

North Central U.S. Climate & Drought Outlook

May 20, 2021

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State Climate Office of Ohio (SCOO)

OSU Extension

Byrd Polar and Climate Research Center



United States Department of Agriculture
Midwest Climate Hub



THE OHIO STATE UNIVERSITY



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

June 17 (1 PM CDT) Stu Foster– Kentucky State Climatologist – Fare thee well, my friend!

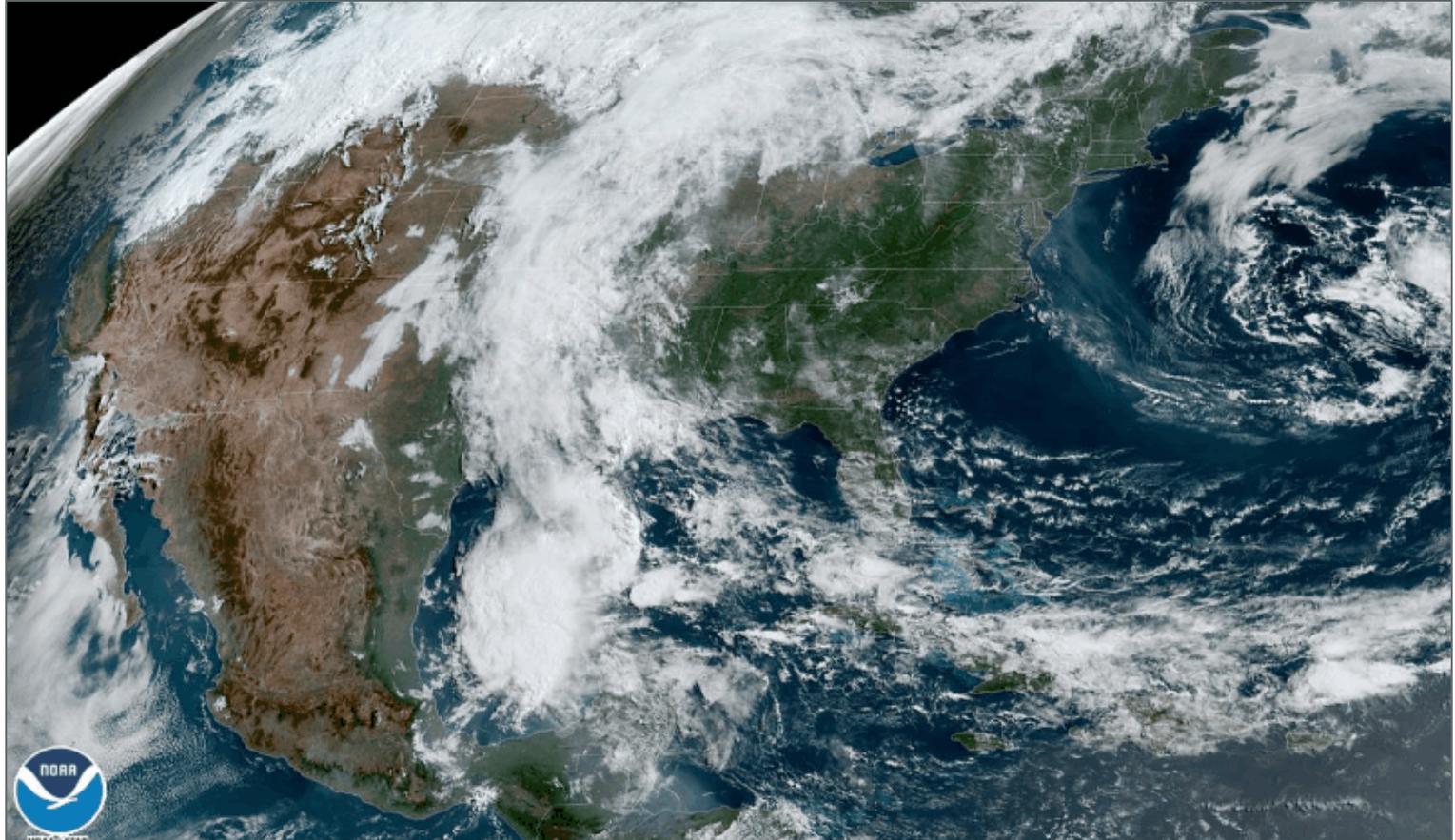
Access to Future Climate Webinars and Information

<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



20 May 2021 14:06Z NOAA/NESDIS/STAR GOES-East GEOCOLOR

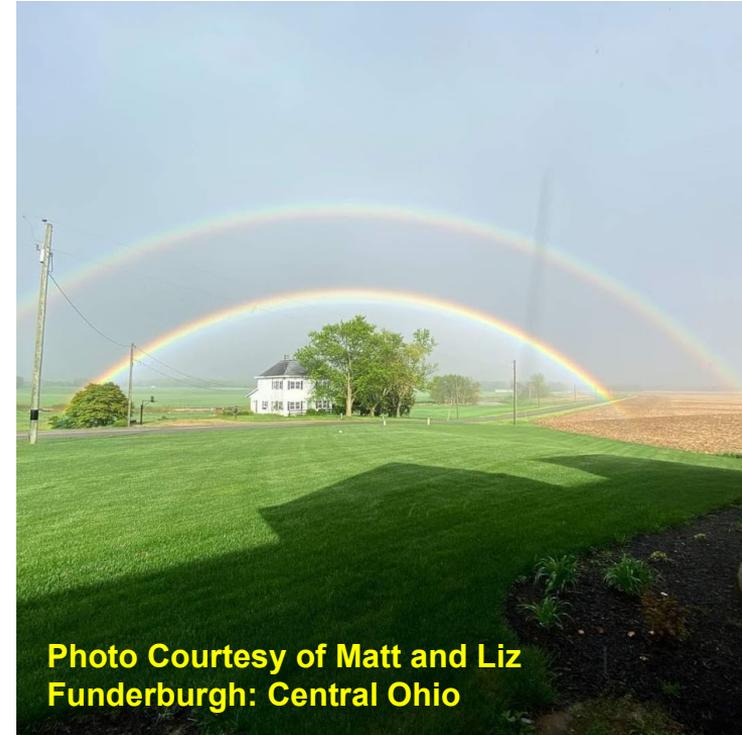


Agenda

Climate Recap & Recent Conditions

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

Outlooks: Short-term, June, and Summer Updates





RECENT CLIMATE CONDITIONS



Photo Courtesy of Pete Boulay:
Minnesota

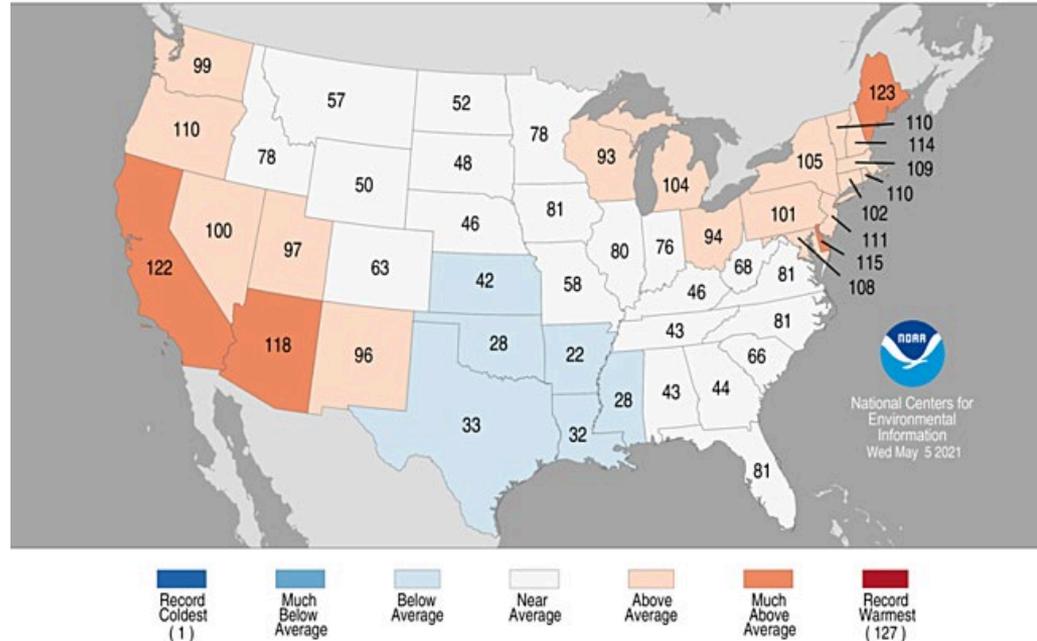


April Temperature Recap

- Close to average for a large portion of the North Central region
- Above average in the Great Lakes
- Below average in Kansas
- Minimum temperatures below average across the western states (not shown)

Recent Climate Conditions

Statewide Average Temperature Ranks
 April 2021
 Period: 1895–2021



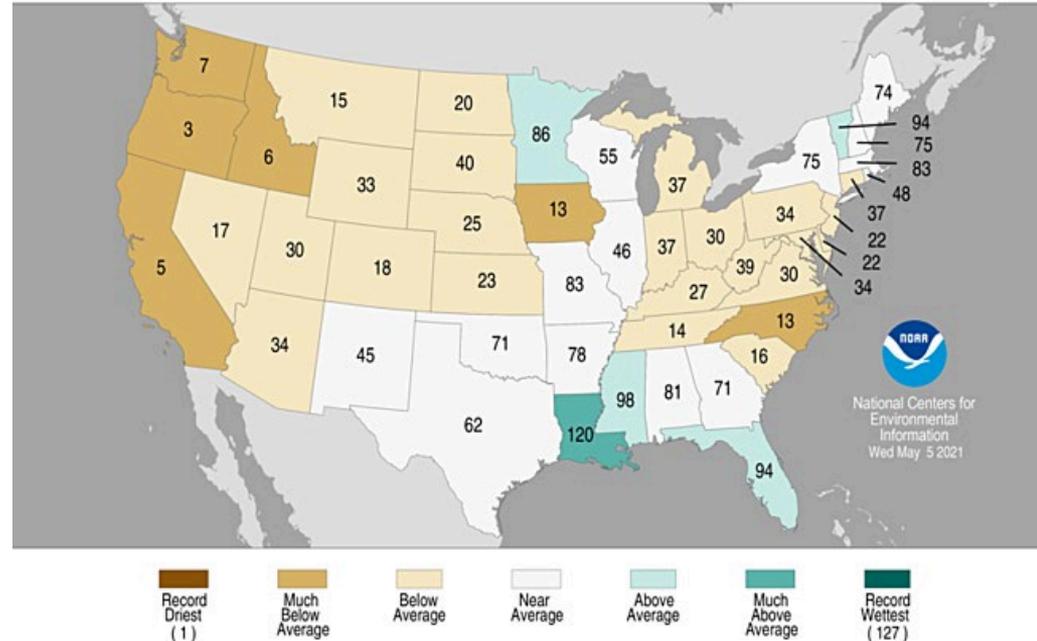


April Precipitation Recap

- In a word...dry!
- Most states were below average (13th driest for Iowa)
- Minnesota only state with above average precipitation for April

Recent Climate Conditions

Statewide Precipitation Ranks
 April 2021
 Period: 1895–2021



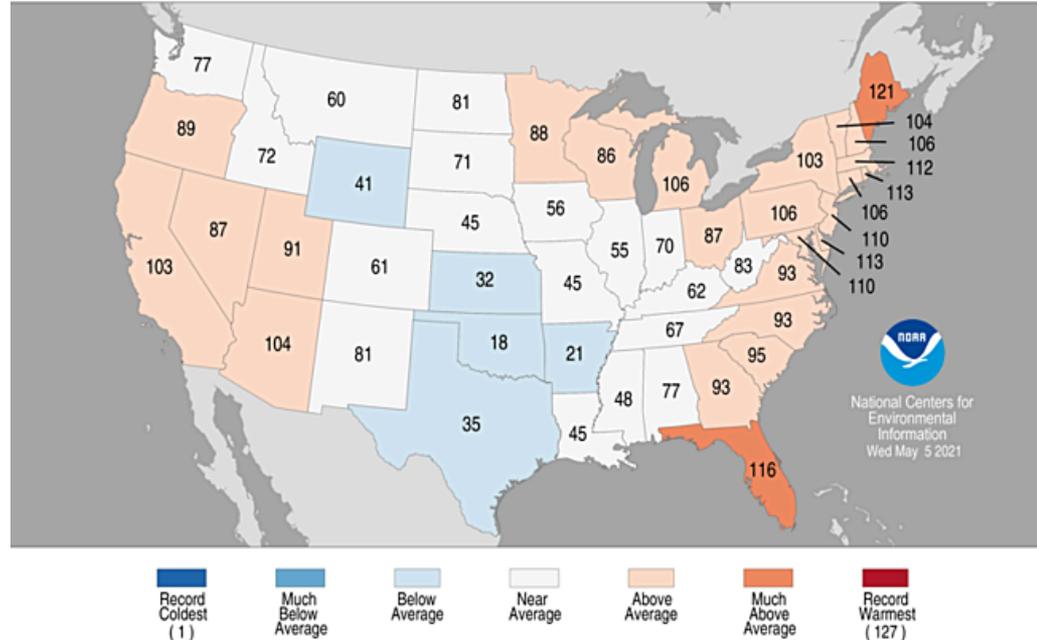


February – April Temperature Recap

- Near to below average for the western states
- Near to above average across the north and east

Recent Climate Conditions

Statewide Average Temperature Ranks
 February – April 2021
 Period: 1895–2021





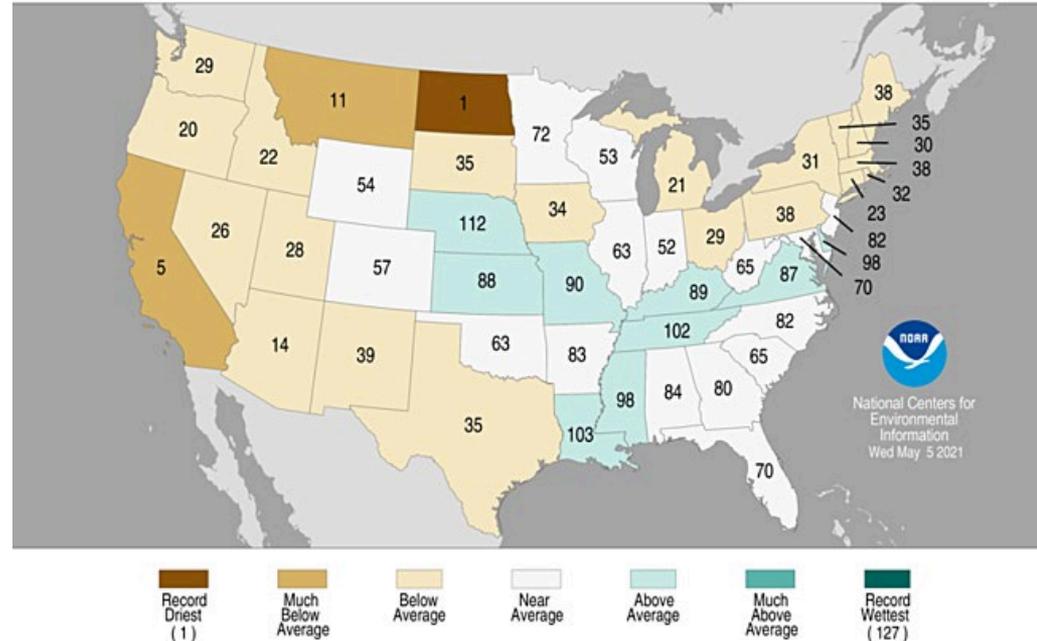
February – April Precipitation Recap

- Very dry conditions across the Northern Plains to Iowa
- Driest Feb-Apr period on record for North Dakota
- Dry across the Great Lakes – Typical La Nina weather pattern largely absent
- Southern tier near to above average

Recent Climate Conditions

Statewide Precipitation Ranks

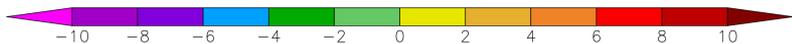
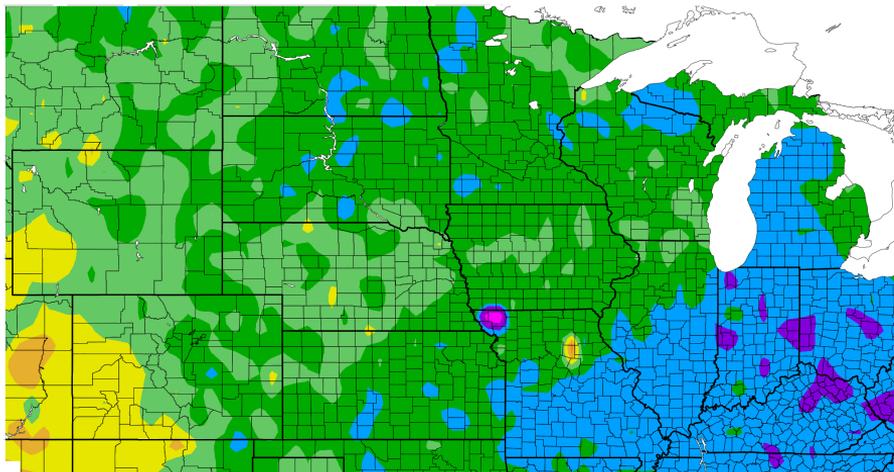
February – April 2021
Period: 1895–2021



NOAA
National Centers for
Environmental
Information
Wed May 5 2021



Departure from Normal Temperature (F)
4/18/2021 – 5/17/2021



Generated 5/18/2021 at HPRCC using provisional data.

NOAA Regional Climate Centers

Recent Climate Conditions

Last 30 Days: Temperature

- Reversal from last month → Below average across most of the region
- Well below average (4-8°F) across the eastern Corn Belt and lower Great Lakes
- A bit above average in southwestern Colorado

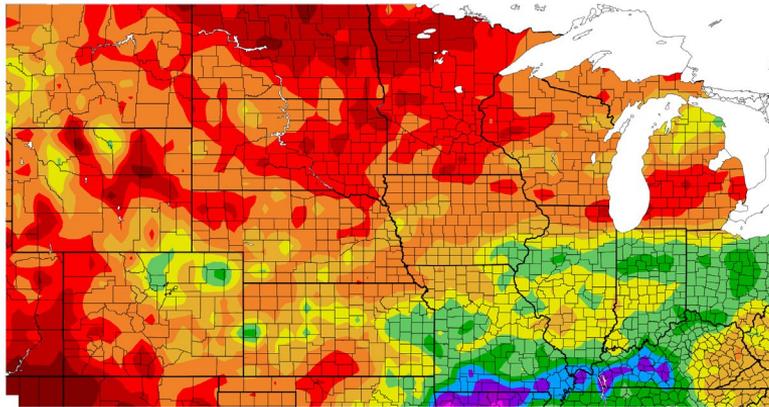


Recent Climate Conditions Last 30 Days: Precipitation

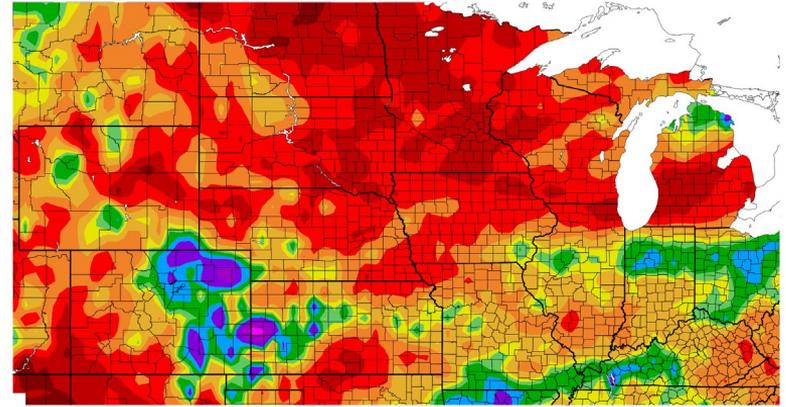
- Heavy rainfall MO – KY – OH (5-8")
- Generally, less than 3" elsewhere
- Less than 1" from MN back through the Dakotas into eastern MT and WY <25% of normal throughout this region

Source: <https://hprcc.unl.edu/maps.php?map=ACISClimateMaps>

Precipitation (in)
4/18/2021 – 5/17/2021

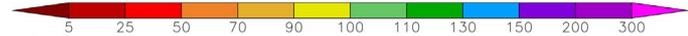


Percent of Normal Precipitation (%)
4/18/2021 – 5/17/2021



Generated 5/18/2021 at HPRCC using provisional data.

NOAA Regional Climate Centers



Generated 5/18/2021 at HPRCC using provisional data.

NOAA Regional Climate Centers



Recent Records

- **Ohio (April 20th):**
 - Toledo saw its largest late-season snowfall – 5”
 - 2.3” of snow at Cincinnati/Northern Kentucky International Airport topping the 1901 record for April 21 of 1.5 inches.
- **All Time Monthly Record Lows Set across OH, KY, MO, CO, and WY**
 - Marysville, MO – 19F 5/5/2021
 - Divide Peak WY – -9F 4/20/2021
- **All Time Monthly Record Low Maximum**
 - Tipton, IN – 42F on 5/10/2021

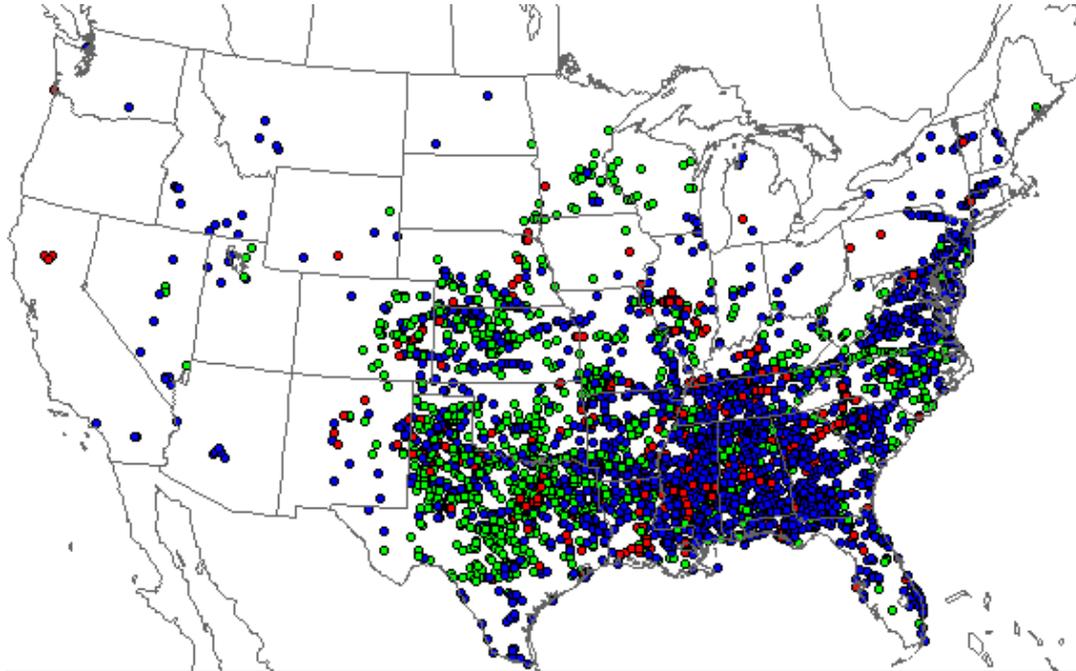


Photo Courtesy of Bruce Clevenger:
Defiance County Ohio



Lack of Severe Weather Across the U.S.

Recent Climate Conditions



PRELIMINARY SEVERE WEATHER
REPORT DATABASE (ROUGH LOG)

NOAA/Storm Prediction Center Norman, Oklahoma

Severe Weather Reports
January 01, 2021 - May 19, 2021

Updated: Wednesday May 19, 2021 09:55 CT

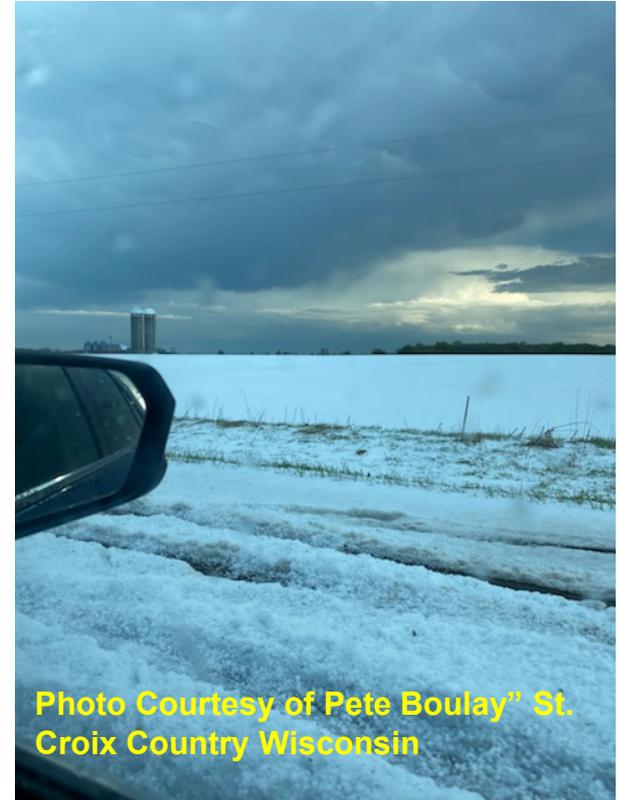


Photo Courtesy of Pete Boulay^{III} St. Croix County Wisconsin



HYDROLOGY

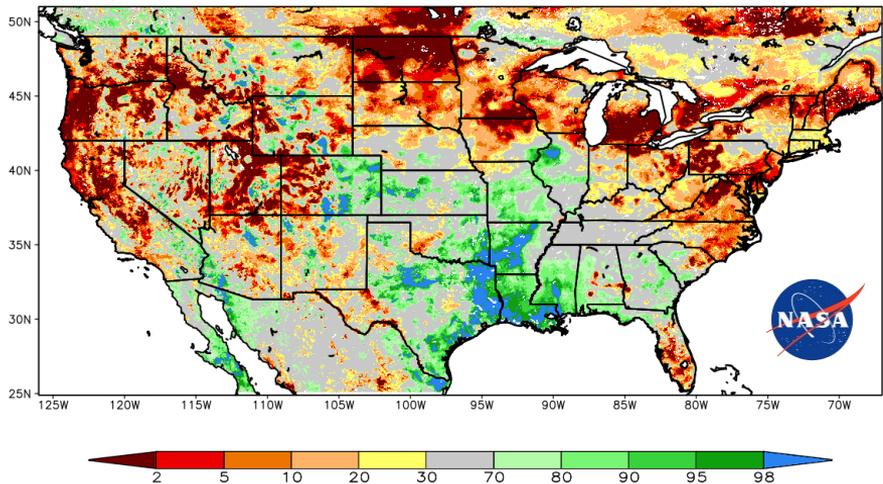


Photo Courtesy of Geddy
Davis: NW Ohio



Soil Moisture

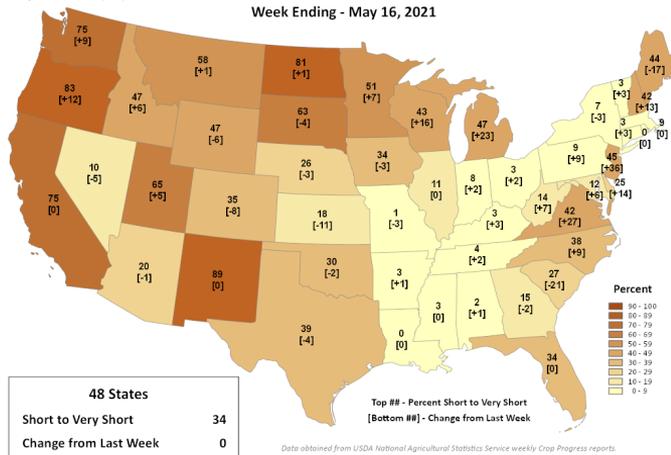
Source: https://weather.msfc.nasa.gov/sport/case_studies/lis_CONUS.html
SPoRT-LIS 0-100 cm Soil Moisture percentile valid 20 May 2021



USDA United States Department of Agriculture
This product was prepared by the USDA Office of the Chief Economist (OCE) World Agricultural Outlook Board (WAOB)

Topsoil Moisture

Percent Short to Very Short
Week Ending - May 16, 2021



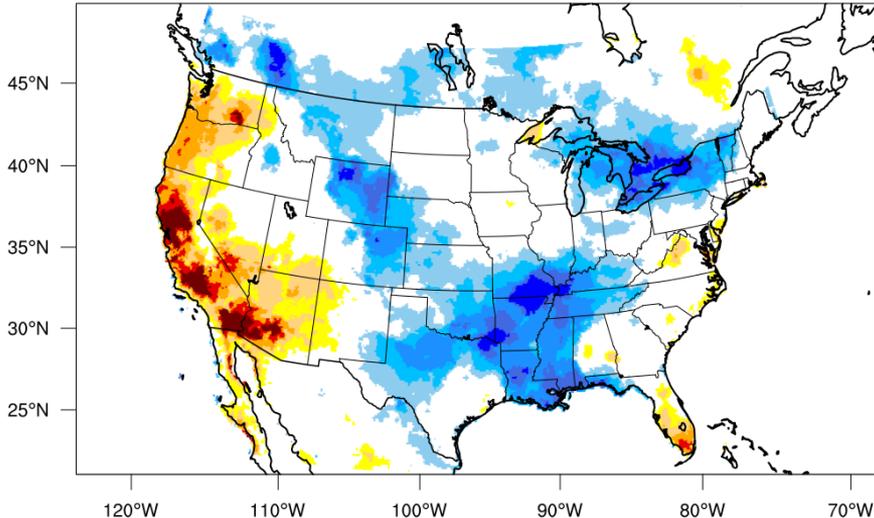
- Continued extreme dryness across the Dakotas and eastern MT
- Deteriorating conditions across the Upper Midwest (MN-MI)
- Minor improvements across a large portion of the region (SD, IA, IL, MO, KS, and NE)



Hydrology

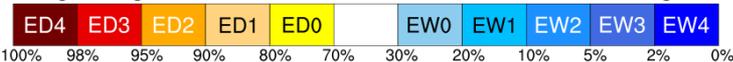
Evaporative Demand Drought Index

1-month EDDI categories for May 13, 2021



Drought categories

Wetness categories



(EDDI-percentile category breaks: 100% = driest; 0% = wettest)

Generated by NOAA/ESRL/Physical Sciences Laboratory

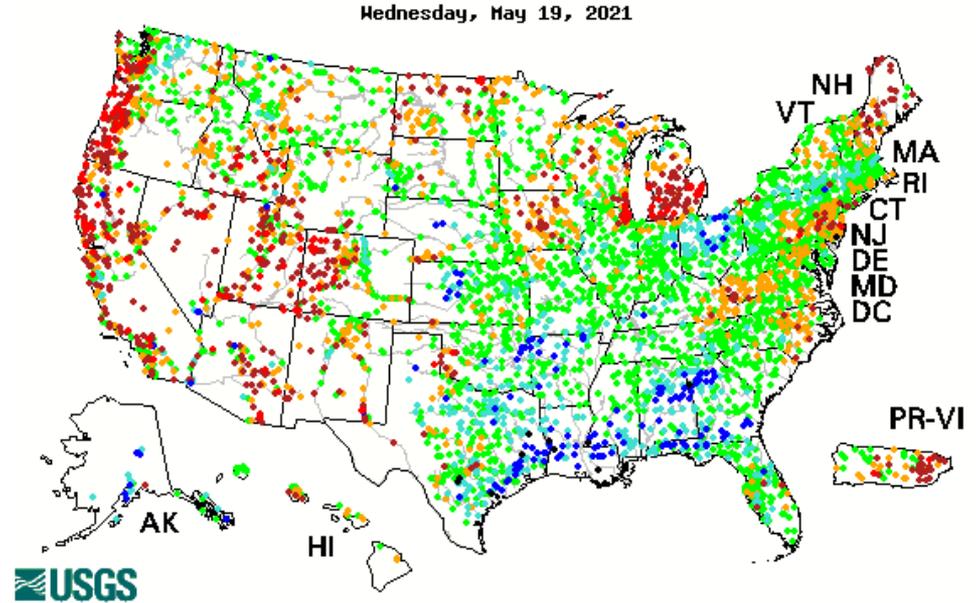
- “Thirst of the atmosphere” or precursor for water stress
- 1-month: Cool conditions have limited strong evaporation for the most part



Hydrology

28-Day Stream Flows

- Stream flows have improved across the Lower Great Lakes (IL-IN-OH)
- Below to much below average across southern Michigan into NE Illinois, dropping across Iowa
- Low flows continue across the Upper Missouri Basin
- Colorado west side rivers low and early melt out issues



Explanation - Percentile classes

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

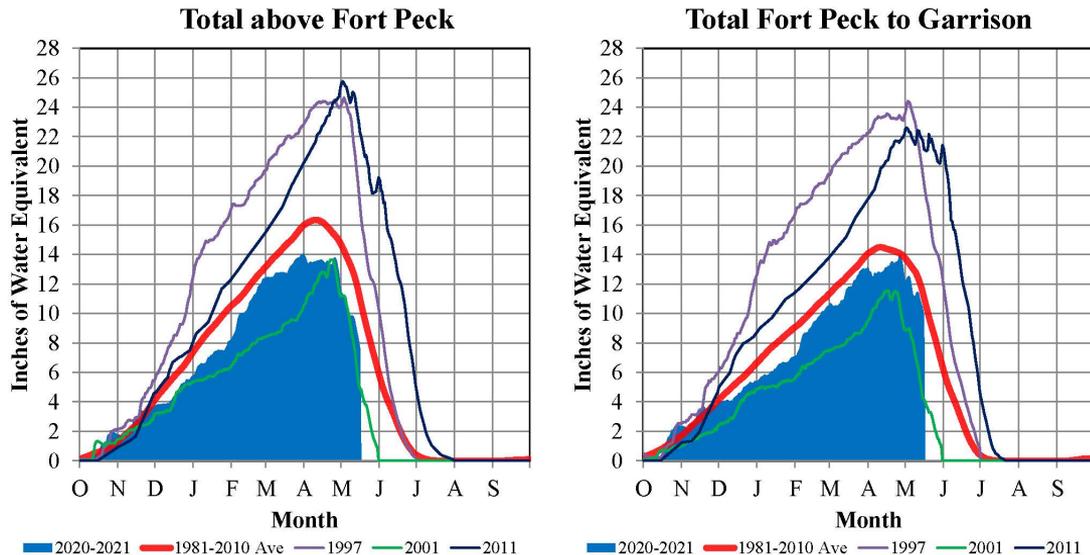


Missouri River Snowpack

- Upper basin (above Sioux City, IA) runoff in May is 50% of average through the first 18 days of the month
- System storage, primarily in Fort Peck, Garrison, and Oahe, is decreasing, rather than increasing.
- The lower basin, Omaha to St. Louis, is fairly wet – typical spring

Missouri River Basin – Mountain Snowpack Water Content 2020-2021 with comparison plots from 1997*, 2001*, and 2011

16-May-2021



On May 16, 2021 the mountain Snow Water Equivalent (SWE) in the “Total above Fort Peck” reach was 7.6”, 69% of the May 16 average. The “Total above Fort Peck” reach peaked on March 31, 2021, at 14.1” SWE and 86% of the normal peak. On May 16, 2021 the mountain SWE in the “Fort Peck to Garrison” reach was 9.8”, 89% of the May 16 average. The “Fort Peck to Garrison” reach peaked on April 26, 2021, at 14.0” of SWE and 96% of the normal peak.

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

Provisional data. Subject to revision.

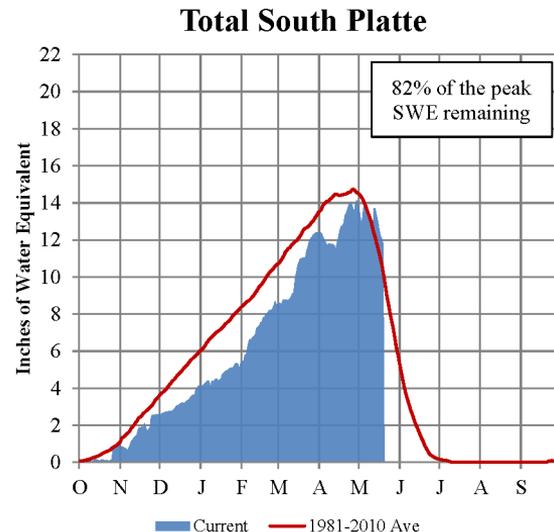
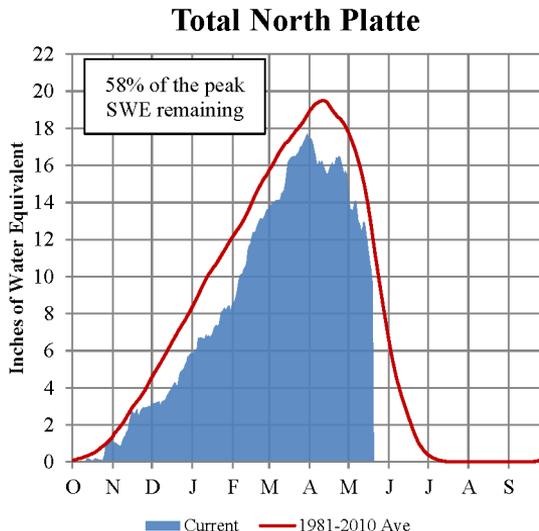


Platte River Snowpack

- Over 50% of peak SWE remains in both areas (58% North, 82% South)
- S. Platte not melting out early but will have a big melt due to late season "peaks" due to storms

Platte River Basin - Mountain Snowpack Water Content Water Year 2018-2019

May 19, 2021



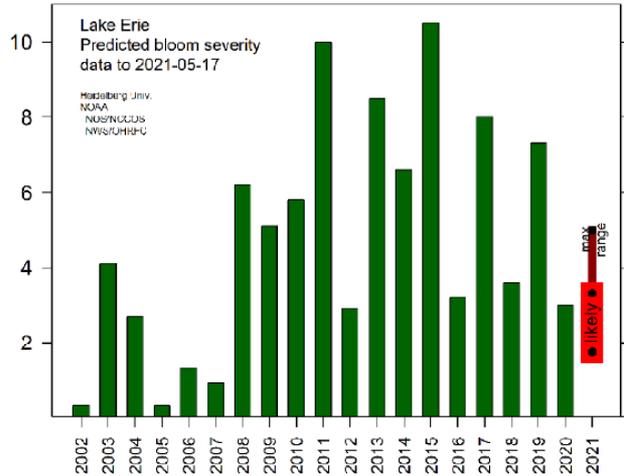
The North and South Platte River Basin mountain snowpacks normally peak near April 15 and the end of April, respectively. As of May 19, 2021, the mountain snowpack SWE in the "Total North Platte" reach peaked at 17.7" and currently has 58% of the peak SWE remaining. The mountain snowpack SWE in the "Total South Platte" reach peaked at 14.2" and currently has 82% of the peak SWE remaining.

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



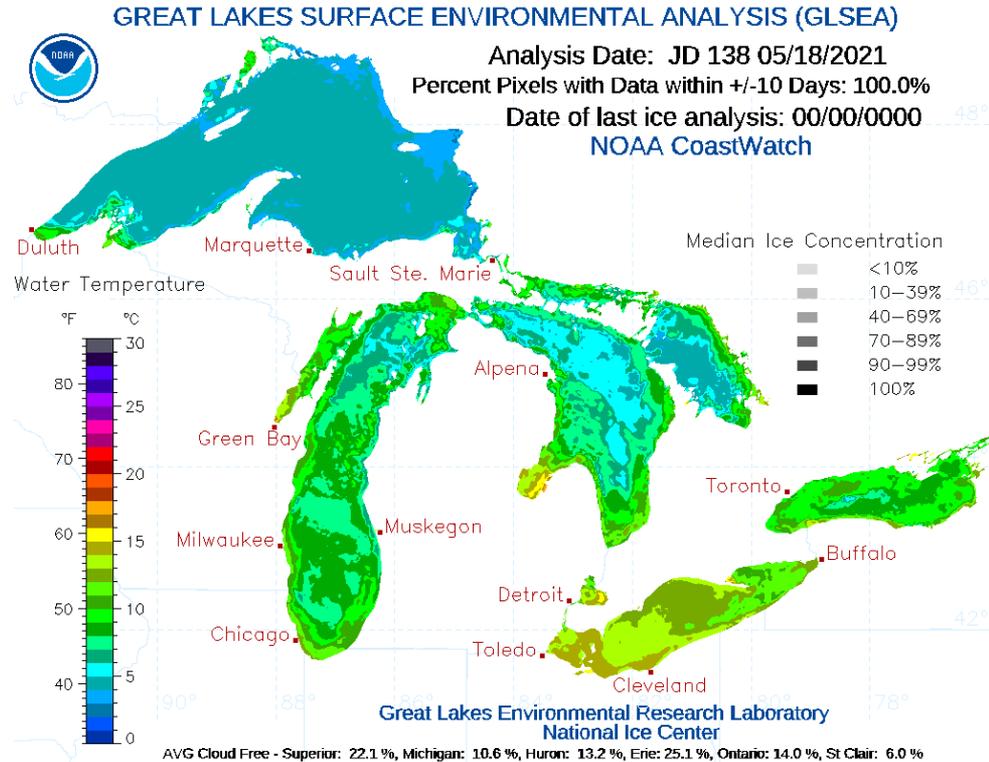
Hydrology

Great Lakes



- Harmful Algal Bloom is likely to be smaller than average (<5)
- Discharge of water from the Maumee River was below average in March and April, due to lower-than-average rainfall, which led to low phosphorus loads in early spring.

https://nccospublicstor.blob.core.windows.net/hab-data/bulletins/lake-erie/current/bulletin_current.pdf

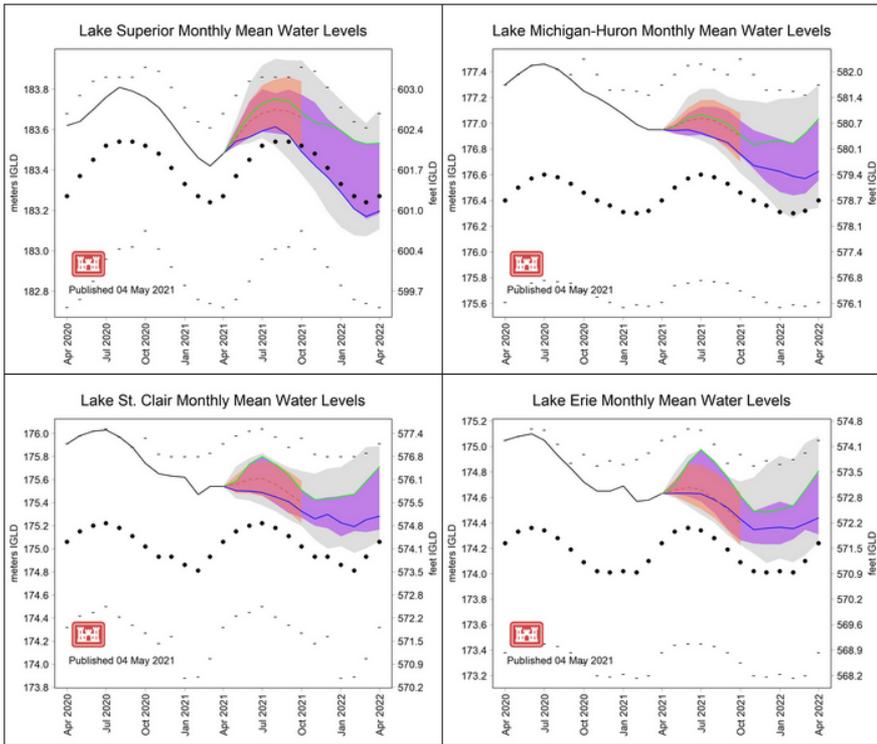




Hydrology

Great Lakes

- Lakes Superior continues to slowly rise
- Other lakes continue to fall from record levels relatively flat in the other lakes
- Continued dryness in the region allowing for levels to drop
- Rising levels likely on Superior, perhaps a small bump up on other lakes - expected this time of year part of the cycle
- Still trending down from highs

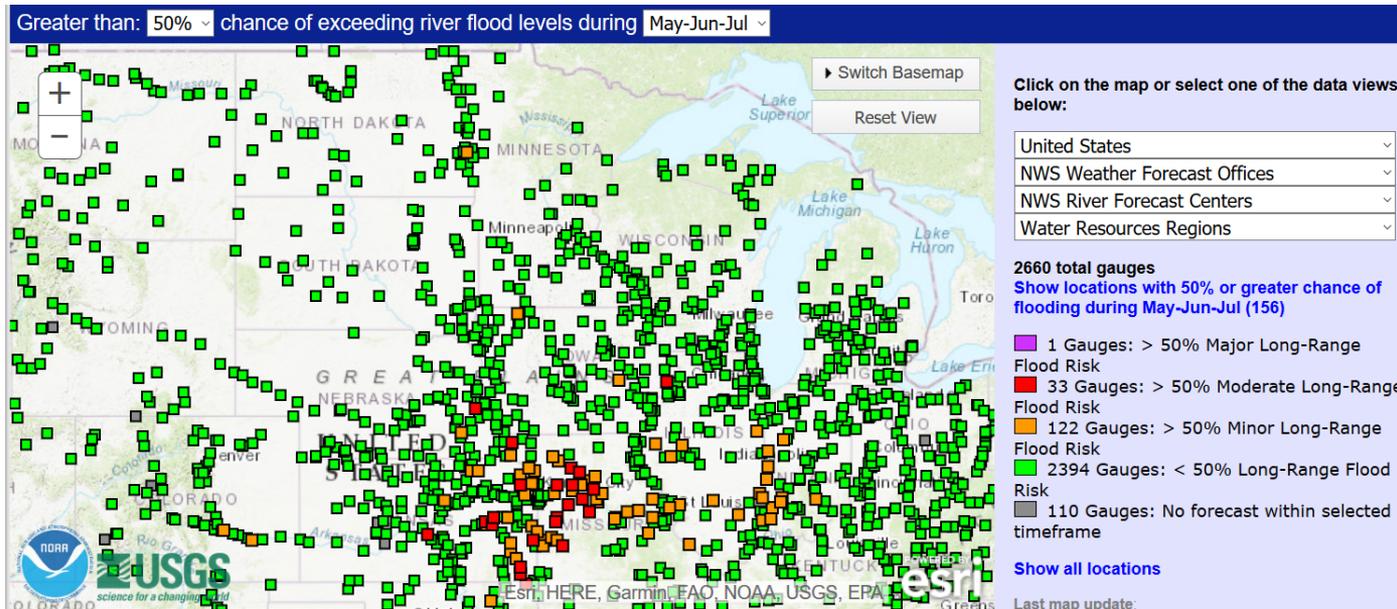


<https://www.ire.usace.army.mil/Missions/Great-Lakes-Information/Lakes-Water-Level-Future-Scenarios/>



Hydrology

River Forecasts (May-Jul)



- Minor to moderate flooding from Central MO to NW IL (recent heavy rainfall)
- Continued risk of flooding from KS-MO-IL – typical of spring/summer storm activity



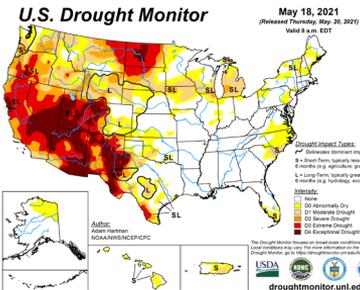
U.S. Drought Monitor

U.S. Drought Monitor NWS Central Region

May 18, 2021

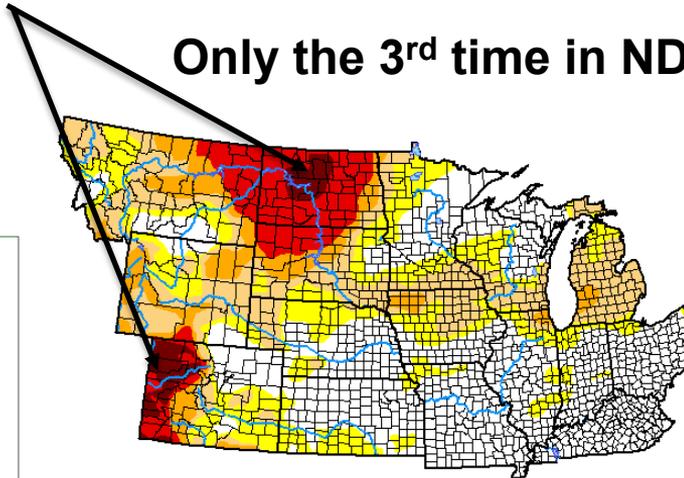
(Released Thursday, May 20, 2021)

Valid 8 a.m. EDT



D4

Only the 3rd time in ND



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	40.78	59.22	39.28	19.29	11.37	2.50
Last Week 05-11-2021	39.11	60.89	42.43	19.55	11.56	1.48
3 Months Ago 02-16-2021	28.50	71.50	47.39	22.73	9.02	1.60
Start of Calendar Year 12-29-2020	30.52	69.48	46.07	24.23	12.18	2.52
Start of Water Year 09-29-2020	29.60	70.40	37.34	17.96	7.13	0.24
One Year Ago 05-19-2020	71.33	28.67	9.15	5.00	1.76	0.00

Intensity:



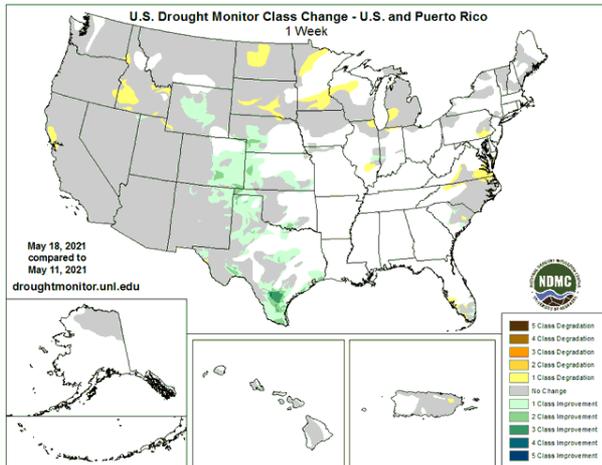
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

Adam Hartman
NOAA/NWS/NCEP/CPCC



droughtmonitor.unl.edu



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



Agriculture



Photo Courtesy of Mary Knapp: Kansas



Photo Courtesy of CMOR 2021:
Ward County in North Dakota



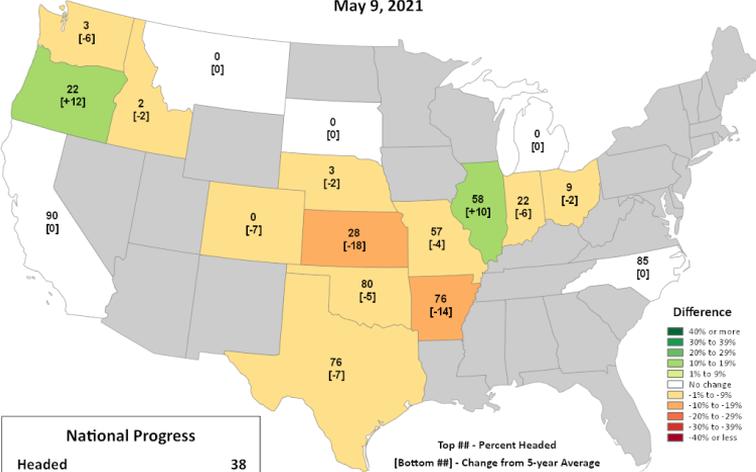
USDA NASS Crop Progress: Winter Wheat

Agriculture



This product was prepared by the USDA Office of the Chief Economist (OCE), World Agricultural Outlook Board (WAOB)

Winter Wheat Progress Percent Headed May 9, 2021



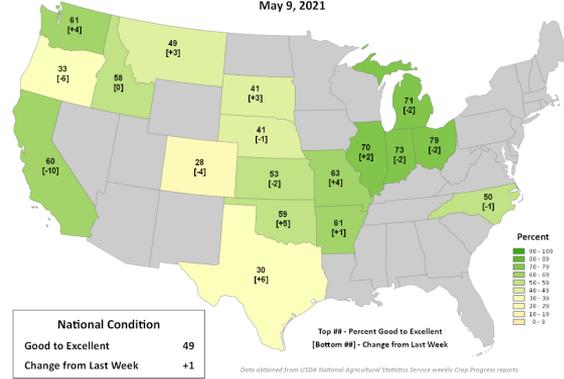
National Progress	
Headed	38
Change from 5-year Average	-8

Data obtained from USDA National Agricultural Statistics Service weekly Crop Progress reports



This product was prepared by the USDA Office of the Chief Economist (OCE), World Agricultural Outlook Board (WAOB)

Winter Wheat Conditions Percent Good to Excellent May 9, 2021



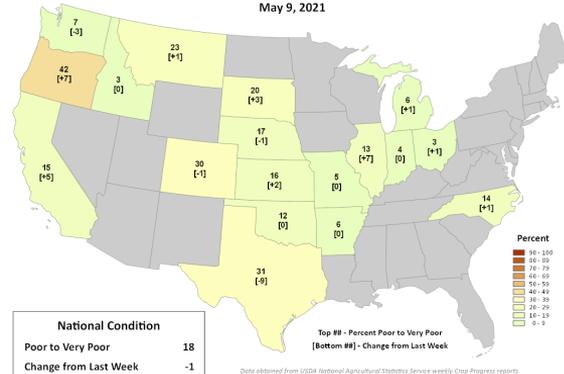
National Condition	
Good to Excellent	49
Change from Last Week	+1

Data obtained from USDA National Agricultural Statistics Service weekly Crop Progress reports



This product was prepared by the USDA Office of the Chief Economist (OCE), World Agricultural Outlook Board (WAOB)

Winter Wheat Conditions Percent Poor to Very Poor May 9, 2021



National Condition	
Poor to Very Poor	18
Change from Last Week	-1

Data obtained from USDA National Agricultural Statistics Service weekly Crop Progress reports

- Progress continues to lag the 5-year average (-8%)
- Dryness and cold conditions are likely culprits
- Condition still strong across the east
- Some disease pressure in the west

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



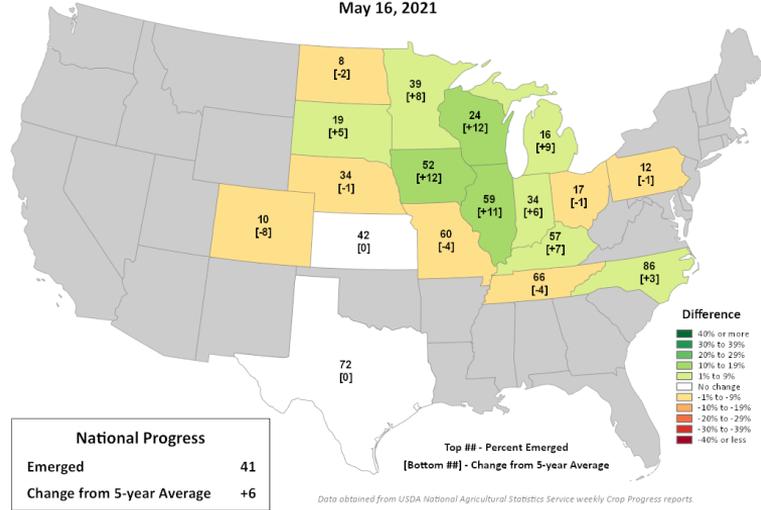
Agriculture

USDA NASS Crop Progress: Corn/Soy

USDA United States Department of Agriculture
This product was prepared by the USDA Office of the Chief Economist (OCE) World Agricultural Outlook Board (WAOB)

Corn Progress

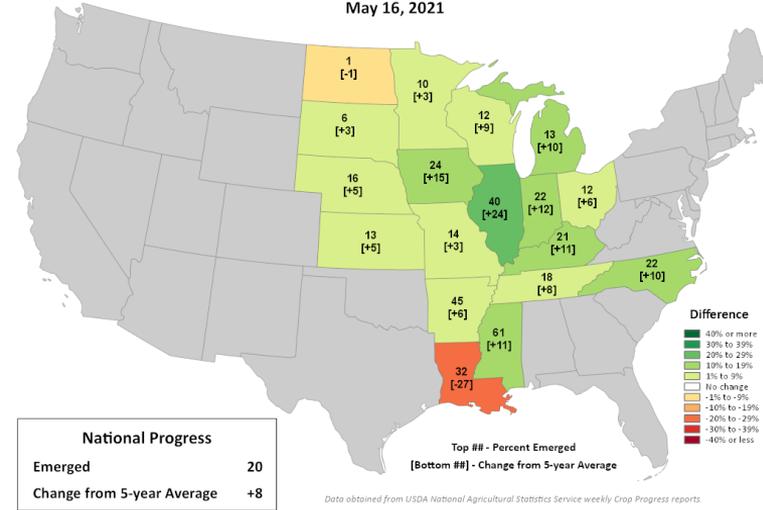
Percent Emerged
May 16, 2021



USDA United States Department of Agriculture
This product was prepared by the USDA Office of the Chief Economist (OCE) World Agricultural Outlook Board (WAOB)

Soybeans Progress

Percent Emerged
May 16, 2021



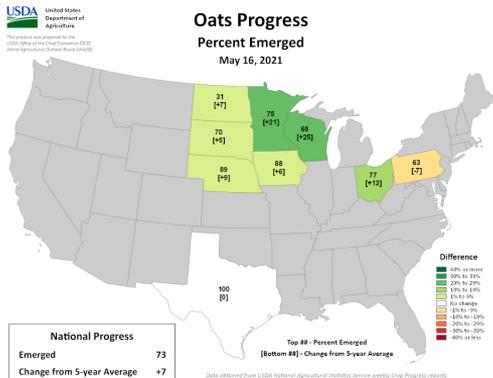
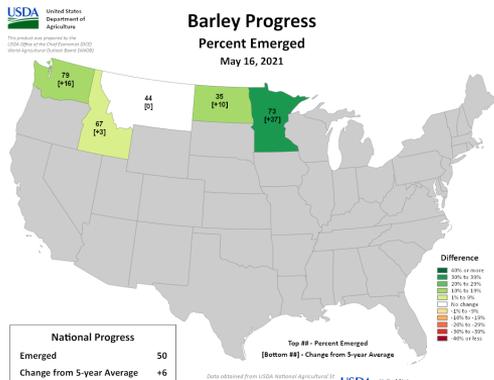
Thanks to Brad Rippey – USDA OCE Washington D.C.

- Corn and soybeans are ahead of 5-year average
- Behind in ND due to dryness, other states as well with chilly temperatures



Agriculture

USDA NASS Crop Progress: Others

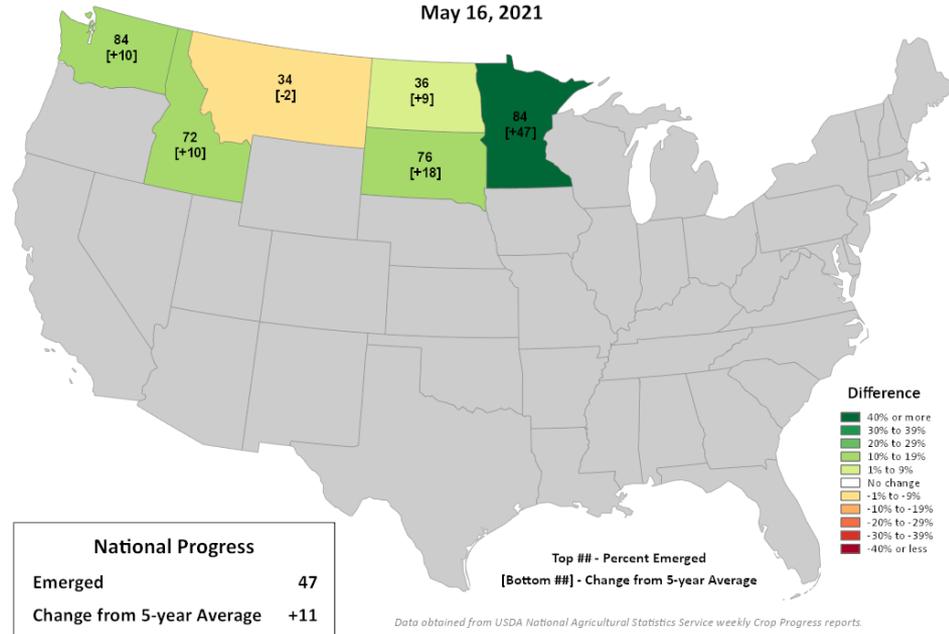


USDA United States Department of Agriculture

This product was prepared by the USDA Office of the Chief Economist (OCE) World Agricultural Outlook Board (WAOB)

Spring Wheat Progress

Percent Emerged
May 16, 2021



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



Agriculture

USDA NASS Crop Progress: Pasture/Rangeland

- Tough pasture conditions across the Northern Great Plains continue
- North Dakota Agriculture Commissioner has reactivated the Drought Hotline and interactive hay map.
www.nd.gov/ndda

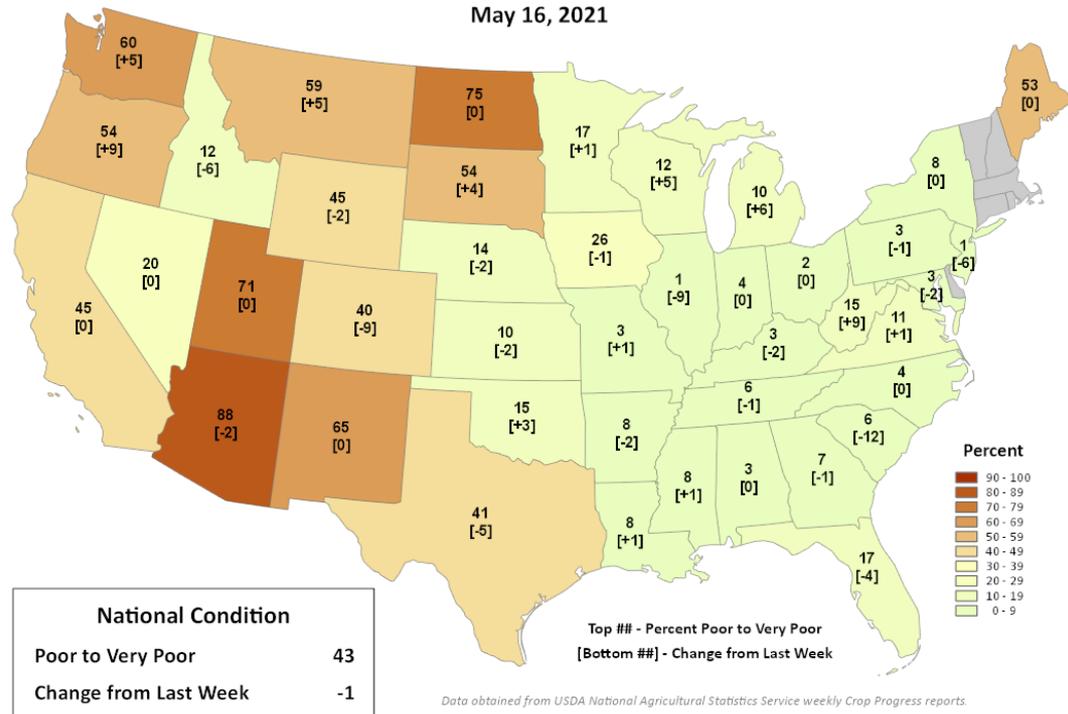
Thanks to Brad Rippey – USDA OCE Washington D.C.

USDA United States Department of Agriculture
This product was prepared by the USDA Office of the Chief Economist (OCE) World Agricultural Outlook Board (WAOB)

Pasture and Range Conditions

Percent Poor to Very Poor

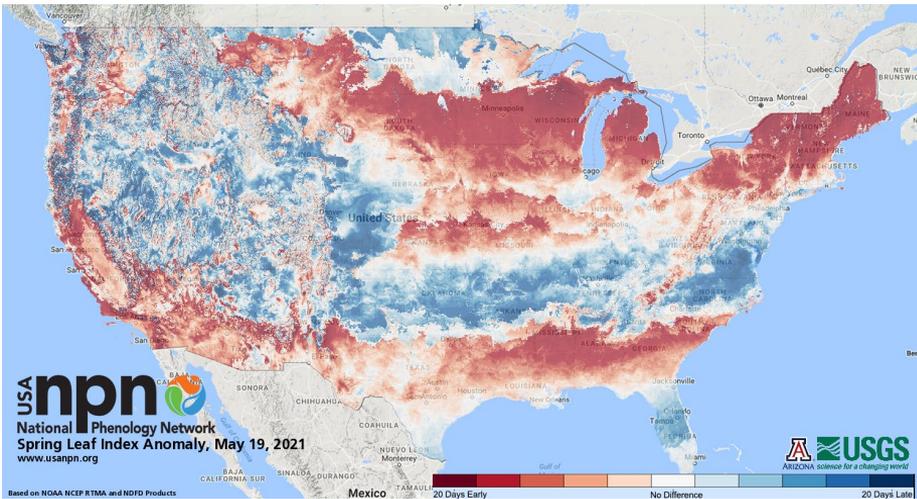
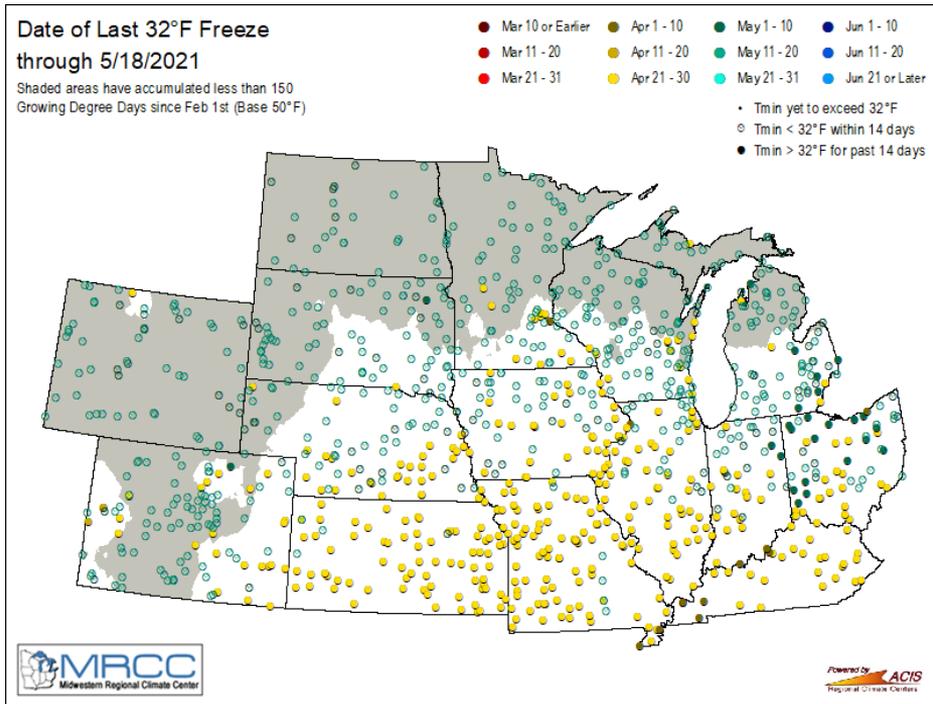
May 16, 2021





Agriculture

Spring Leaf Out & Late Freeze Conditions



<https://www.usanpn.org/news/spring>

- Many areas have seen freeze conditions within the last 14 days
- Cold conditions slowed spring's progress across the north



Agriculture

Late Freeze Issues



- Frost/and or freezing temperatures occurred on an almost daily basis in Michigan from the 8th-12th
- The worst in SW Lower MI was the morning of May 8.
- Reports of King Blossoms lost, but secondary and tertiary blossoms okay
- Some corn/soy nipped



Left: Central Illinois (Jason Carr)

Middle: Grape vine in S. Michigan Right: Strawberry blooms from the April 21 and 22 coming out now. (Mike Reinke, MSU Extension)



Other Impacts

- **Slow germination and uneven stands as seeds sit in dry soils (Dakotas, MN, WI, MI)**
- **Very poor water quality in stock ponds and low to no surface water available (SD)**
- **Some replanting will be taking place – scattered across the NC region**
- **Missouri River mainstream reservoirs have some low water issues, thus boat launches and water intakes are being adjusted for potential issues this summer**
- **Flooding/erosion concerns across burn scar areas of the Front Range**



Photos courtesy of
NDSU Extension



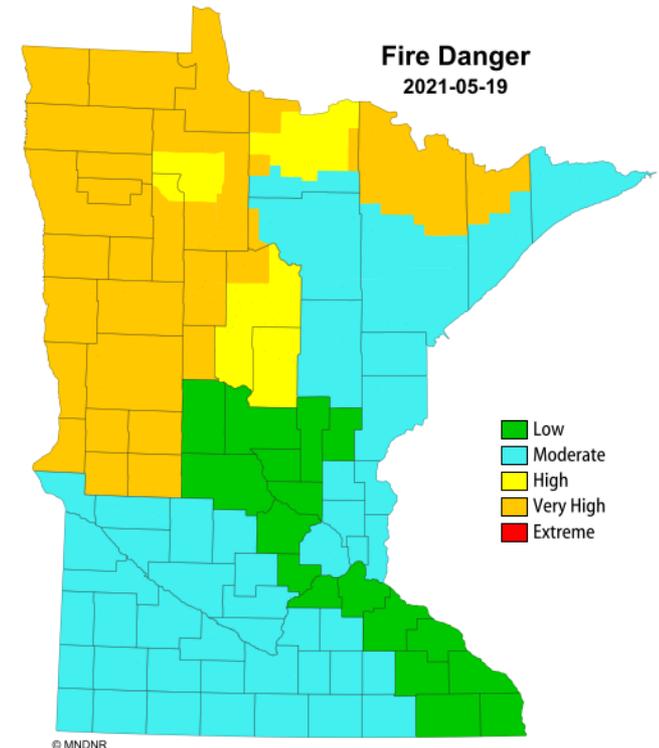
Wildfire

MINNESOTA

- Very high fire danger across portions of MN – Burn Restrictions
- May 17: lightning started wildfire was detected on the LaCroix Ranger District of the Superior National Forest.

NORTH DAKOTA

- To date, there have been 1,080 wildfires impacting over 100,000 acres in ND
- (See interactive map: <https://www.arcgis.com/apps/MapSeries/index.html?appid=c4b976a3e04c4712943388a6c7bdb1a4>)





Outlooks

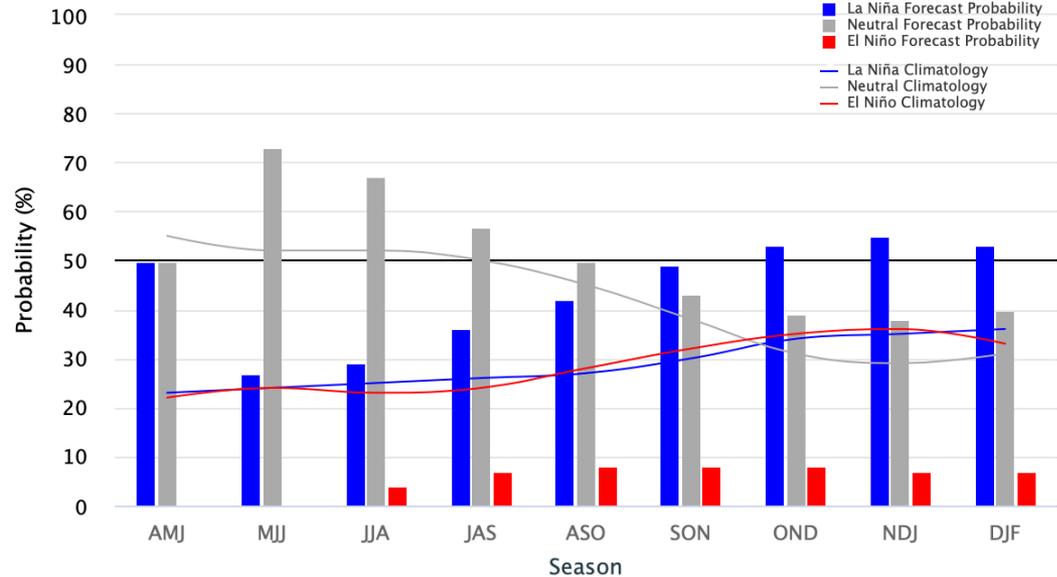


ENSO Status and Projection

- ENSO-neutral conditions will dominate this summer with negligible impacts
- Early indications we will slip back to La Nina this fall but to early to tell

Early-May 2021 CPC/IRI Official Probabilistic ENSO Forecasts

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

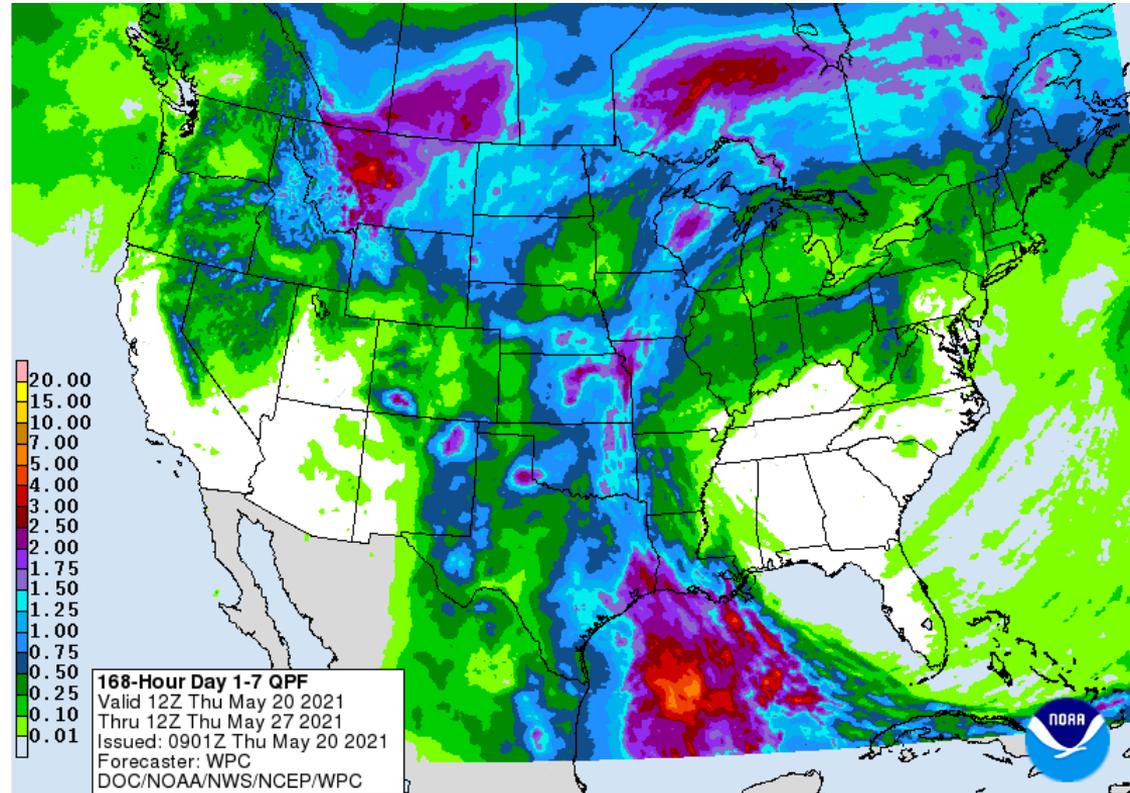




7-Day Quantitative Precipitation Forecast

Valid Thu May 20 –
Thu May 27

- Gulf of Mexico moisture stream around high pressure in the SE
- Much needed rain over dry areas (MT, ND, SD, MN, WI, IA)
- Lack of precipitation expected across the severe drought areas of Chicago and SE Michigan



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

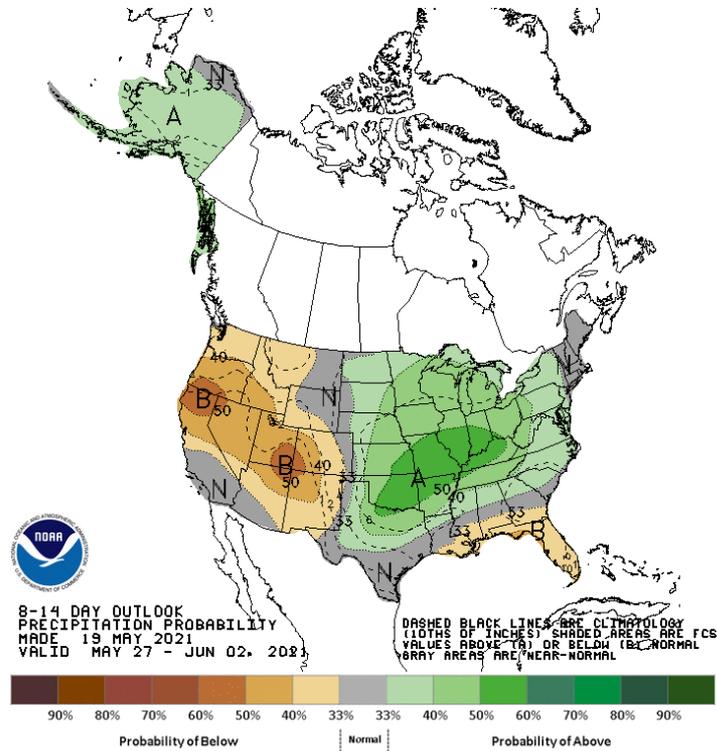
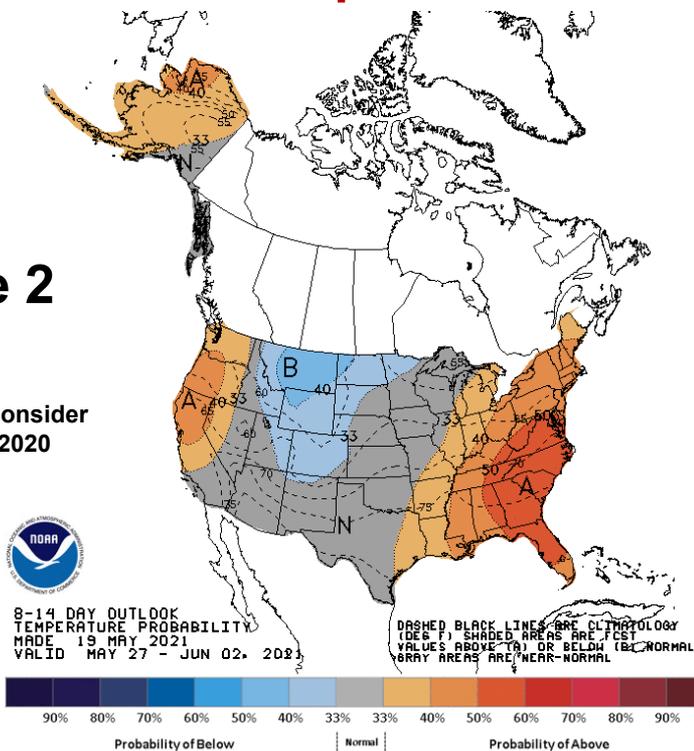


Outlooks

8-14 Day Temperature/Precipitation Probabilities

May 27 – June 2

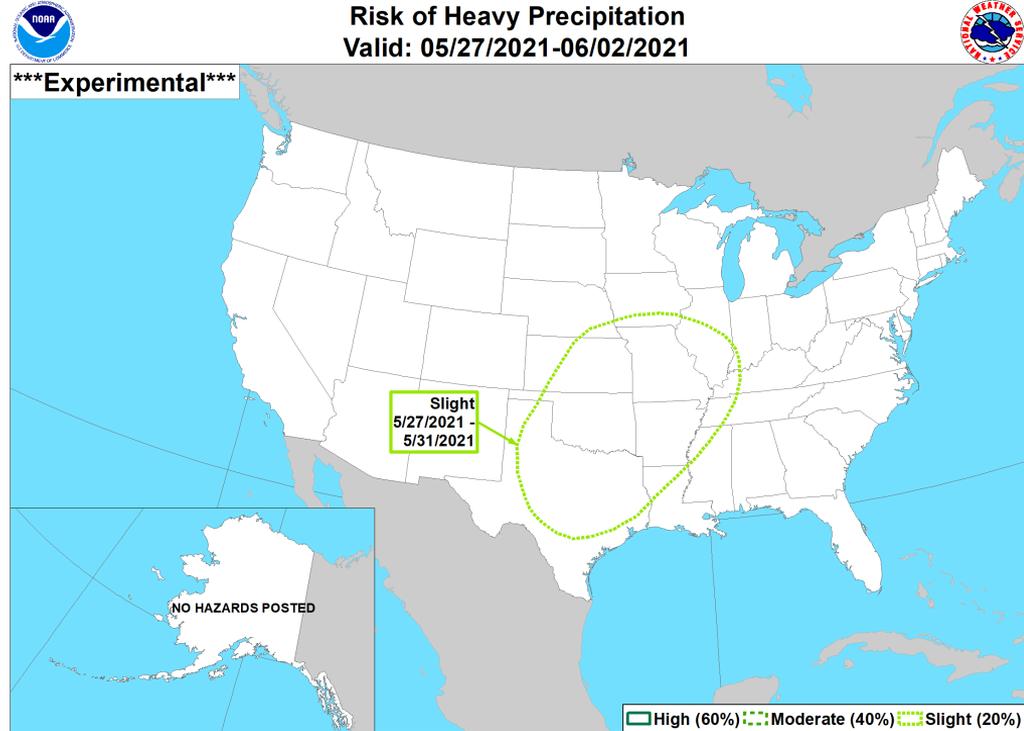
*Note: Probabilistic Outlooks consider new NWS Normal Period 1990-2020





8-14 Day Risks

May 27 – June 2



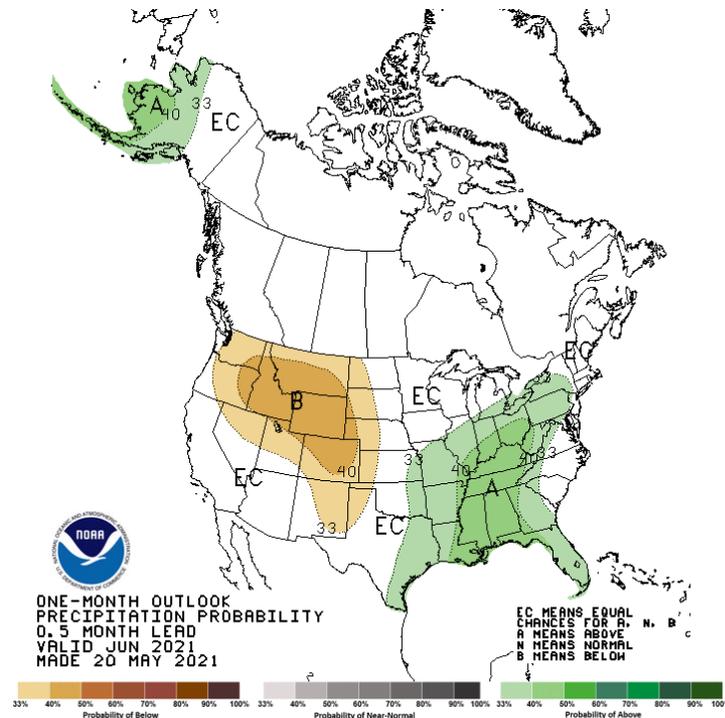
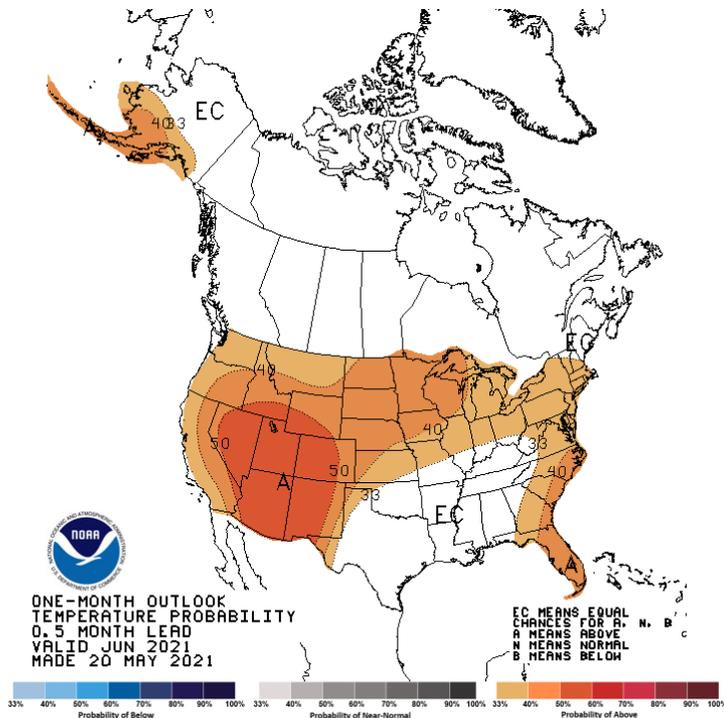
Climate Prediction Center
Made: 05/19/2021 3PM EDT

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Outlooks

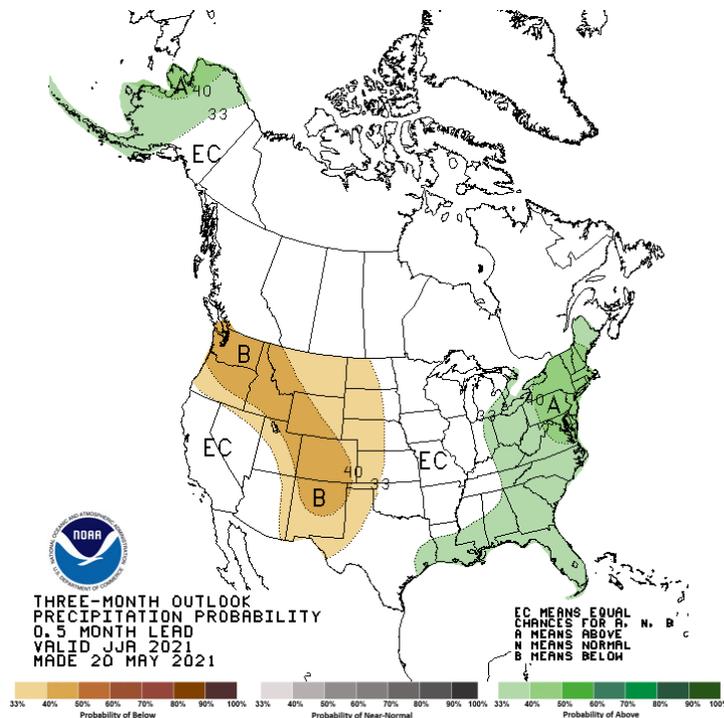
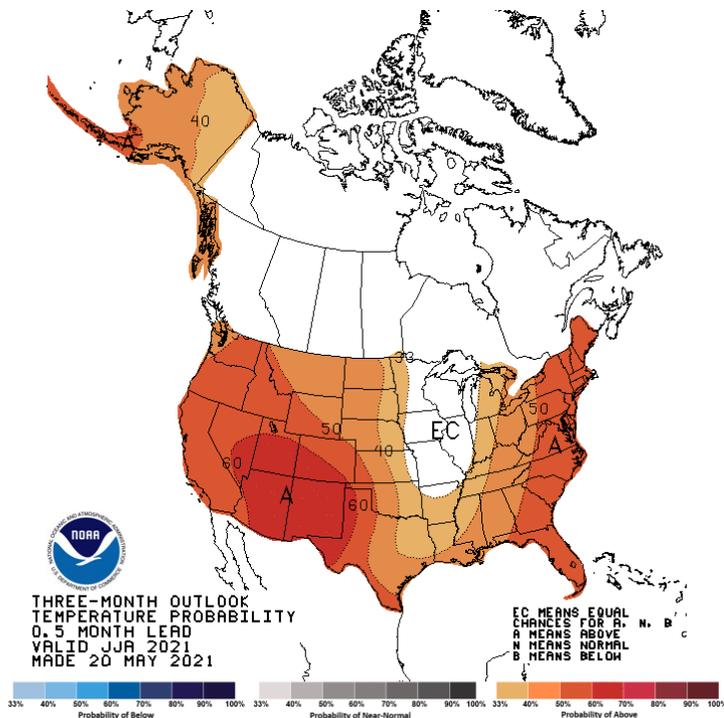
June Temperature/Precipitation Probabilities





Outlooks

Jun – Aug Temperature/Precipitation Probabilities





Outlooks

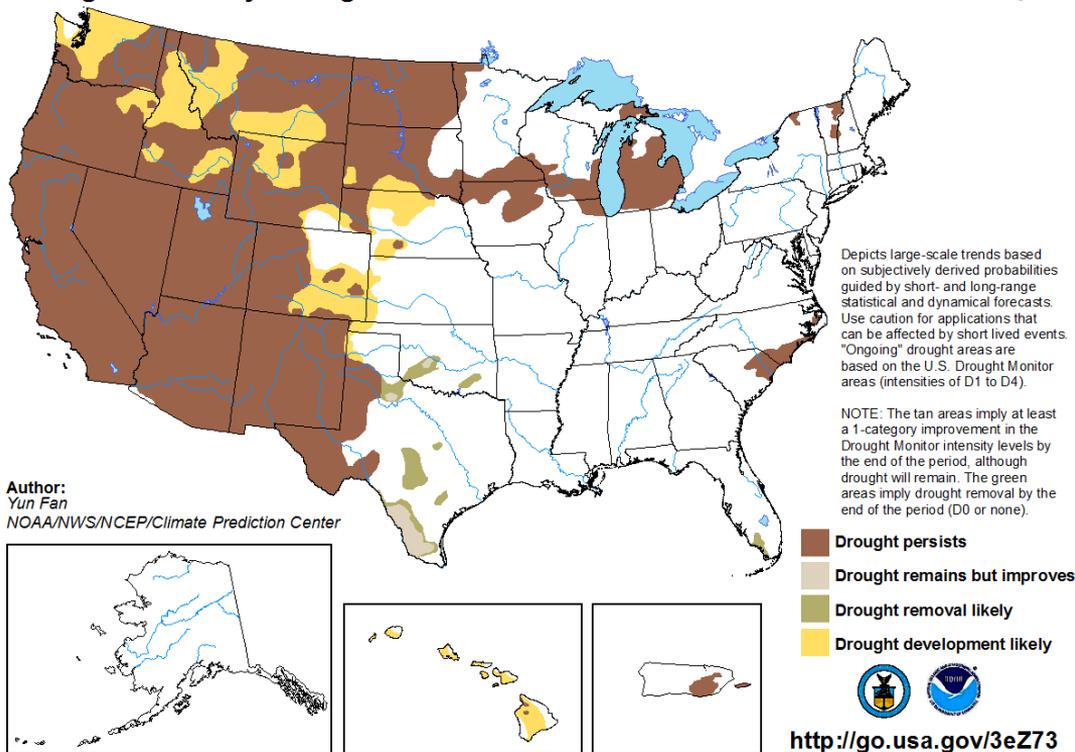
Drought Outlook

- Expecting current drought conditions to remain steady over the summer with slight expansion possible

U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

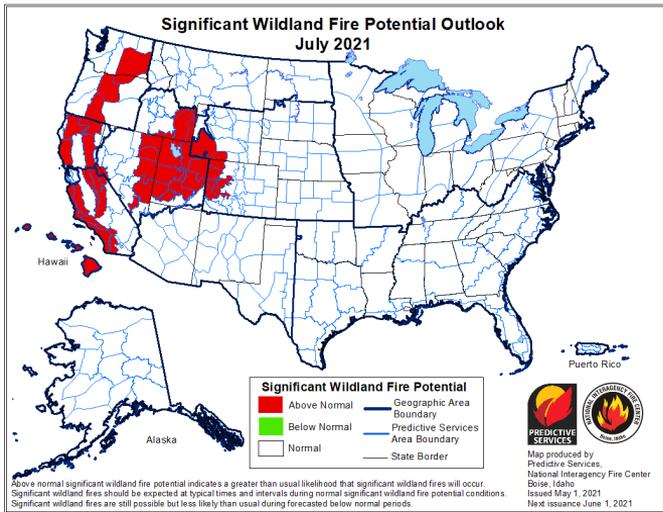
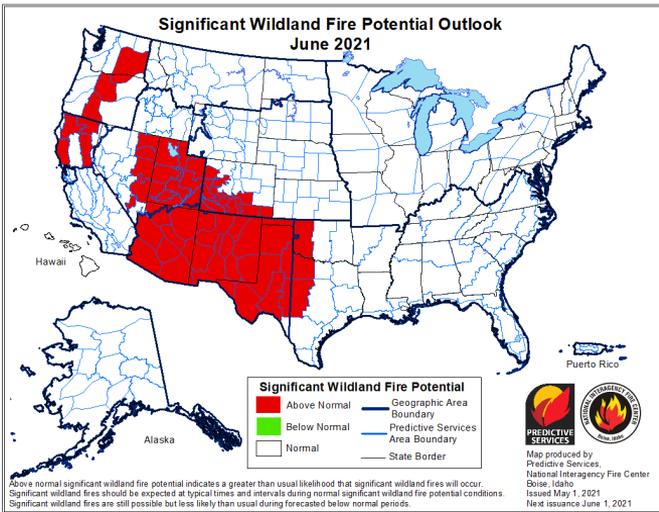
Valid for May 20 - August 31, 2021
Released May 20





Outlooks

Fire



- High wildland fire danger present across SW Colorado for June, spreading northward during July



Summary of Current Conditions

- **Most of the spring brought warm conditions in the east and cold conditions in the west → May has been chilly for the entire region**
- **Generally drier conditions across the northern tier of states into the Great Lakes; Wetter conditions for the southern tier (KS to KY)**
- **Big increase in temperatures this week → transitioning to more moisture demand which could intensify areas already dry**
- **Potential low water impacts along the Missouri**
- **Crops planted efficiently → Need water and heating units now**
- **Fire danger still elevated over the northern states, though green up has helped some across the Dakotas for now → Need the rain**



Outlook Summary

- **ENSO neutral through summer then...?**
- **June and summer outlooks reflect warmer conditions across much of the region; perhaps wet in the east and dry in the west**
- **Drought not likely to improve**



Additional Information - Partners

Today's and Past Recorded Presentations

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

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

NOAA's National Climatic Data Center: www.ncdc.noaa.gov

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

NOAA's Climate Prediction Center: www.cpc.ncep.noaa.gov

Climate Portal: www.climate.gov

U.S. Drought Portal: 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>



Questions

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North Central U.S. Climate & Drought Outlook

May 20, 2021



THE OHIO STATE UNIVERSITY

THANK YOU!

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