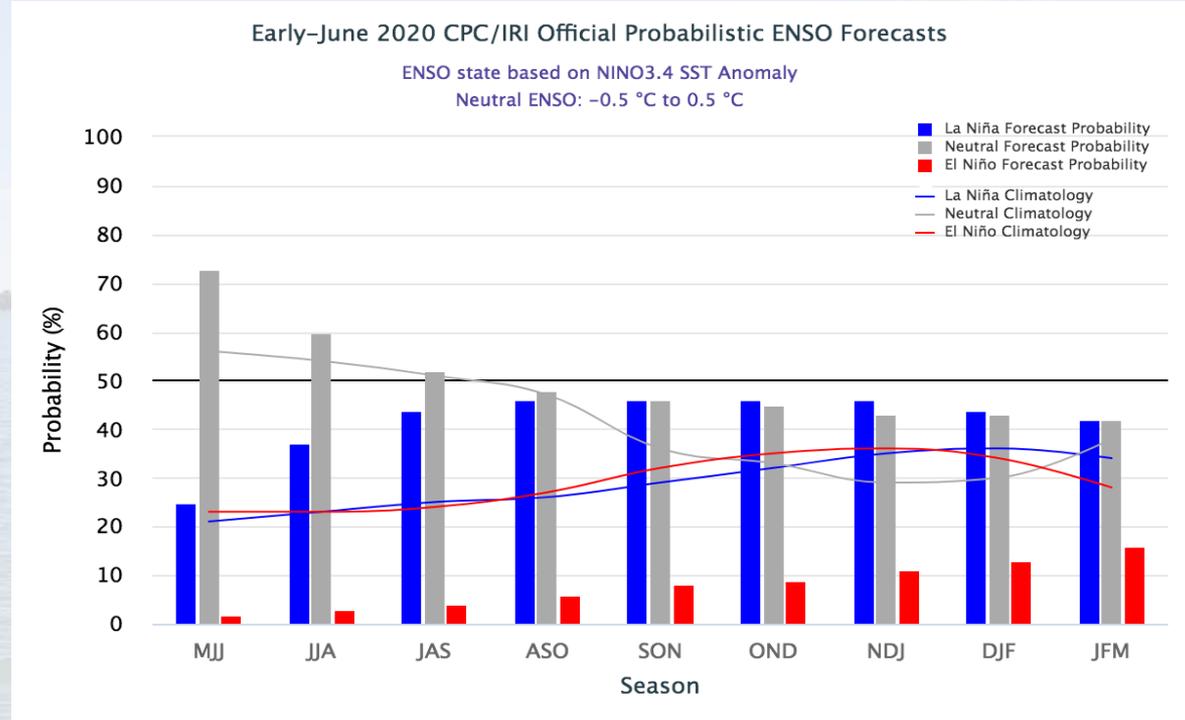
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# Outlooks

## ENSO Status and Projection

- ENSO-neutral is most likely to continue through the Northern Hemisphere summer 2020, with roughly equal chances of ENSO-neutral or La Niña beginning in August-October 2020.
- Not forecasting La Niña at this time

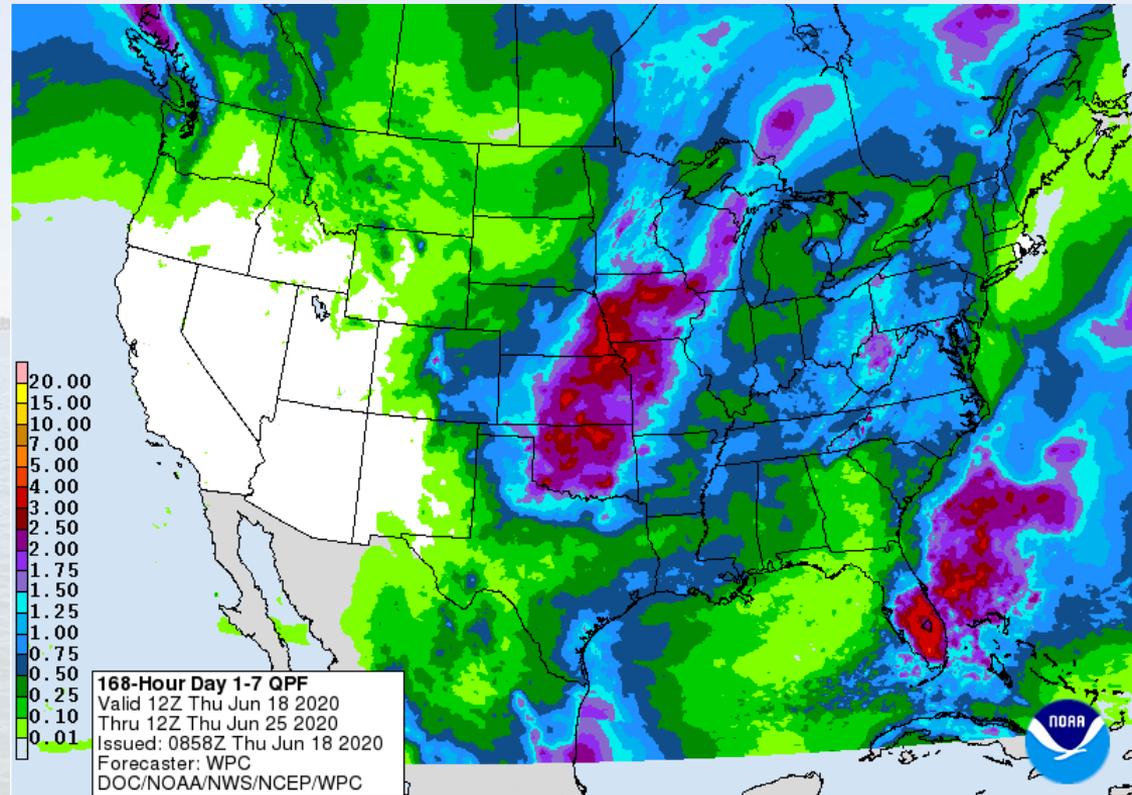




## 7-Day Quantitative Precipitation Forecast

Valid 7am Thu June 18 –  
7 am Thu June 25

- Actual precipitation is likely to be more isolated than indicated
- Given current evaporation rates, only the heaviest rainfall will ease drying conditions long-term; lighter rains will not likely to have big impact



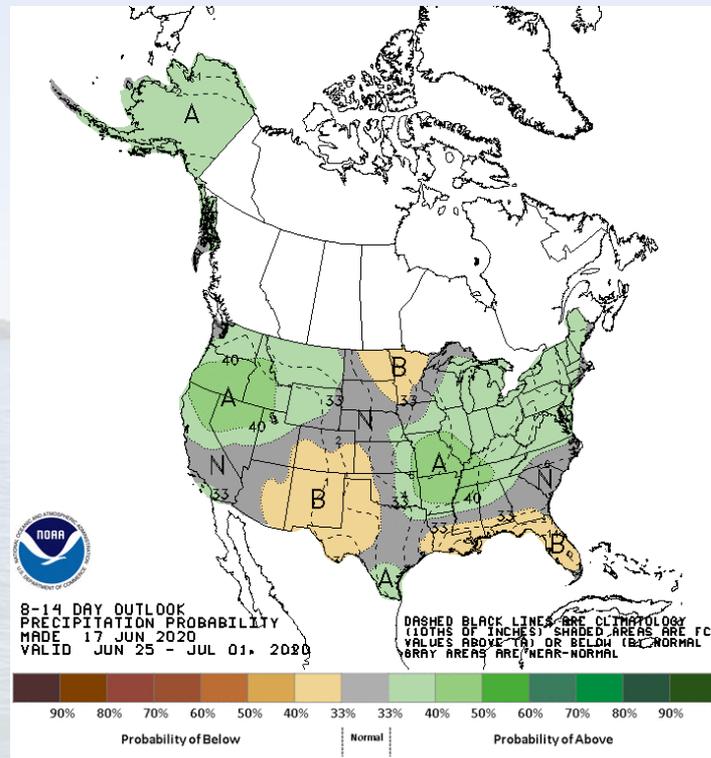
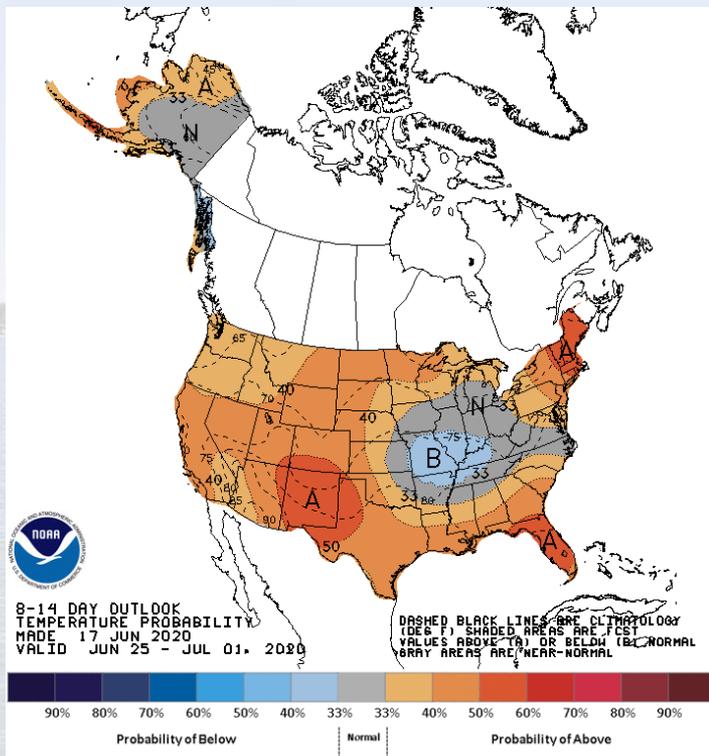
Source: <https://www.wpc.ncep.noaa.gov/#>



# Outlooks

## 8-14 Day Temperature/Precipitation Probabilities

June 25 –  
July 1, 2020



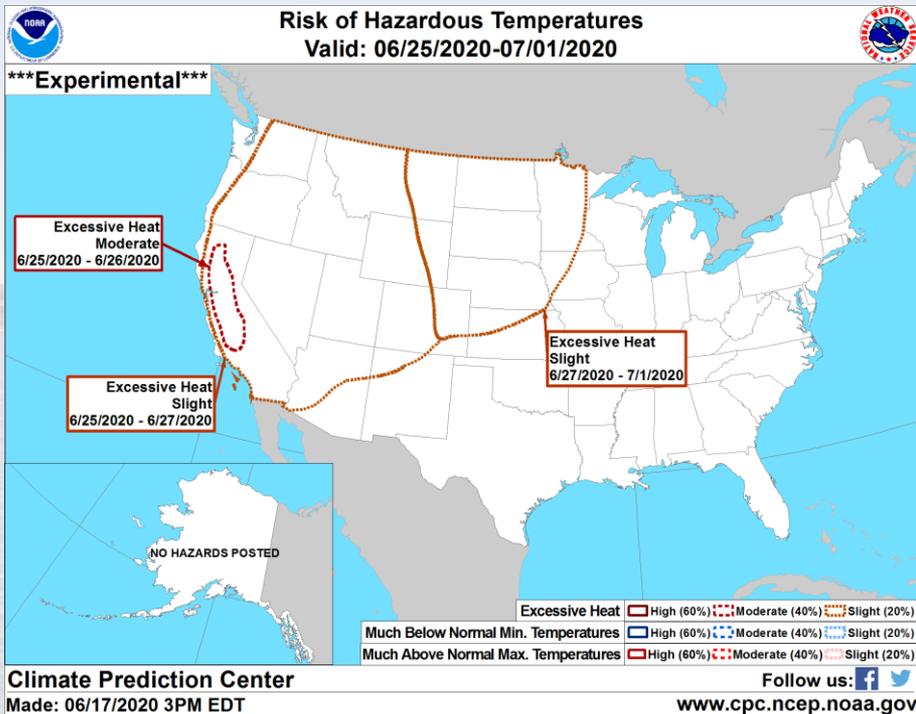
Source: <http://www.cpc.ncep.noaa.gov/products/predictions/814day/index.php>



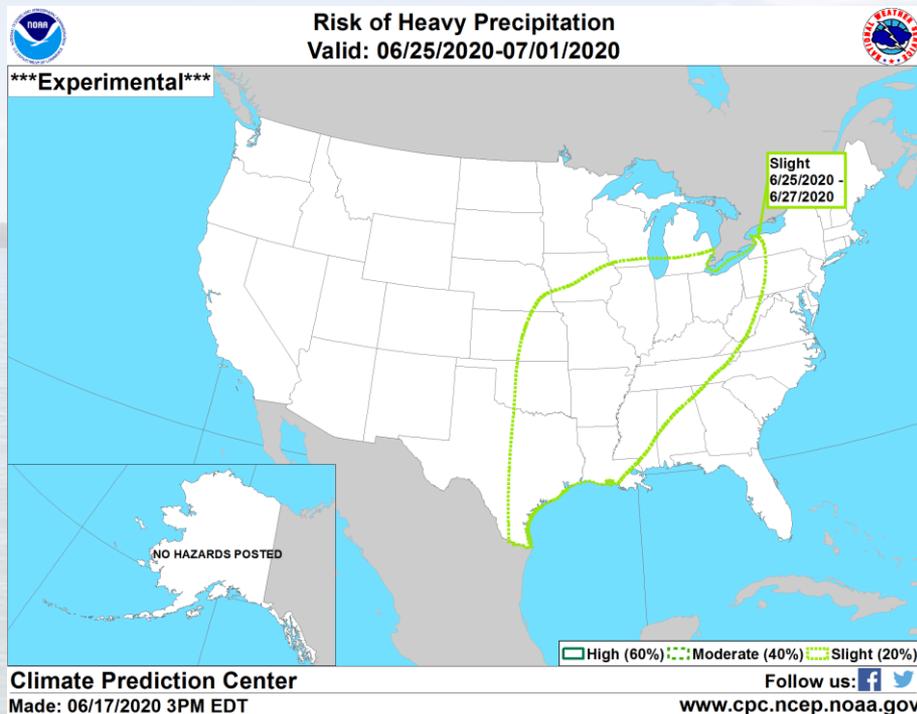
# Outlooks

## 8-14 Day Risks

## June 25 – July 1, 2020



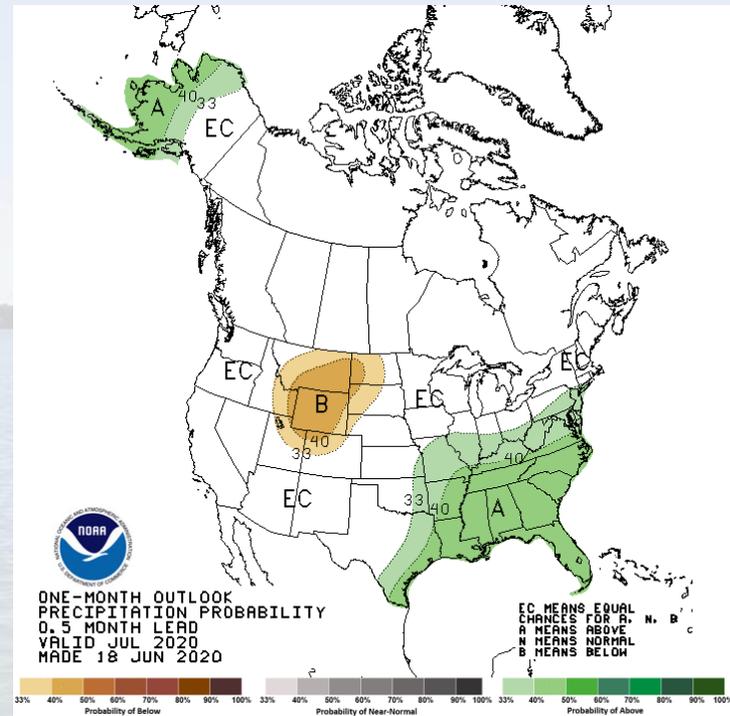
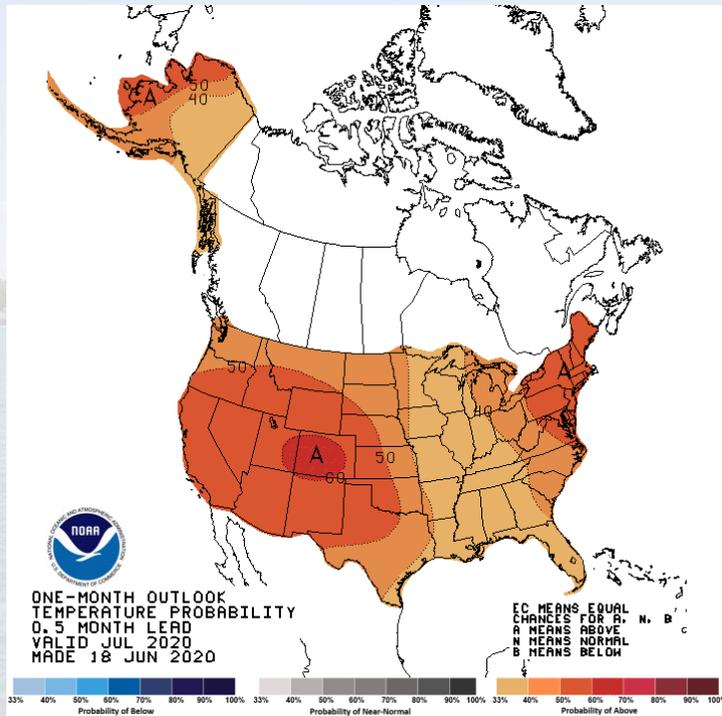
Source: <https://www.cpc.ncep.noaa.gov/>





# Outlooks

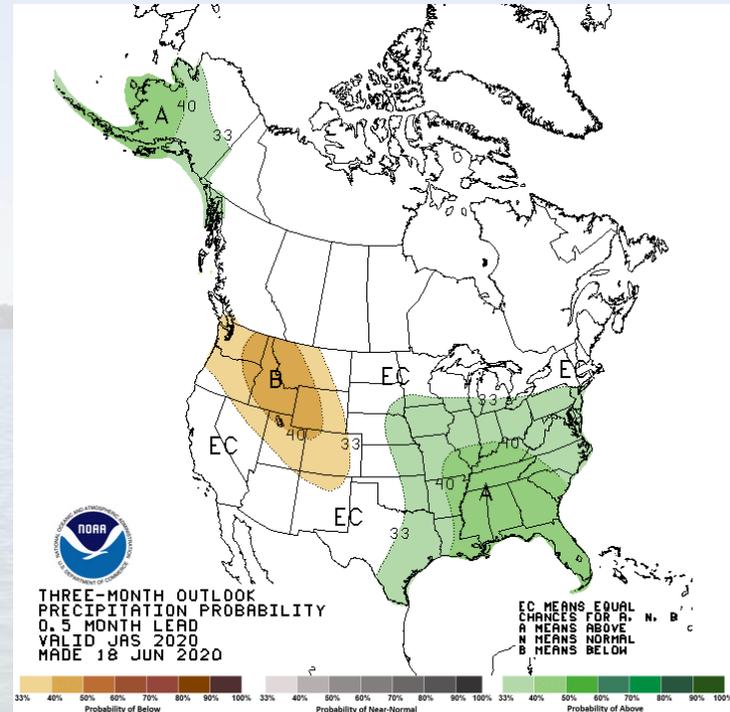
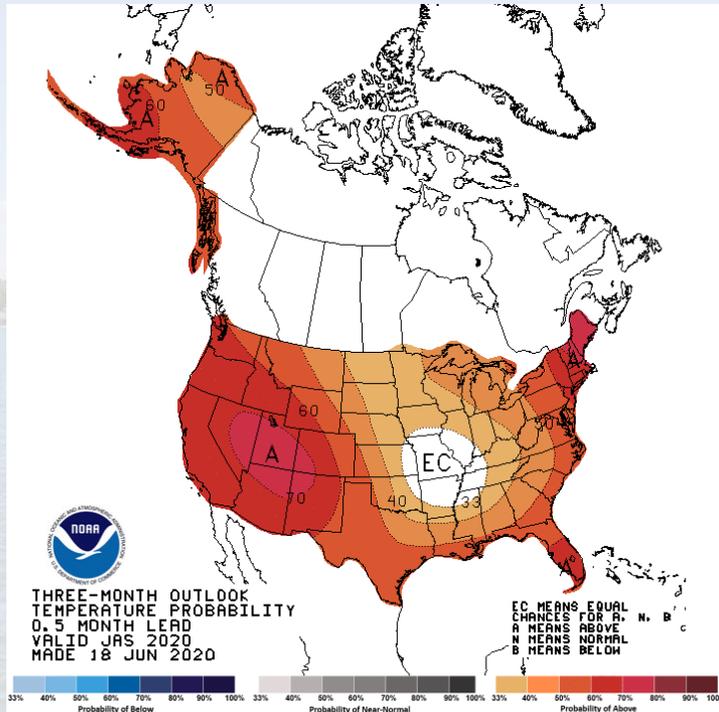
## July Temperature/Precipitation Probabilities





# Outlooks

## Jul - Sep Temperature/Precipitation Probabilities





# Outlooks

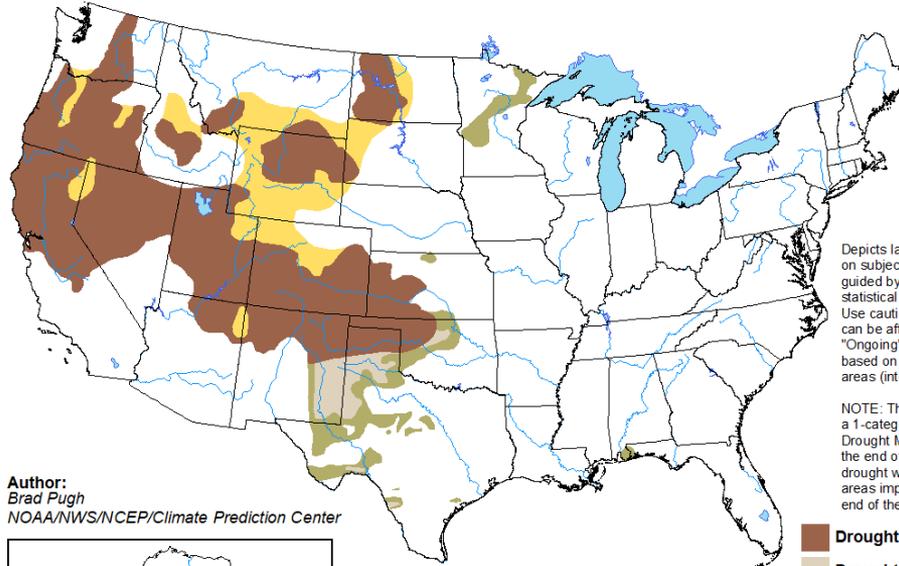
## Drought Outlook

- Generally across the region – conditions will like deteriorate before improving in September

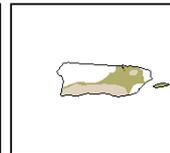
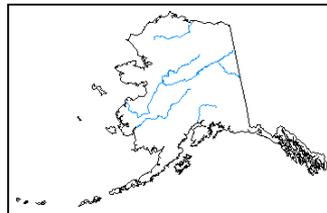
### U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

Valid for June 18 - September 30, 2020  
Released June 18



Author:  
Brad Pugh  
NOAA/NWS/NCEP/Climate Prediction Center



Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

- Drought persists
- Drought remains but improves
- Drought removal likely
- Drought development likely

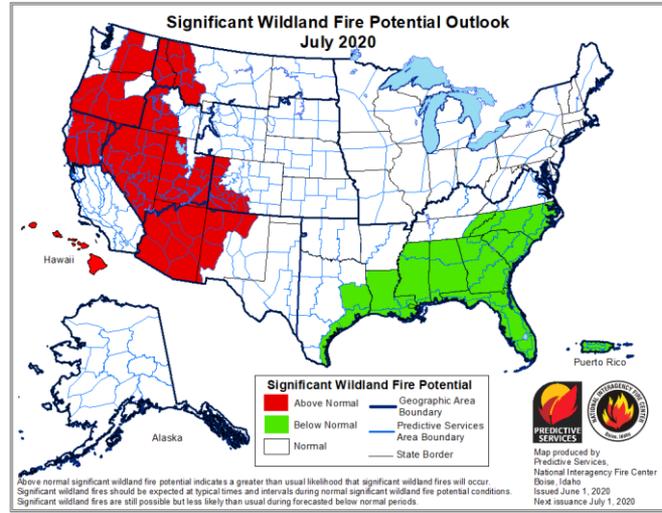
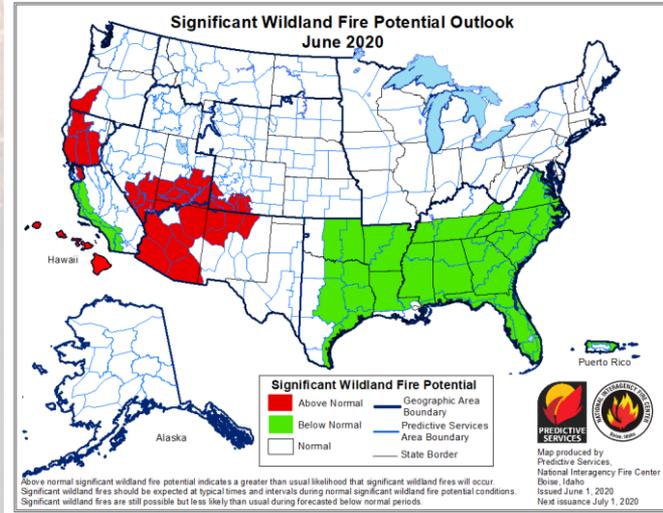


<http://go.usa.gov/3eZ73>



# Outlooks

## Fire



- High wildland fire danger present in SW Colorado; Above normal potential to expand throughout western Colorado and western Montana during July
- Emergency declaration made in western Kansas to prepare; may not be capturing concerns across the Northern Plains

Source: <https://www.weather.gov/iln/fireweather>



## Conditions Summary

- Transitioned from cooler to warmer than average across the North Central Region
- Very warm and windy across the central and northern Plains
- Rapidly increasing demand for water with intense evaporation occurring
- Soils are drying; stream flows are dropping; fire danger is increasing in the west
- Great Lakes continue their record or near-record levels
- Row crops (corn and soybean) fairing well – much better than 2019
- Some issues with specialty crops, pastures/rangelands deteriorating



## Outlook Summary

- ENSO neutral through summer then...?
- Summer outlooks based on in-situ soil moisture and trends
- Warmer than average conditions likely across the region in July – greater confidence in the western states
- Slightly elevated probability of above average precipitation in the far southern and eastern reaches of the North Central Region
- Drought likely to expand and intensify across Colorado, Wyoming, Montana, and the western Dakotas



## Additional Information - Partners

### Today's and Past Recorded Presentations and

<http://mrcc.isws.illinois.edu/webinars.htm> should be

<https://mrcc.illinois.edu/multimedia/webinars.jsp><http://www.hprcc.unl.edu>

**NOAA's National Climatic Data Center:** [www.ncdc.noaa.gov](http://www.ncdc.noaa.gov)

Monthly climate reports (U.S. & Global): [www.ncdc.noaa.gov/sotc/](http://www.ncdc.noaa.gov/sotc/)

**NOAA's Climate Prediction Center:** [www.cpc.ncep.noaa.gov](http://www.cpc.ncep.noaa.gov)

**Climate Portal:** [www.climate.gov](http://www.climate.gov)

**U.S. Drought Portal:** [www.drought.gov](http://www.drought.gov)

**National Drought Mitigation Center:** <http://drought.unl.edu/>

**State climatologists:** <http://www.stateclimate.org>

**Regional climate centers:** <http://mrcc.illinois.edu> and <http://www.hprcc.unl.edu>



## Special Information

### Updated Great Lakes Climate and Water Levels Update and Outlook Webinar - June 22, 12:30-2pm CT

Topics covered include:

- The conditions that contributed to the high water levels
- The climate outlook from 2 weeks through the next season
- Some of the impacts from high lake levels
- The typical watches and warnings that may occur around the Lakes due to high levels
- An outlook for the lake levels themselves

Register at <https://attendee.gotowebinar.com/register/7783082580408145934>



## Questions

### Climate:

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### Weather:

crhroc@noaa.gov

# North Central U.S. Climate & Drought Outlook

## June 18, 2020



THE OHIO STATE UNIVERSITY

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**THANK YOU!**

Aaron Wilson  
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