



North Central Climate and Drought Outlook

15 July 2021



Corn in Washington County, MN: June 16, 2021
Courtesy: Pete Boulay MNDNR



United States Department of Agriculture
Midwest Climate Hub



Pete Boulay, MNDNR State Climatology Office
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General Information

- **Providing climate services to the Central Region**
 - Collaboration Activity Between:
 - State Climatologists/American Association of State Climatologists
 - NOAA NCEI/NWS/OAR/NIDIS
 - USDA Climate Hubs
 - Midwest and High Plains Regional Climate Centers
 - National Drought Mitigation Center
- **Next Regular Climate/Drought Outlook Webinar**
 - August 19, 2021 (1 PM CST): Presenter: Montana State Climate Office
- **Access to Future Climate Webinars and Information**
- <http://www.drought.gov/drought/content/regional-programs/regional-drought-webinars>
- **Recordings of Past Webinars**
- <http://mrcc.isws.illinois.edu/webinars.htm>
- <http://www.hprcc.unl.edu/webinars.php>
- **Open for questions at the end**

Presentation Outline

- Recent Conditions
 - Temperature and precipitation ranks
 - 30-day temperature and precipitation
 - Modeled soil moisture
 - Drought
- Impacts
- Outlooks
 - El Niño-Southern Oscillation
 - Short-term
 - Summer and autumn season



Grasshopper Damage to Barley
Danvers, MT
Courtesy: Julius Frehse



Fire in the Boundary Waters
caused by lightning.

July 8, 2021

Looking north from Isabella Lake, MN

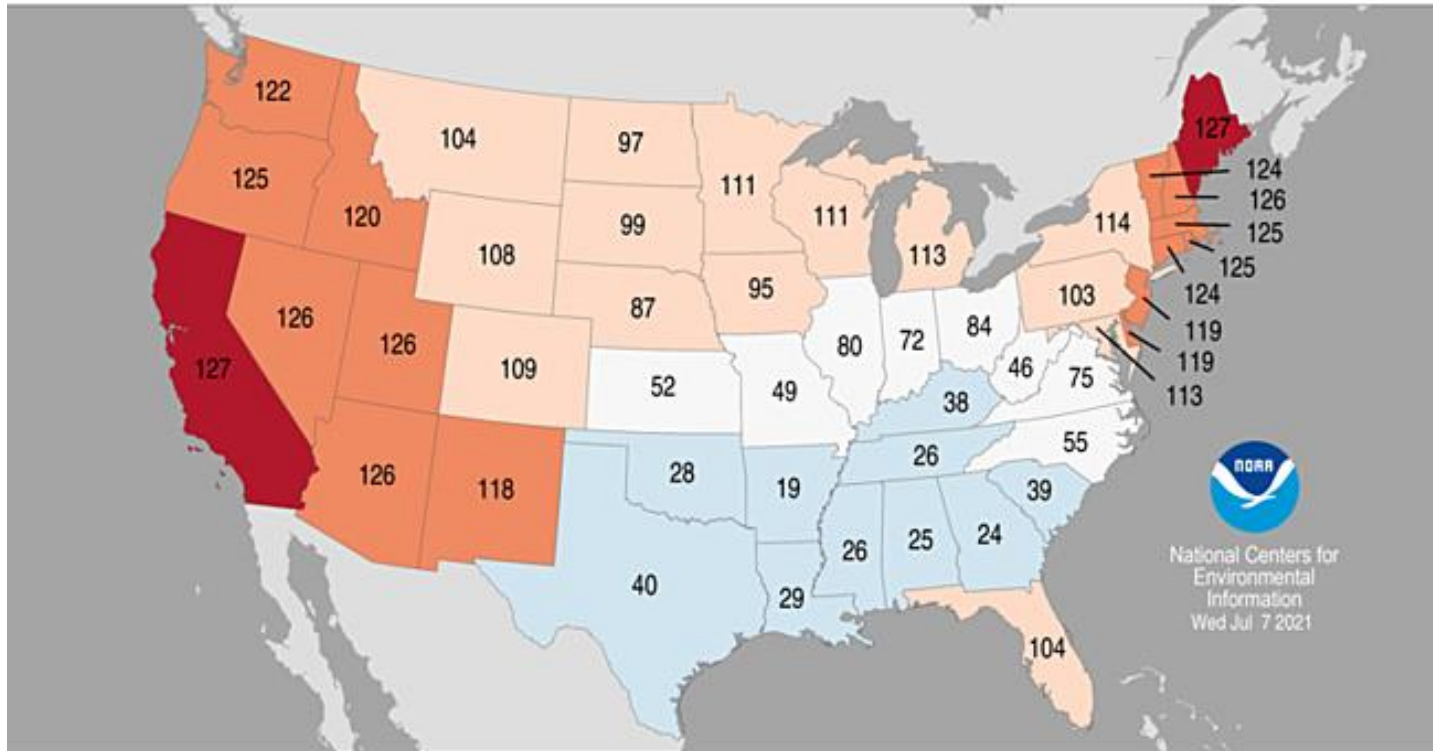
Courtesy: Jim Brozowski

RECENT CONDITIONS

2021 April-June Temperature Ranks

Statewide Average Temperature Ranks

April - June 2021
 Period: 1895-2021





 National Centers for

 Environmental

 Information

 Wed Jul 7 2021

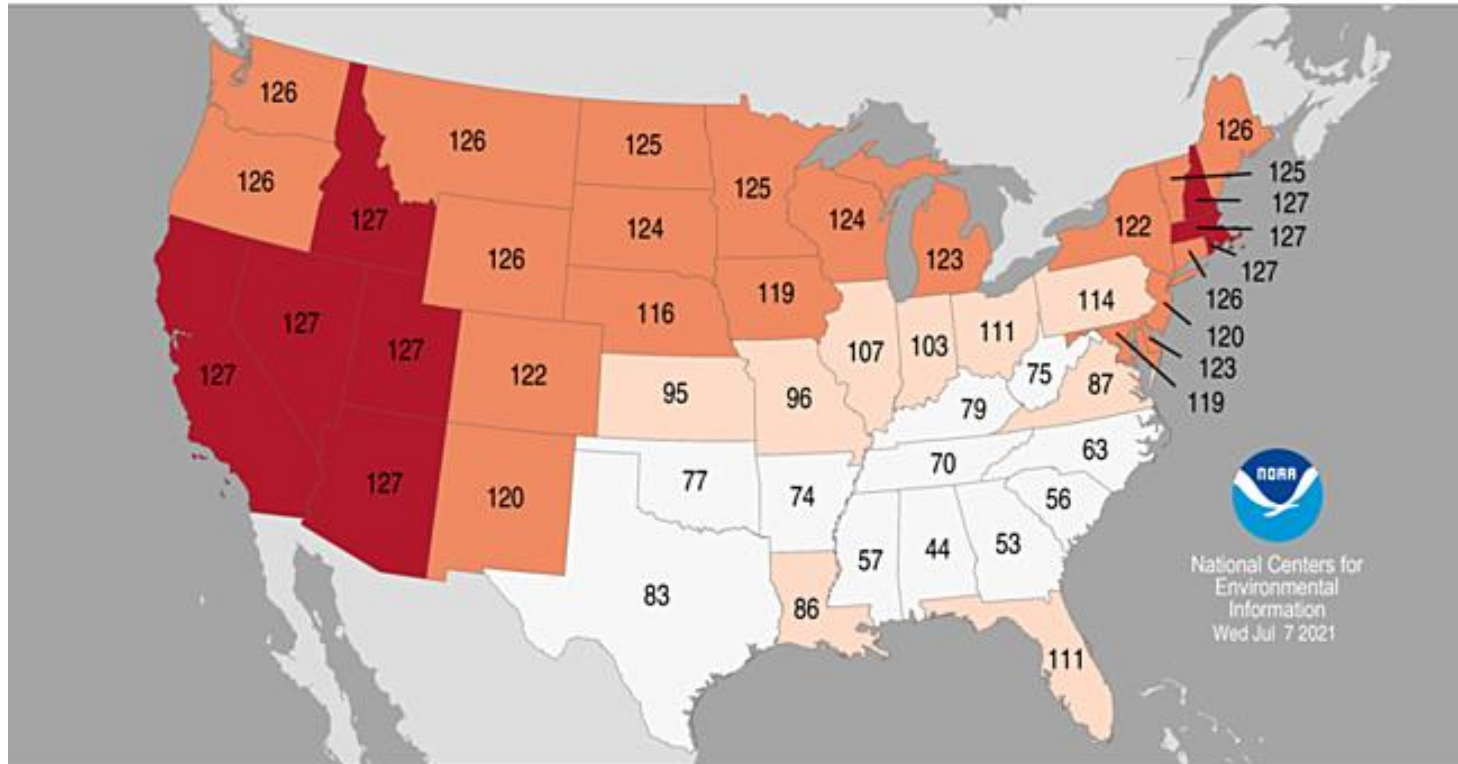


June Temperature Ranks

Statewide Average Temperature Ranks

June 2021

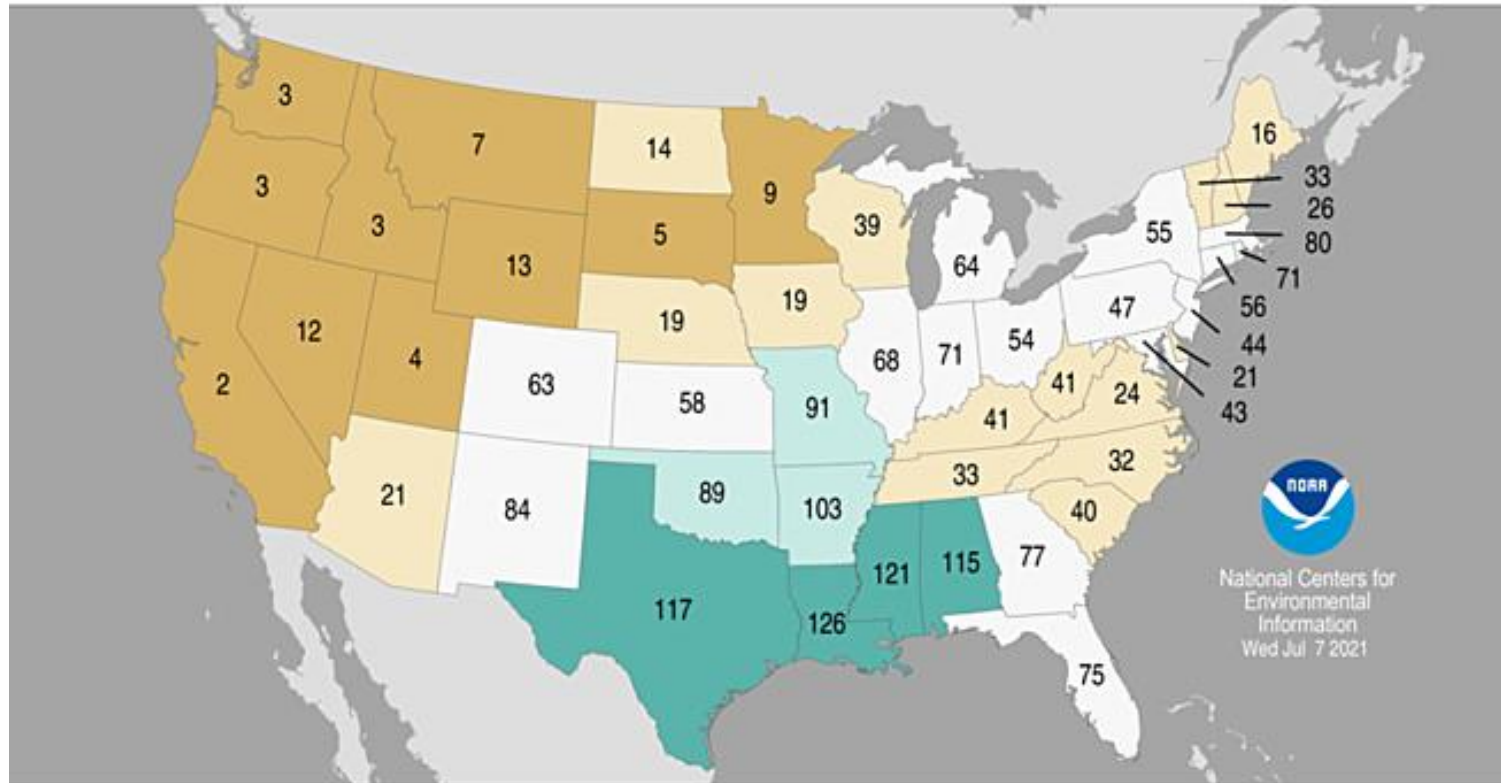
Period: 1895–2021



2021 April-June Precipitation Ranks

Statewide Precipitation Ranks

April - June 2021
Period: 1895-2021



National Centers for
Environmental
Information
Wed Jul 7 2021

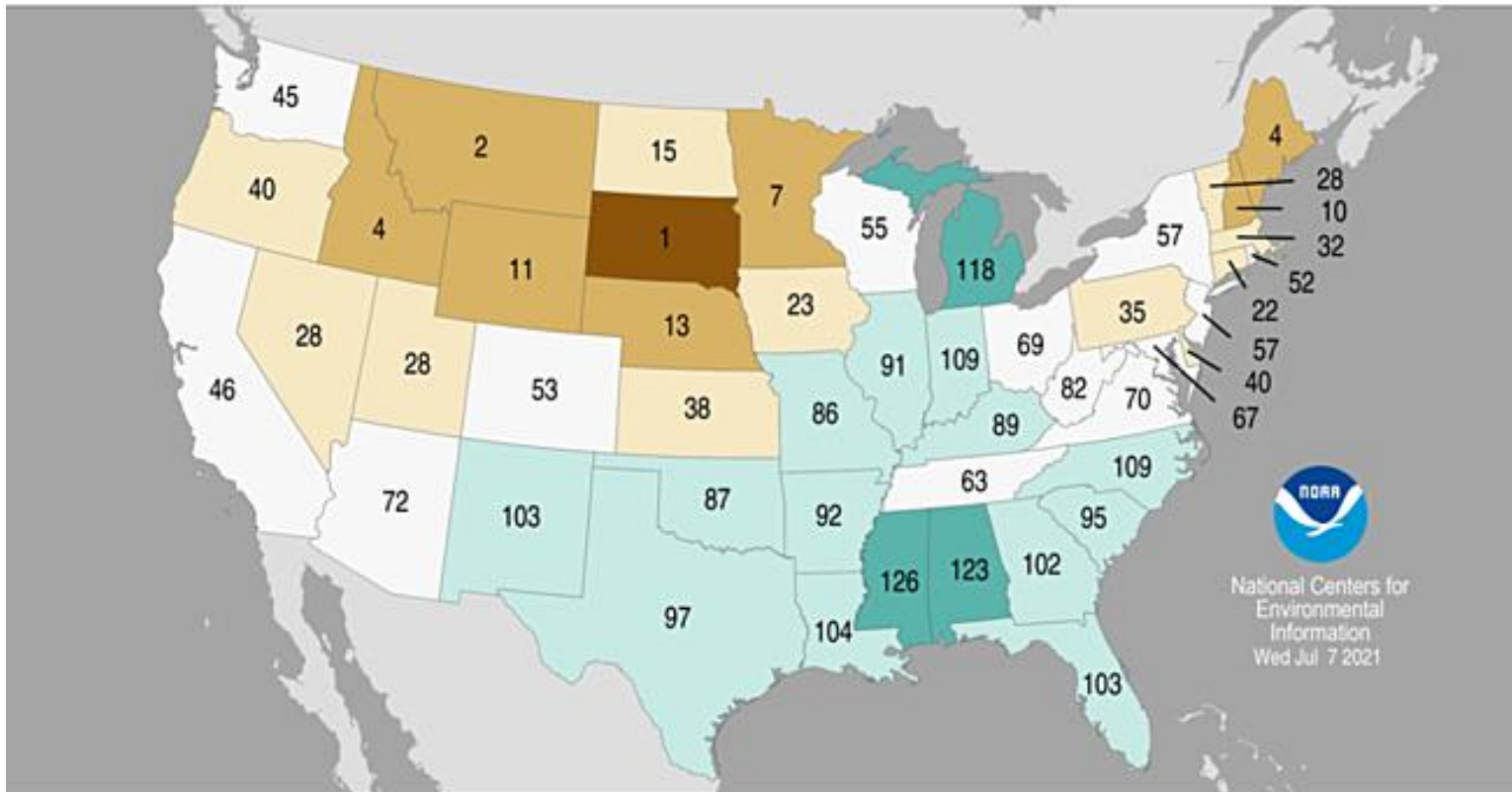


June Precipitation Ranks

Statewide Precipitation Ranks

June 2021

Period: 1895–2021

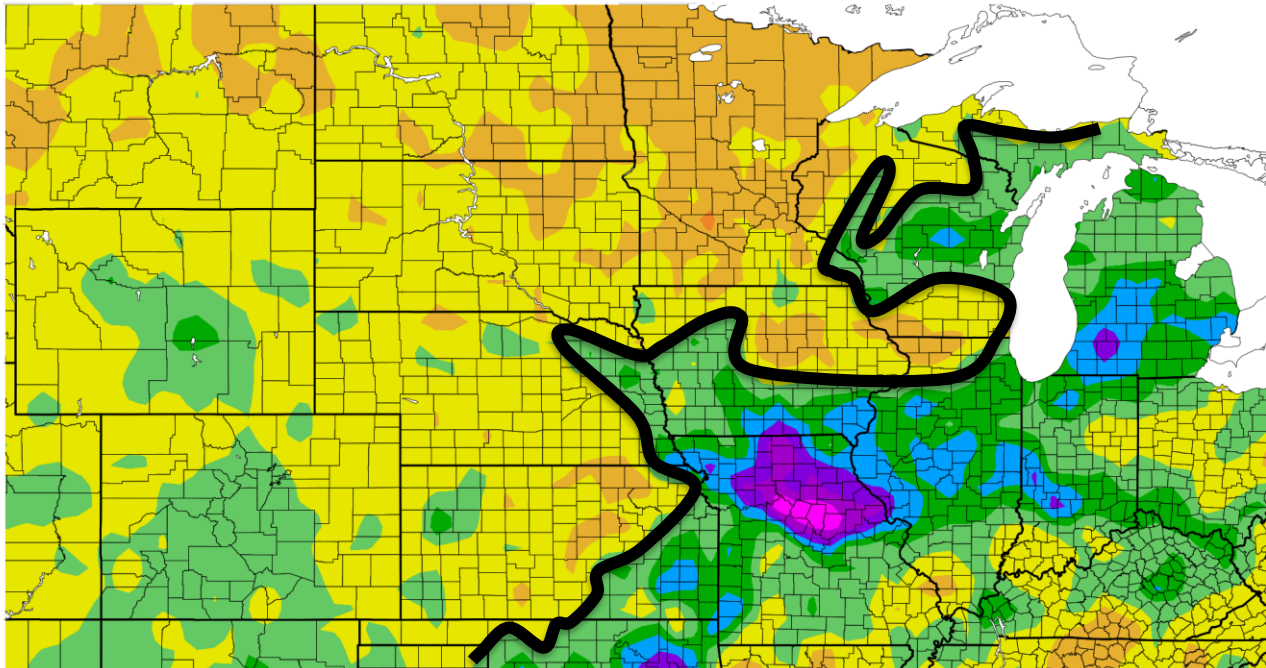


National Centers for
Environmental
Information
Wed Jul 7 2021



Wet vs Dry

Departure from Normal Precipitation (in)
6/14/2021 – 7/13/2021



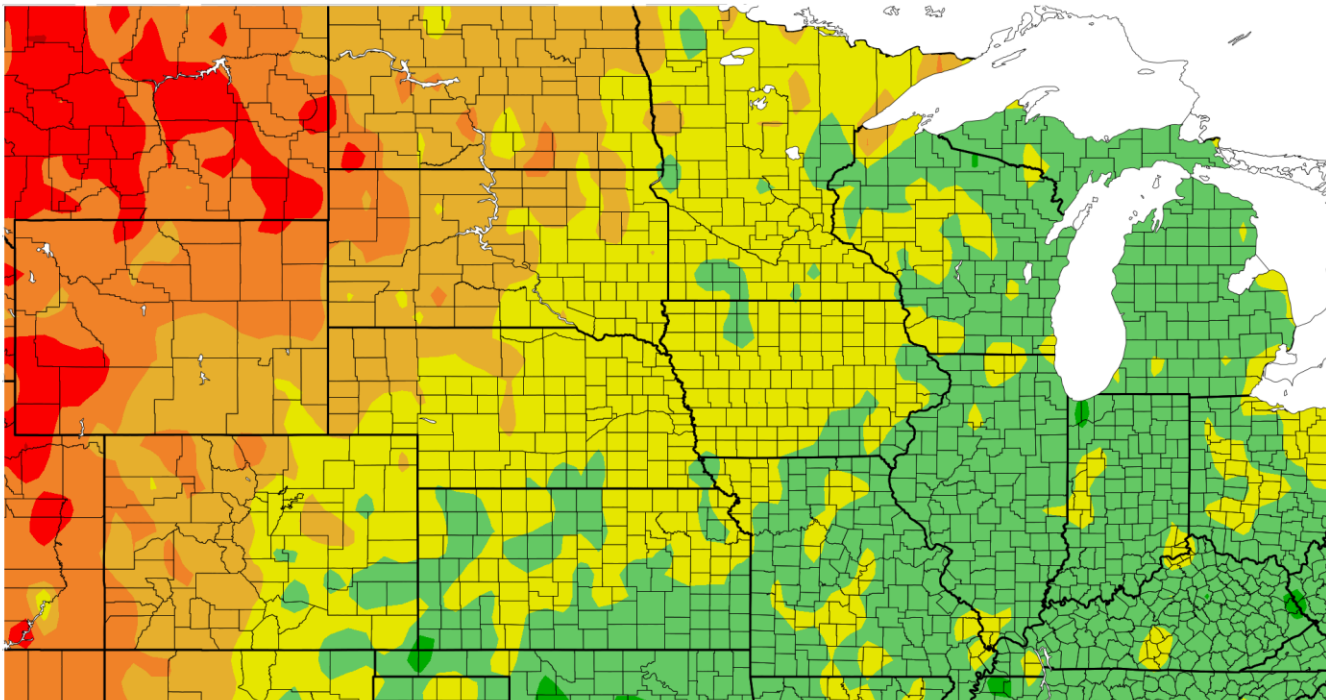
Generated 7/14/2021 at HPRCC using provisional data.

NOAA Regional Climate Centers

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

Relatively Warm vs Relatively Cool

Departure from Normal Temperature (F)
6/14/2021 – 7/13/2021



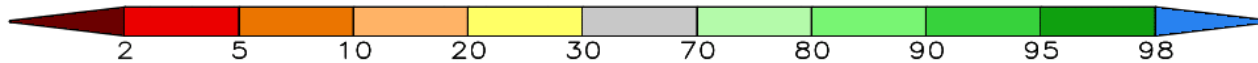
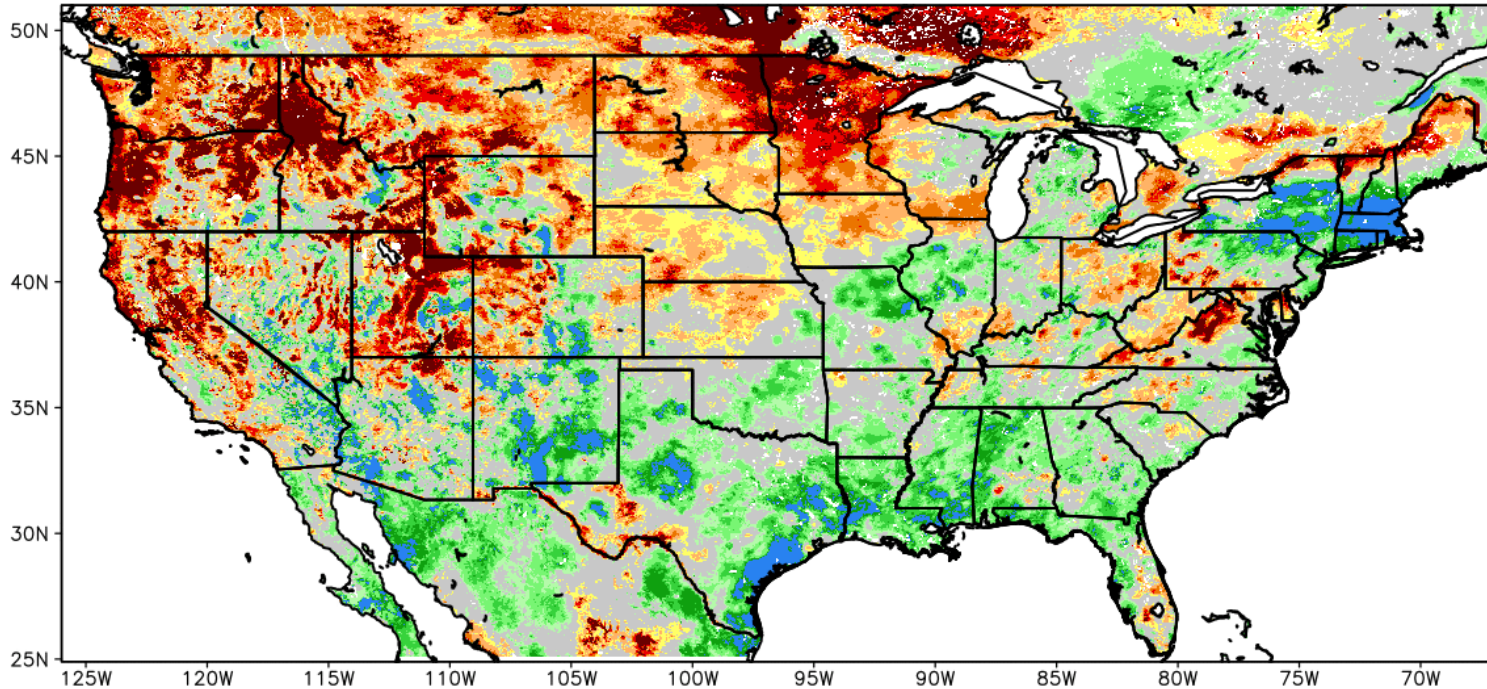
Generated 7/14/2021 at HPRCC using provisional data.

NOAA Regional Climate Centers

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

Calculated Soil Moisture Percentiles

SPoRT-LIS 0-100 cm Soil Moisture percentile valid 15 Jul 2021

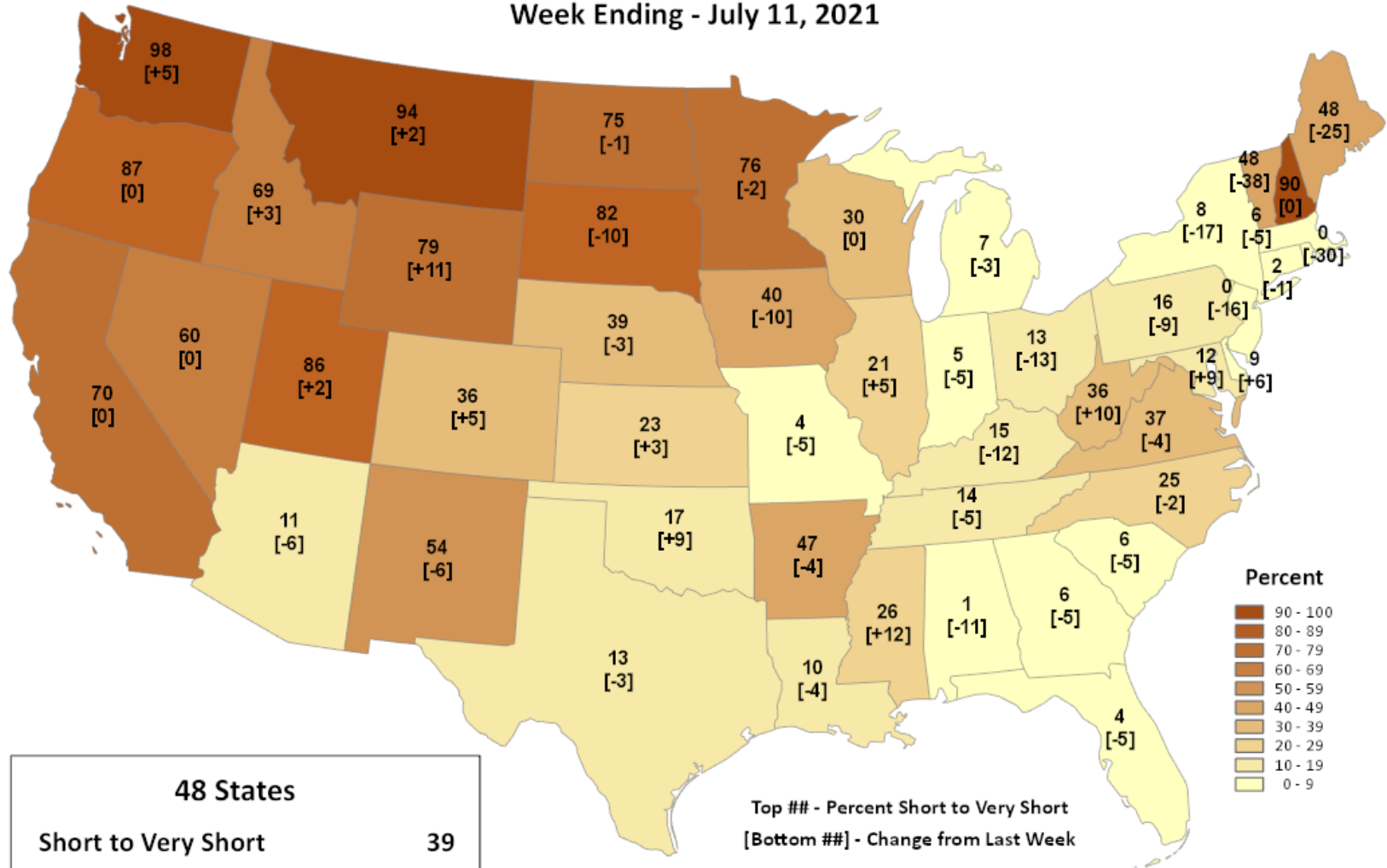


https://weather.msfc.nasa.gov/cgi-bin/basicLooper.pl?category=lis_CONUS&initialize=first®ex=vsm0-100percent_20210715

Topsoil Moisture

Percent Short to Very Short

Week Ending - July 11, 2021



48 States	
Short to Very Short	39
Change from Last Week	-2

Top ## - Percent Short to Very Short

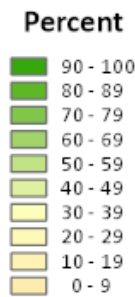
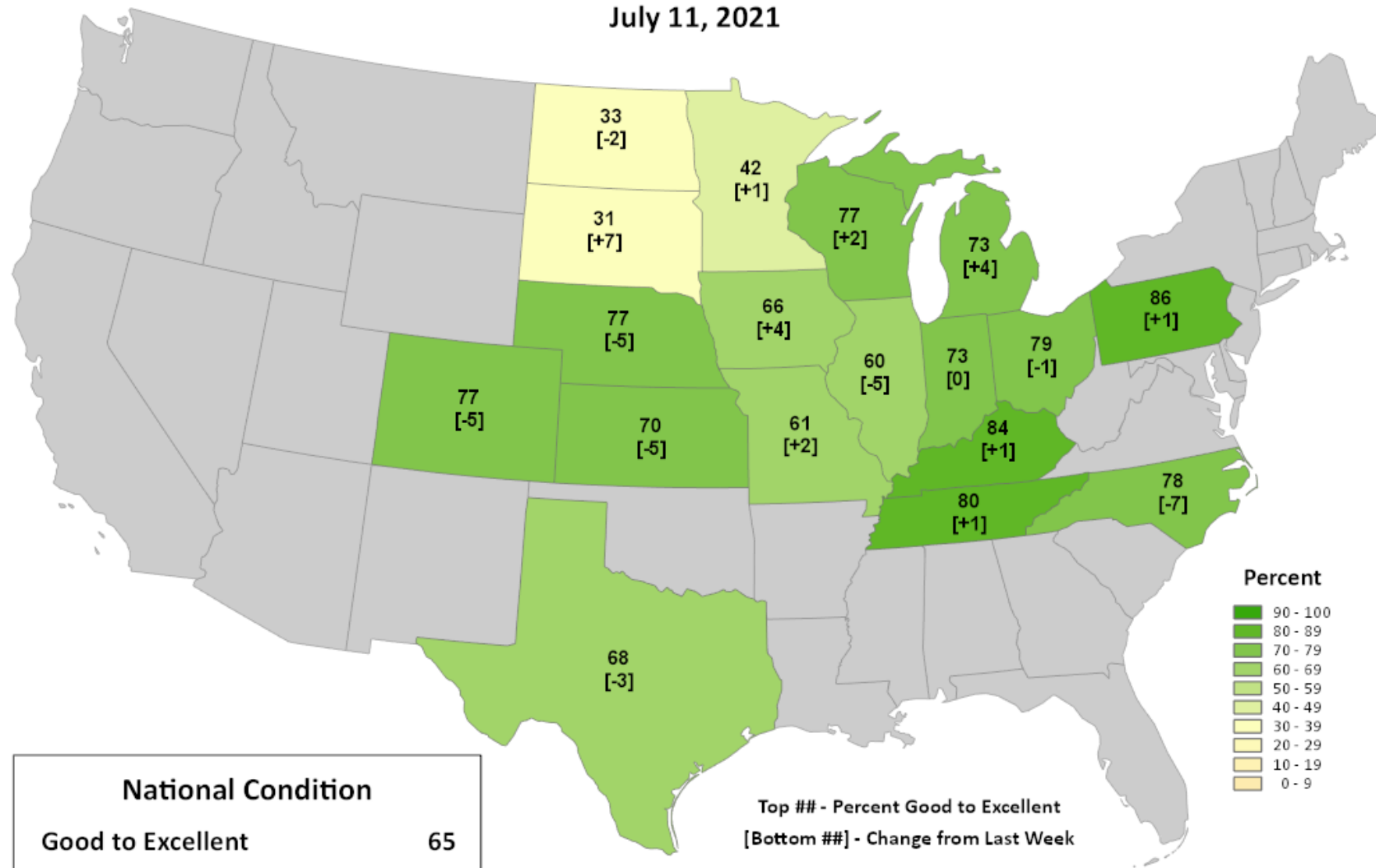
 [Bottom ##] - Change from Last Week

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

Corn Conditions

Percent Good to Excellent

July 11, 2021





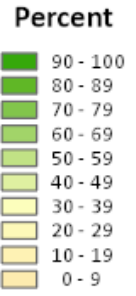
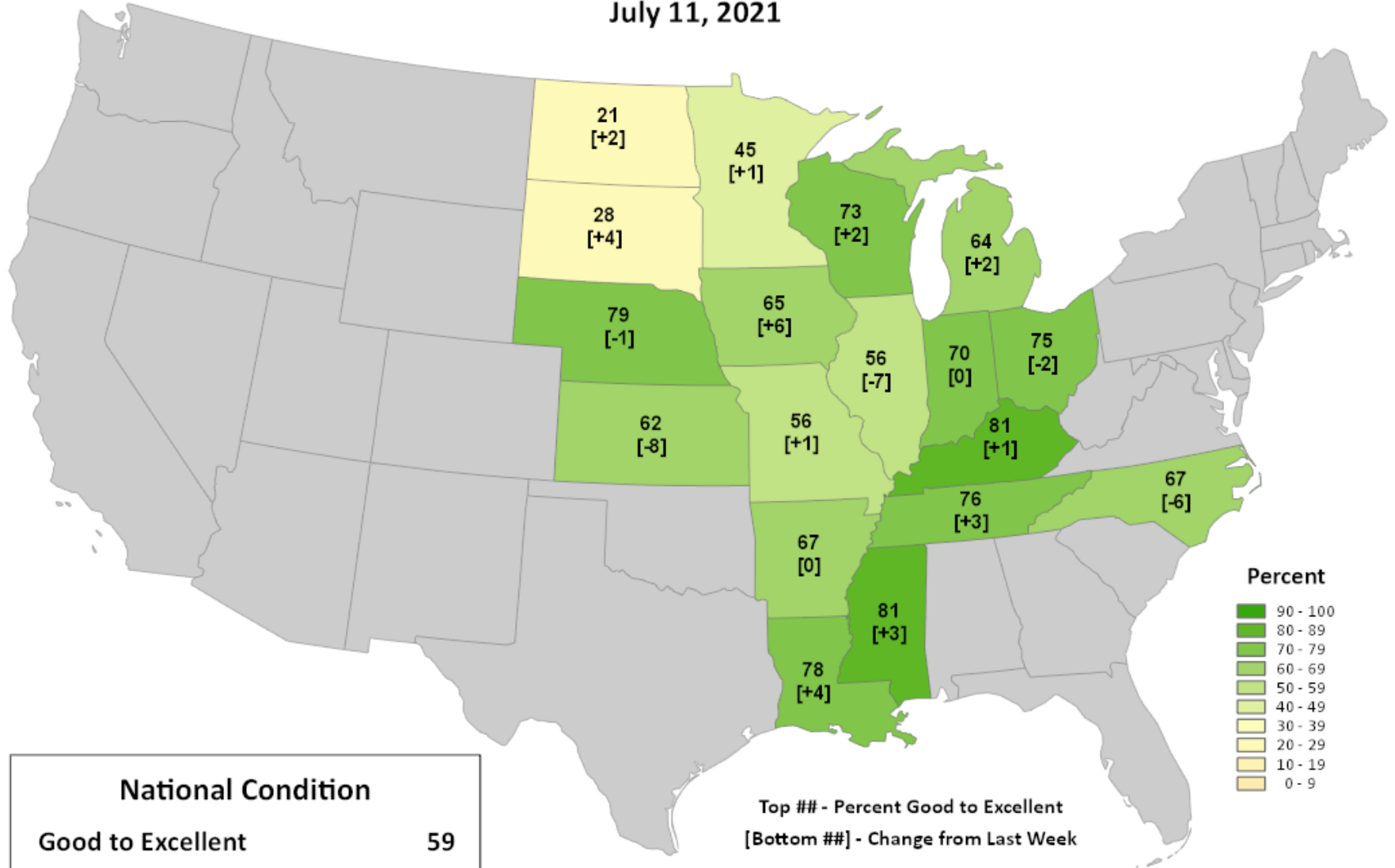
United States
Department of
Agriculture

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

Soybean Conditions

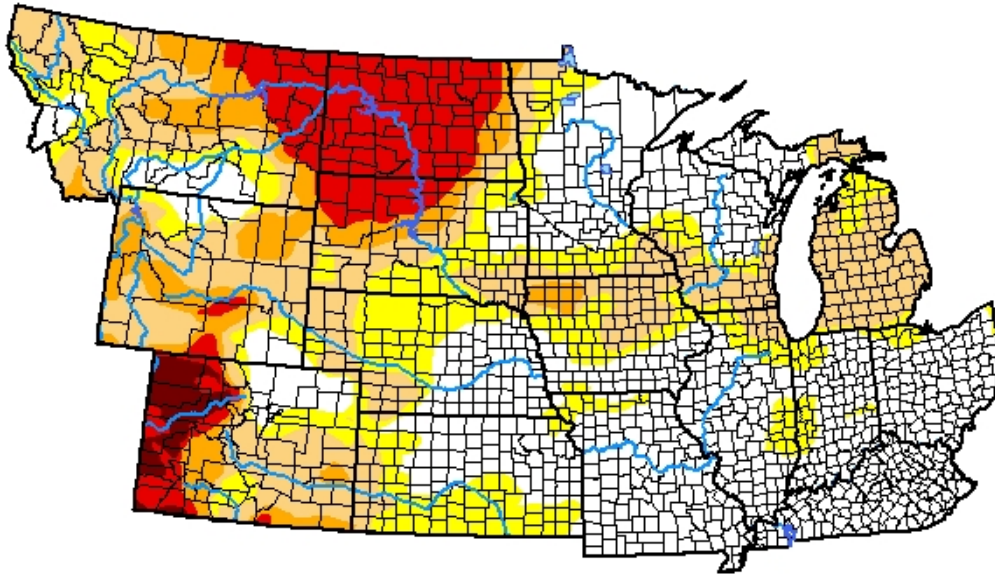
Percent Good to Excellent

July 11, 2021



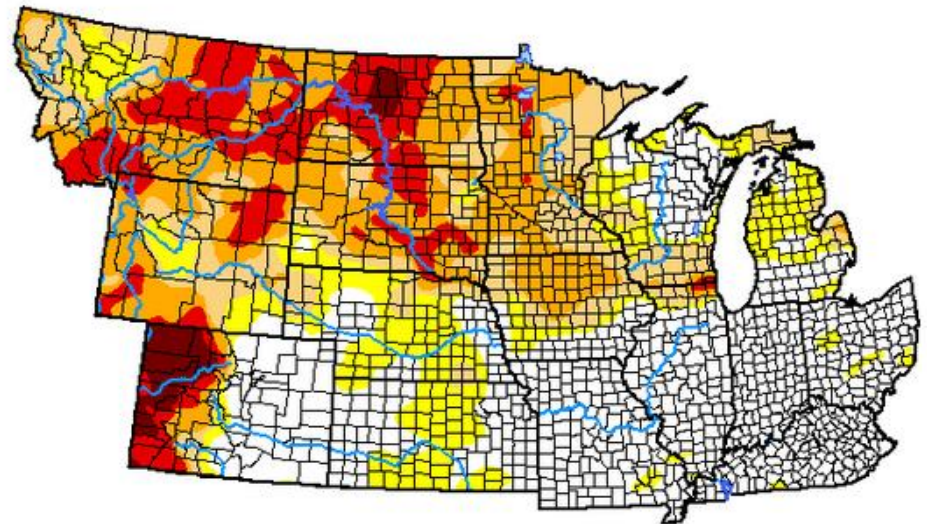
Data obtained from USDA National Agricultural Statistics Service weekly Crop Progress reports.

US Drought Monitor... Past Two Months



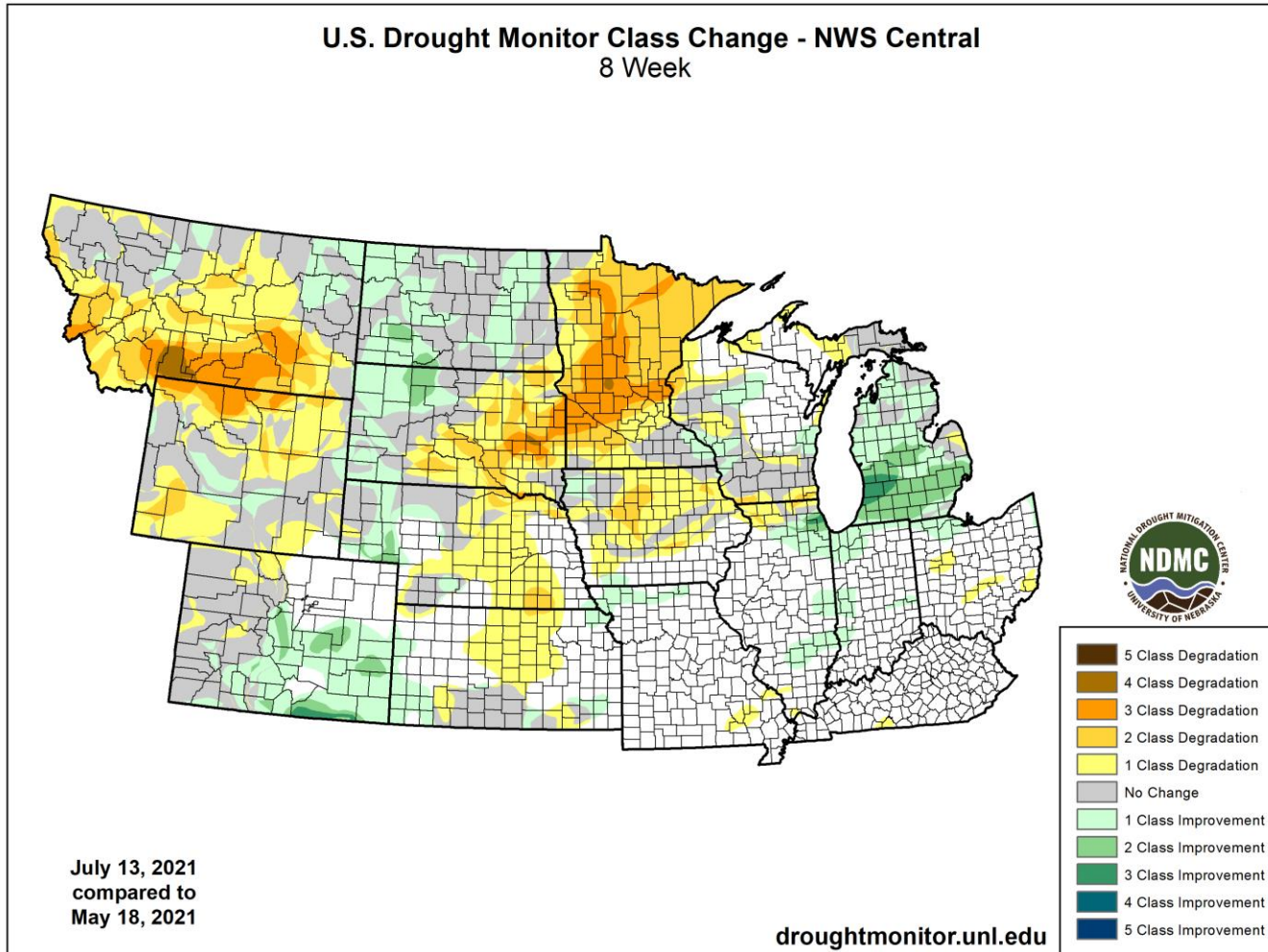
July 15, 2021

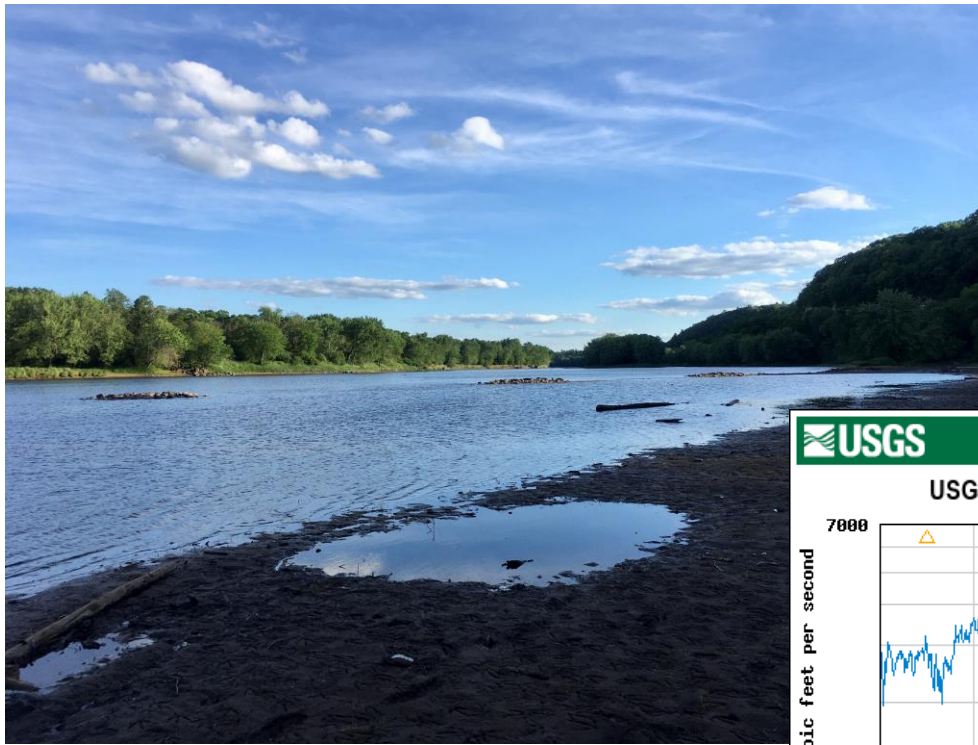
May 11, 2021



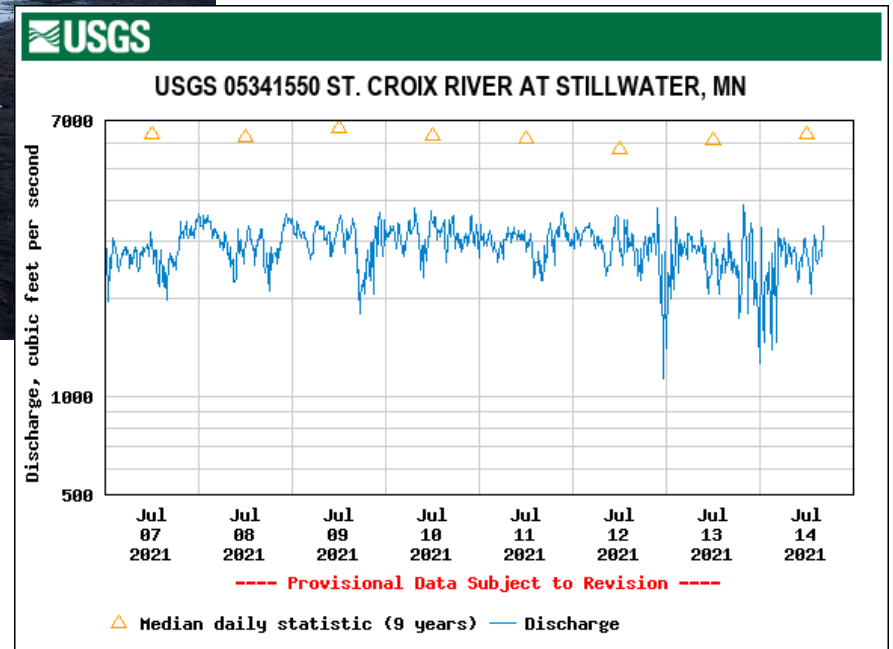
<http://droughtmonitor.unl.edu>

US Drought Monitor... Past Two Months





St. Croix River: June 16, 2021
 at St. Paul
Courtesy Minnesota DNR



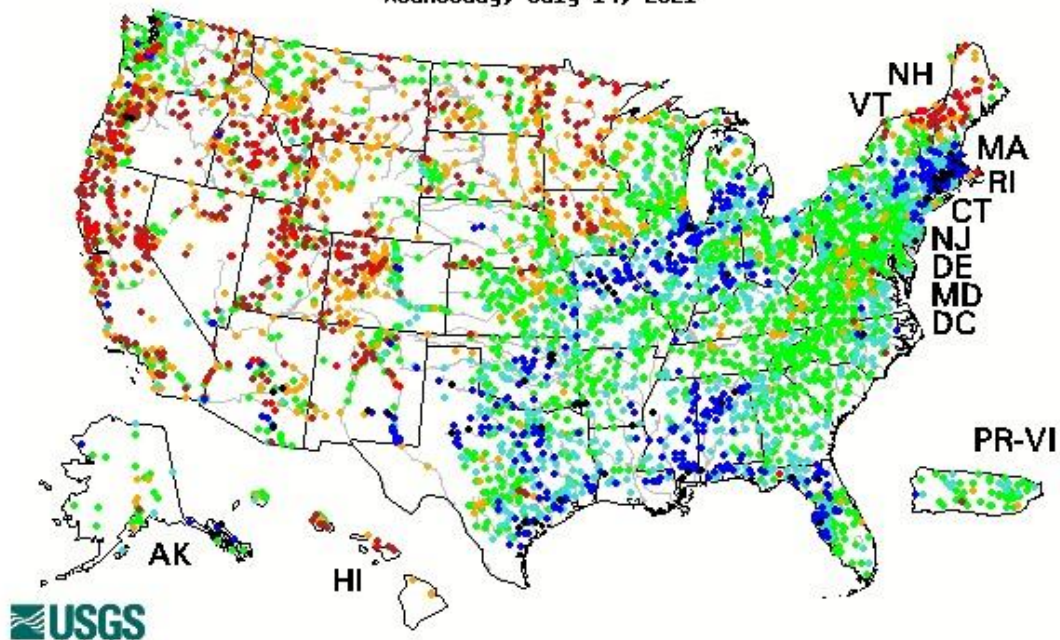
RIVERS AND STREAMS

July 14, 2021
 St. Croix River
 at Stillwater

Map of 28-day average streamflow compared to historical streamflow for the day of the year (United States)

United States or Water-Resources Regions

Mesnesday, July 14, 2021



Search USGS streamgage

Choose a data retrieval option and select a location on the map

- List of all stations in state,
 State map, or
 Nearest stations

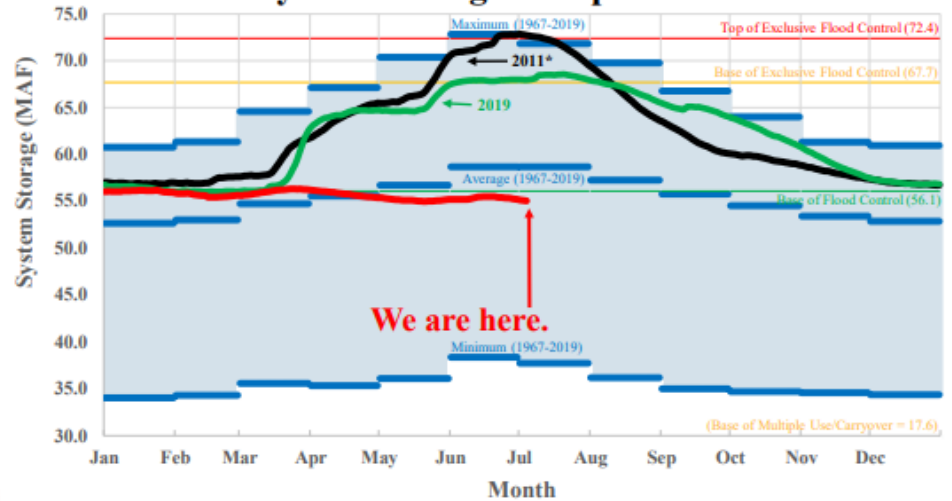
Explanation - Percentile classes						
Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	

Missouri River Basin – Update – 06 July 2021

Mainstem Reservoir Status:

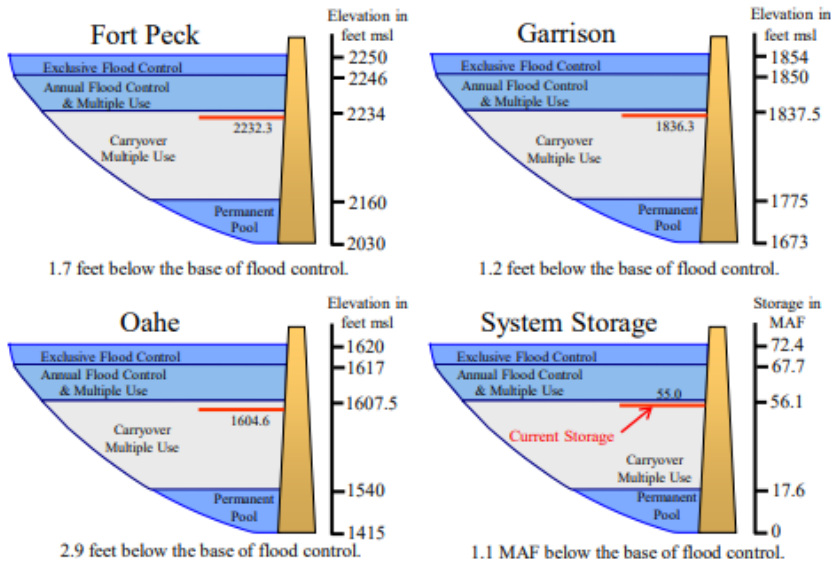
- ❖ System storage is 55.0 MAF, 0.3 MAF less than last week (upper right quadrant).
- ❖ The Upper Basin annual runoff forecast was updated on July 1. If the forecasted runoff of 15.6 MAF is realized, it would be the 10th lowest runoff since 1898.
- ❖ Drought is expected to persist or expand in the Upper Basin during July (lower right quadrant).
- ❖ Per the Master Manual, navigation support for the 2nd half of the navigation season (July 1 to December 1) is 1,500 cfs less than full service ([click here](#)).
- ❖ The navigation season length will be a full 8-month season.
- ❖ Winter releases from Gavins Point Dam, which are based on the Sep 1 System storage check, are expected to be at the minimum rate of 12,000 cfs.
- ❖ Refer to the 3-Week Forecast ([click here](#)) for the most up-to-date System information – pool levels, inflows and releases.

System Storage Comparison



*In January 2011, the Base of Flood Control was 56.8 MAF, and the Top of Exclusive Flood Control was 73.1 MAF.

Current Reservoir Levels

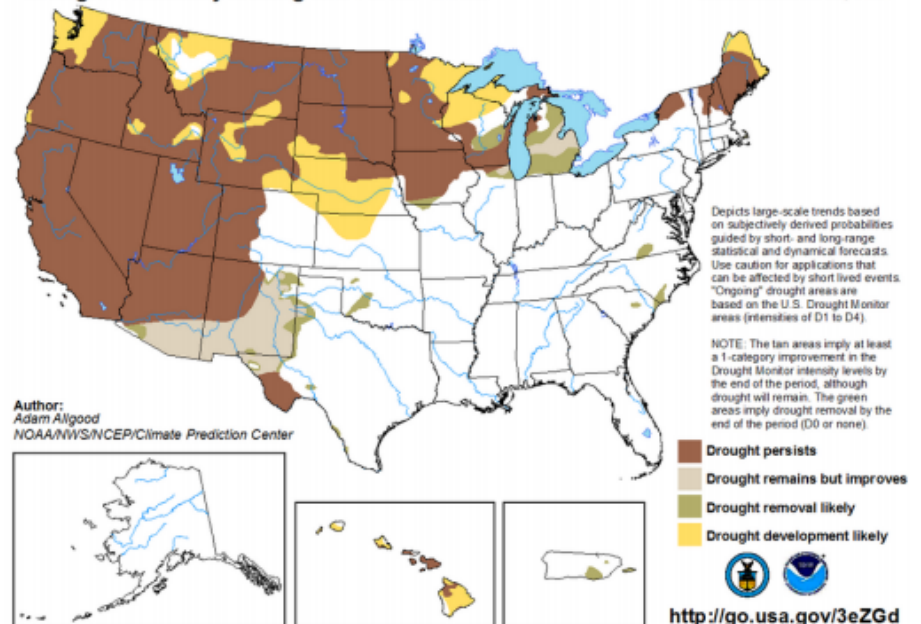


[Click Here](#) for Latest 3-Week Forecast

[Click Here](#) for Comparison Plots

U.S. Monthly Drought Outlook Drought Tendency During the Valid Period

Valid for July 2021
Released June 30, 2021

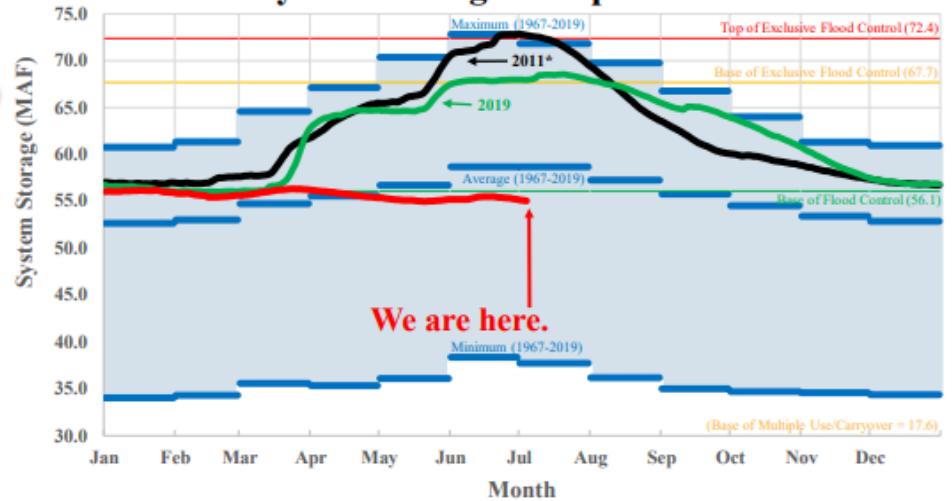


Missouri River Basin – Update – 06 July 2021

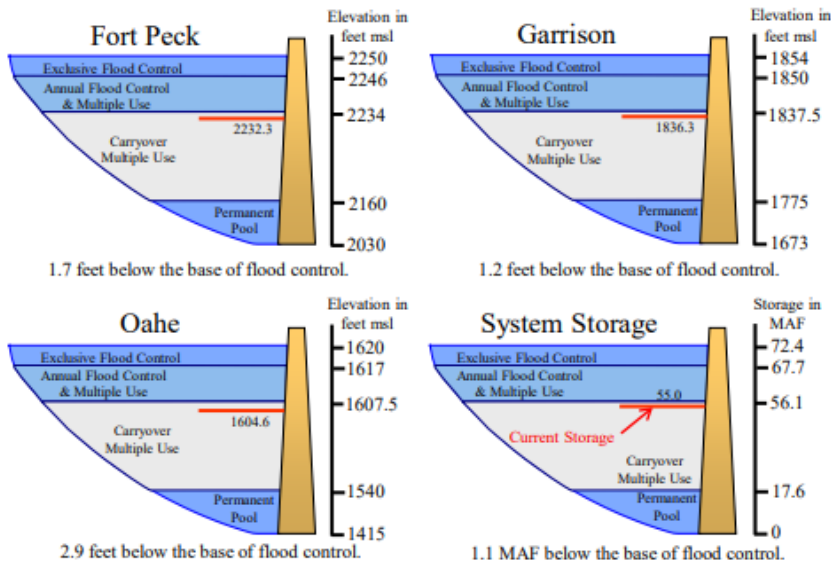
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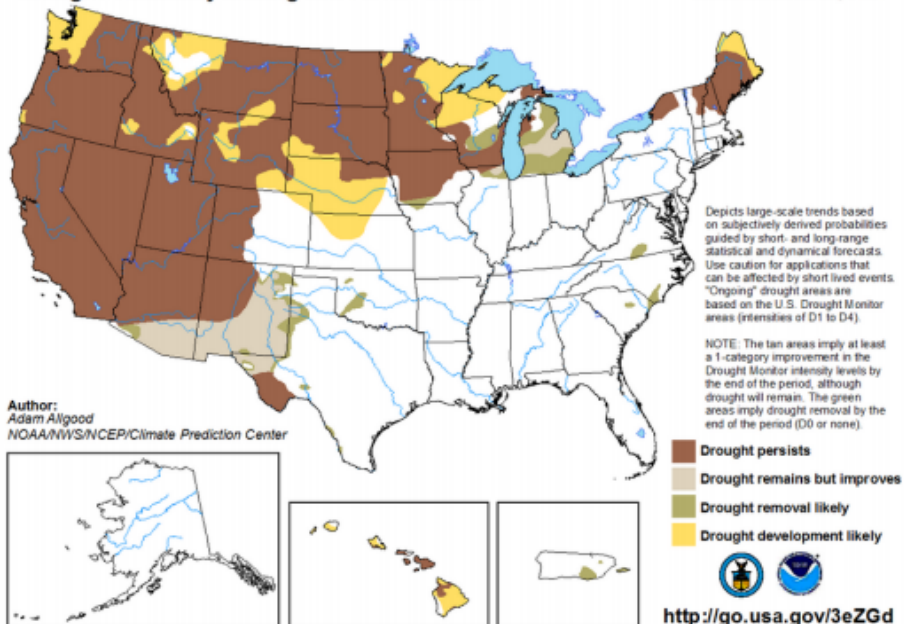
System Storage Comparison



Current Reservoir Levels



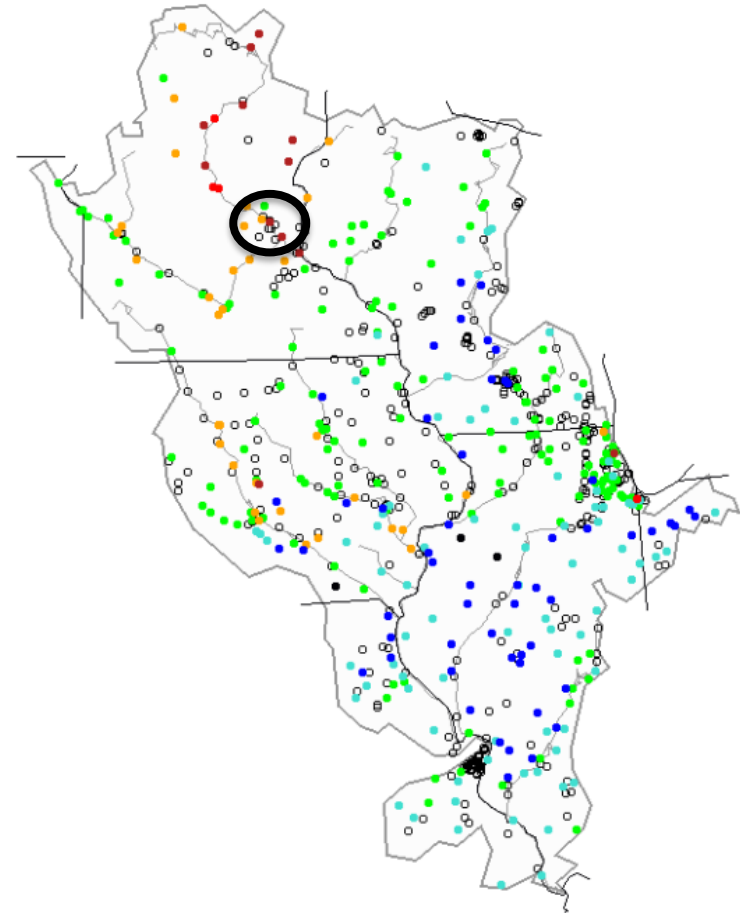
U.S. Monthly Drought Outlook



[Click Here](#) for Latest 3-Week Forecast

[Click Here](#) for Comparison Plots







- Mississippi River
- Map of real time streamflow.
- Mississippi at Brooklyn Park is at 4th percentile ranking (90 years of record.)



Search USGS streamgage

Choose a data retrieval option and select a location on the map

Single station
 Peak flow

Explanation - Percentile classes							
							
Low	<10 Much below normal	10-24 Below normal	25-75 Normal	76-90 Above normal	>90 Much above normal	High	Not-ranked

State Impacts



Smoky Skies in Minnesota due to Canadian Fires
-Courtesy Pete Boulay

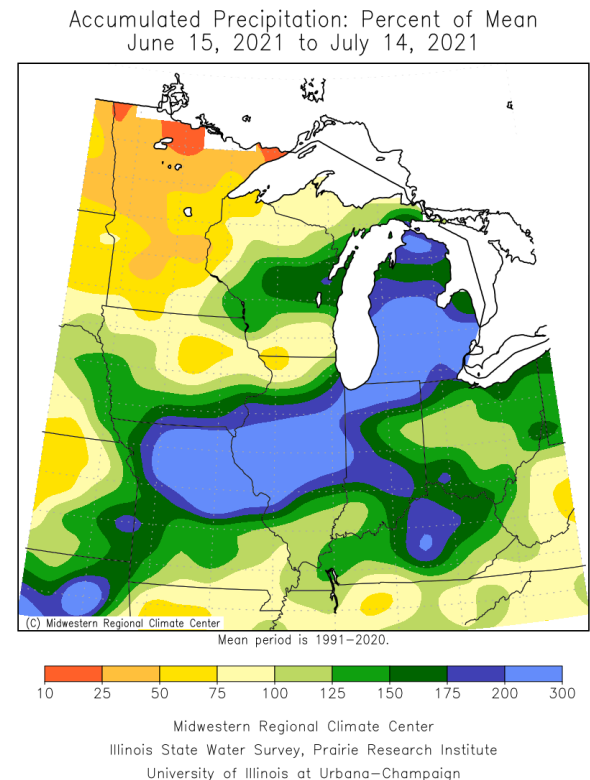


Red Sunset due to smoke
Boyd Lake State Park in Colorado
-Courtesy Becky Bolinger

- Kentucky and Ohio
 - All good in the Ohio Valley. No drought. Minimal flooding. Green grass. Temperatures not too bad.

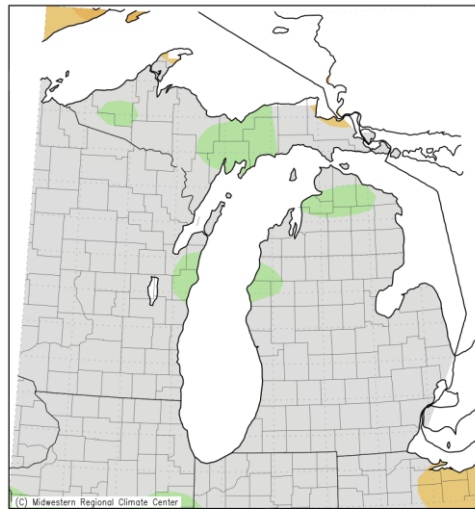


Wilmington Ohio: July 14, 2021
Courtesy: Jim Noel Ohio RFC



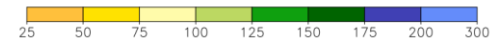
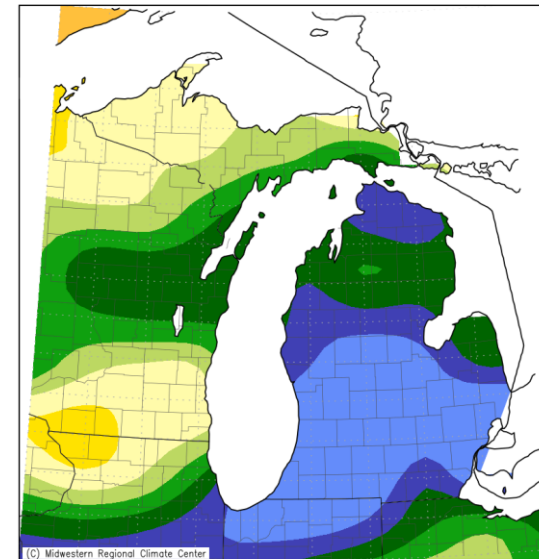
- Michigan
 - Big change from quite dry to wet.
 - Temperatures near normal last 30 days.
 - Smaller than average algal bloom predicted (Erie)

Average Temperature (°F): Departure from Mean
June 14, 2021 to July 13, 2021



Michigan State Climate Office
East Lansing, Michigan

Accumulated Precipitation: Percent of Mean
June 14, 2021 to July 13, 2021

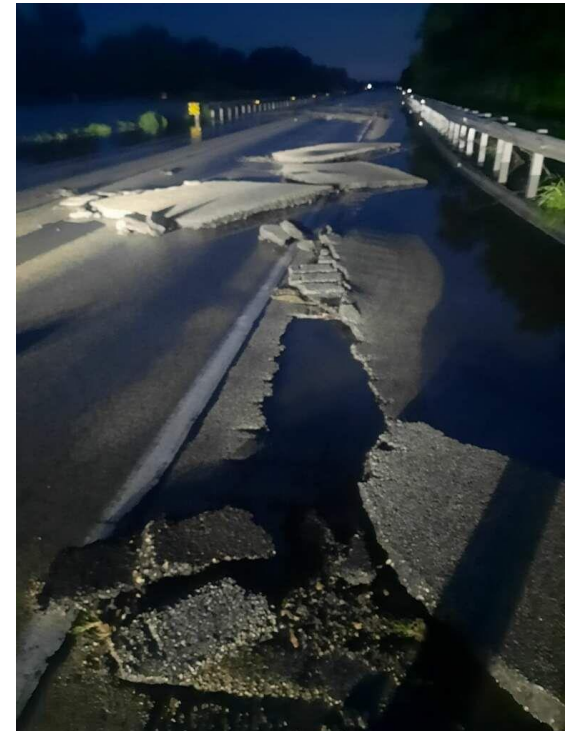


Michigan State Climate Office
East Lansing, Michigan

- Illinois
 - 10 inch rain event in 3 days near Bloomington.
 - EF3 Tornado damaged 230+ homes in western suburbs of Chicago.

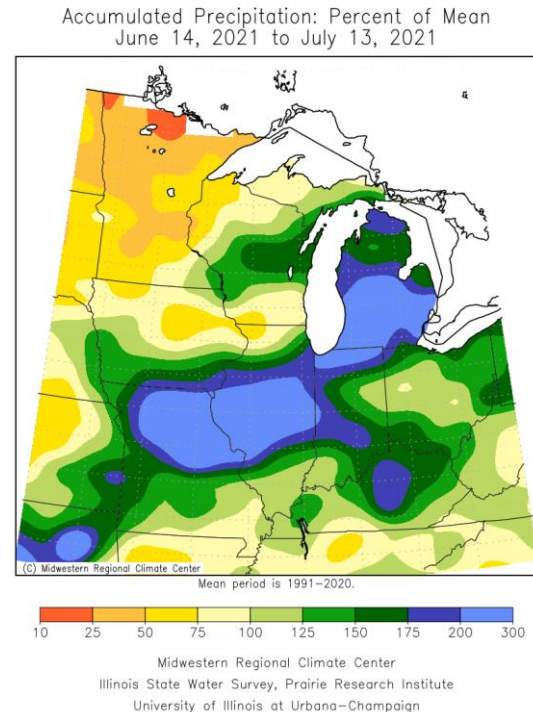


Tornado Damage in Woodridge, IL:
June 20, 2021
Courtesy: Chicago, NWS



I-55 damage due to flood:
June 25-26, 2021
Courtesy: Funks Grove FPD

- Iowa and Missouri
 - First 16 days of June in Iowa was the driest and warmest June.
 - Active severe storm season (12 tornadoes in central Iowa on July 14).
 - Crops are really doing well.



- Iowa and Missouri

- First 16 days of June in Iowa was the driest and warmest June.
- Active severe storm season (12 tornadoes in central Iowa on July 14).
- Crops are really doing well.
- Except where there was hail and where it's too wet.

Hail damage to soybeans in central Iowa

*Courtesy: Justin Glisan, Iowa State
Climatology Office*



- Minnesota

- June was 3rd warmest, 7th driest.
- Top two feet of soil drying out.
- Some beneficial rains in south July 6-7 and July 14, really helped corn and soybeans.

Exposed Boat Landing on the St. Croix River: June, 2021

Courtesy: Minnesota DNR



- North Dakota
 - Drought continues, hot and dry.
 - Algal blooms becoming an issue.
 - Livestock feed and water scarce. Pastures in poor shape, stressed crops.
 - Grasshoppers!

Toxic blister beetle on Alfalfa
Courtesy: NDSU Extension



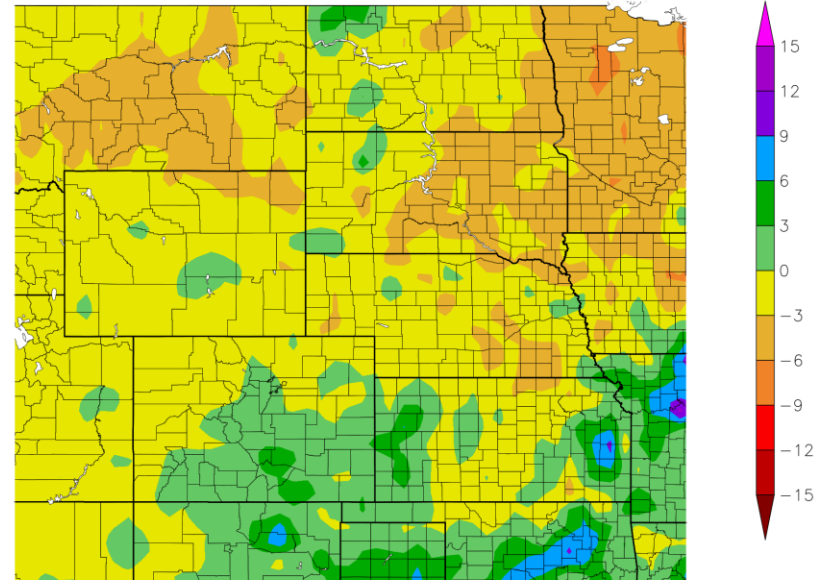
- Kansas and Nebraska

- Currently crops look good, deep soil moisture concerns NE, timely summer rains vital.

- Thunderstorm damage from July 10th still being assessed Grand Island-Omaha.

- Kansas crops are looking good, despite hot weather in June and some hail events.

Departure from Normal Precipitation (in)
5/15/2021 – 7/13/2021



- Colorado
 - Earliest 100 degree F reading at Colorado Springs on June 16. All time record high of 107 F at Grand Junction on July 9.
 - Heavy Rains fell on Grizzly Creek Fire Burn Scar on June 27 caused mudslide across I-70.

Mudslide across I-70:
June 27, 2021
Courtesy: Colorado DOT

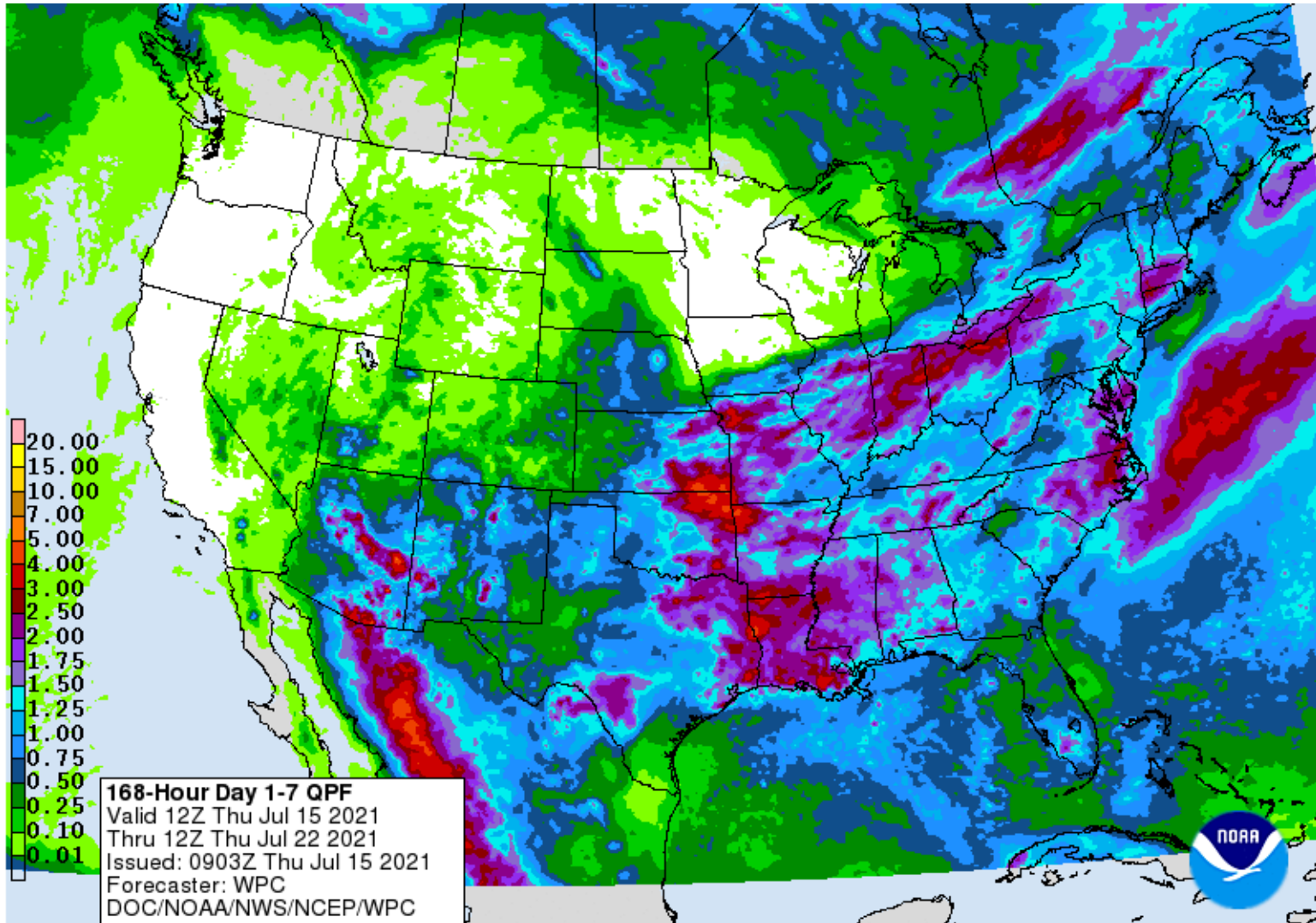


Climate Outlooks

- 7-day QPF
- 8-14 day outlook
- August temperature and precipitation
- ASO temperature and precipitation
- SON temperature and precipitation

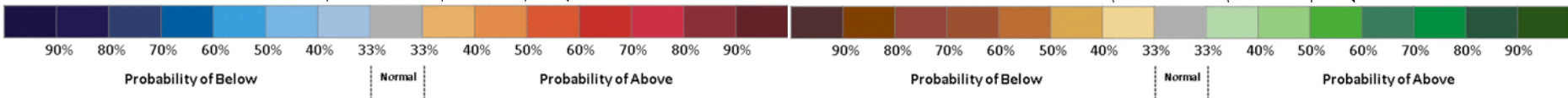
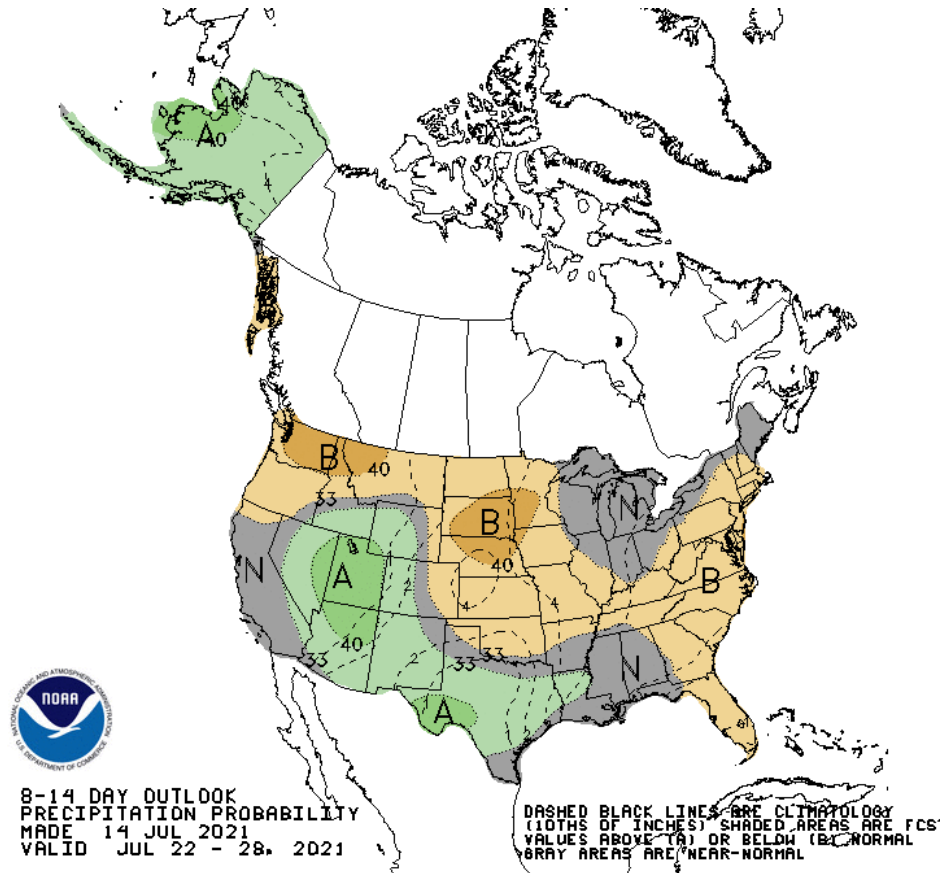
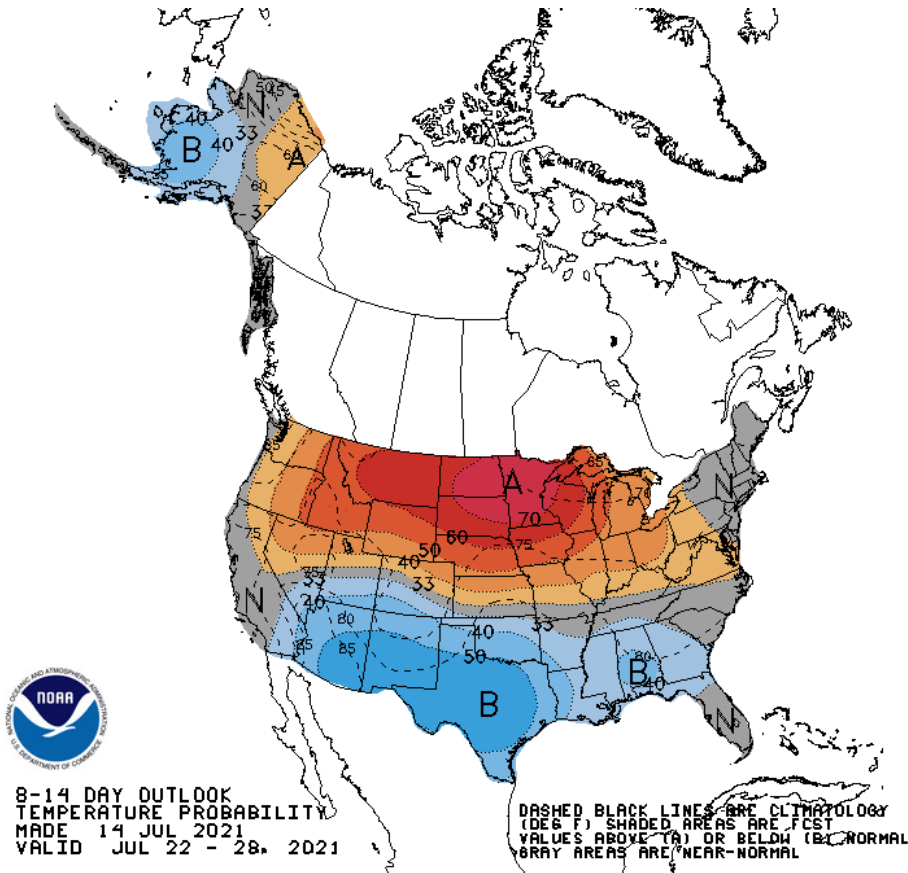
7-day Quantitative Precipitation Forecast

Valid: 15-22 July



<https://www.wpc.ncep.noaa.gov/qpf/day1-7.shtml>

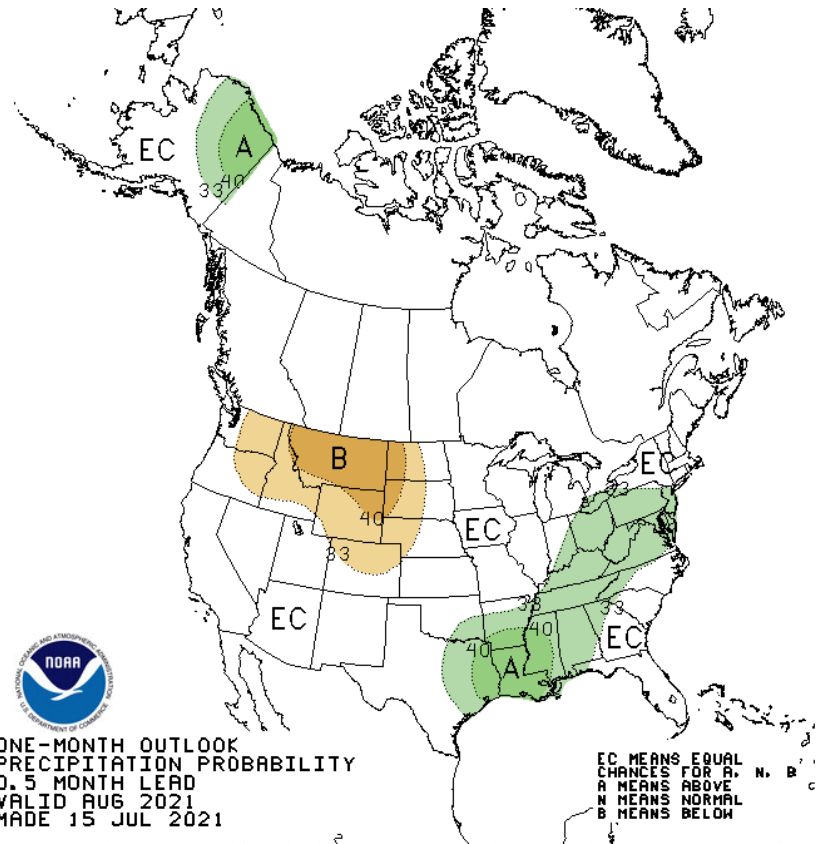
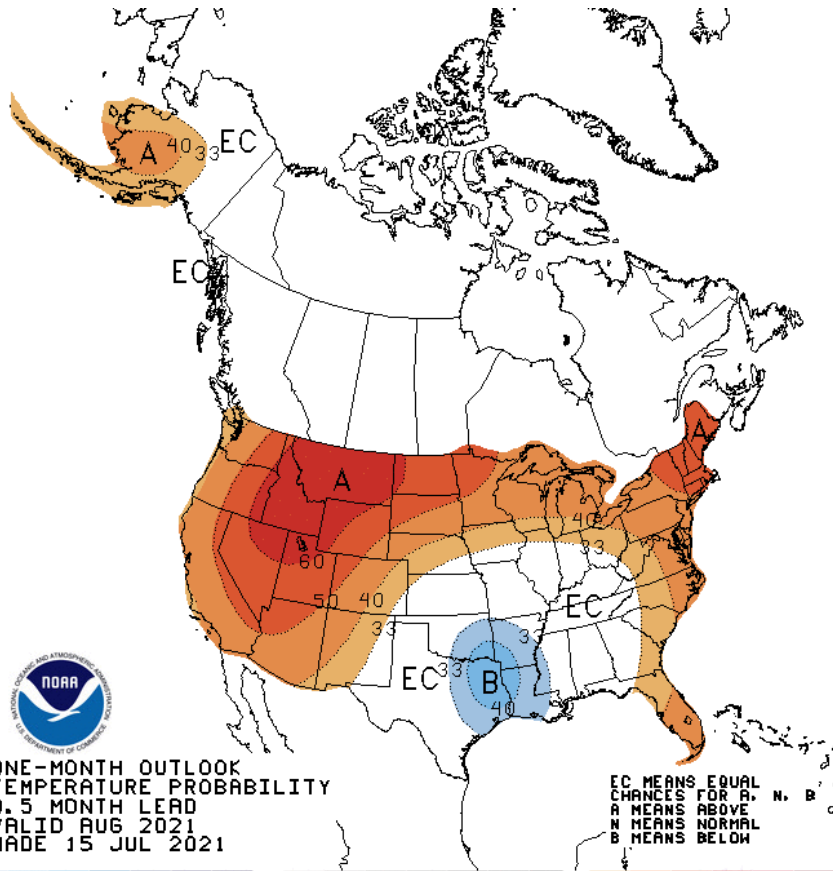
8-14 Day Outlook



Temperature

Precipitation

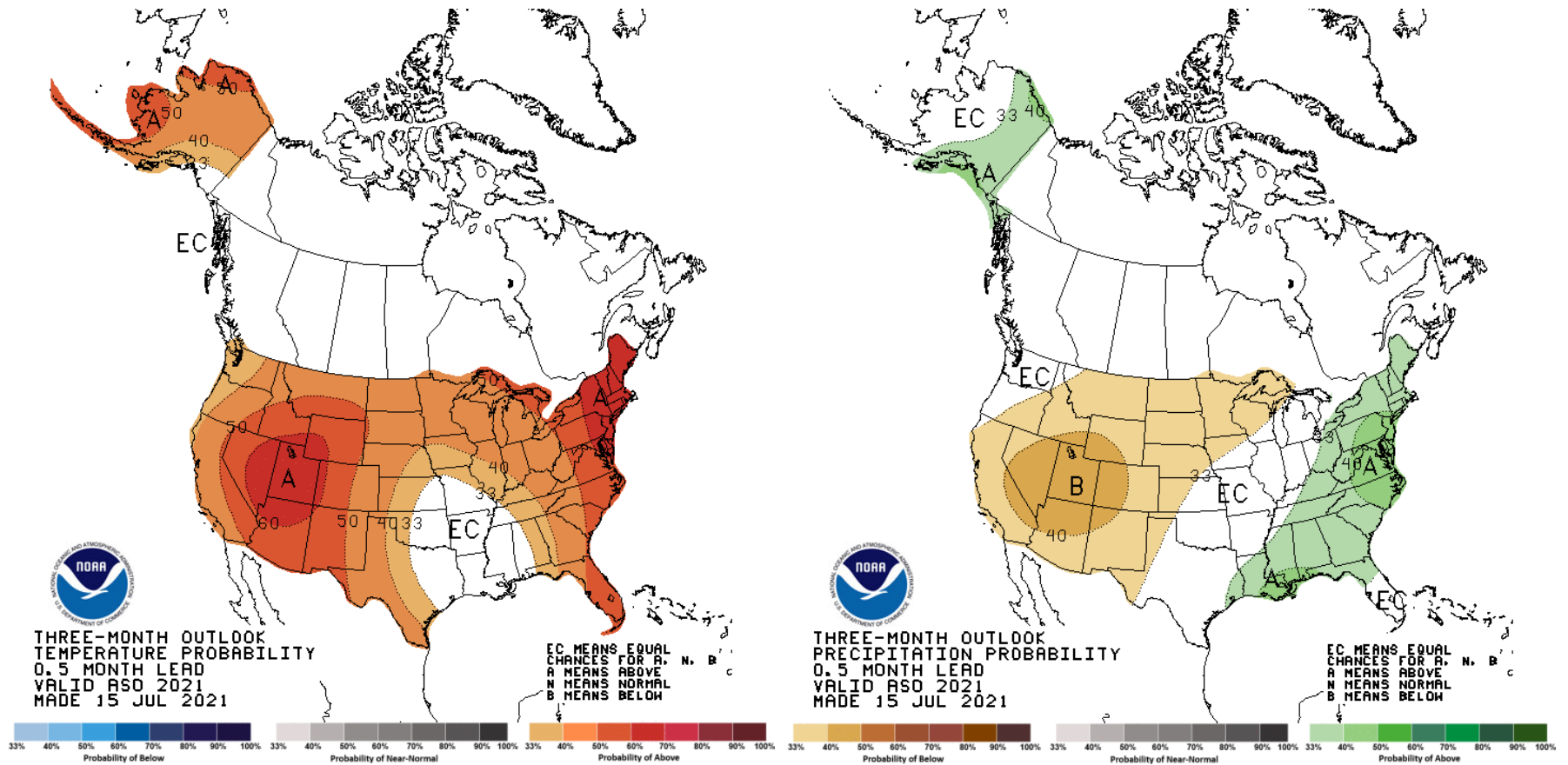
August Outlook



Temperature

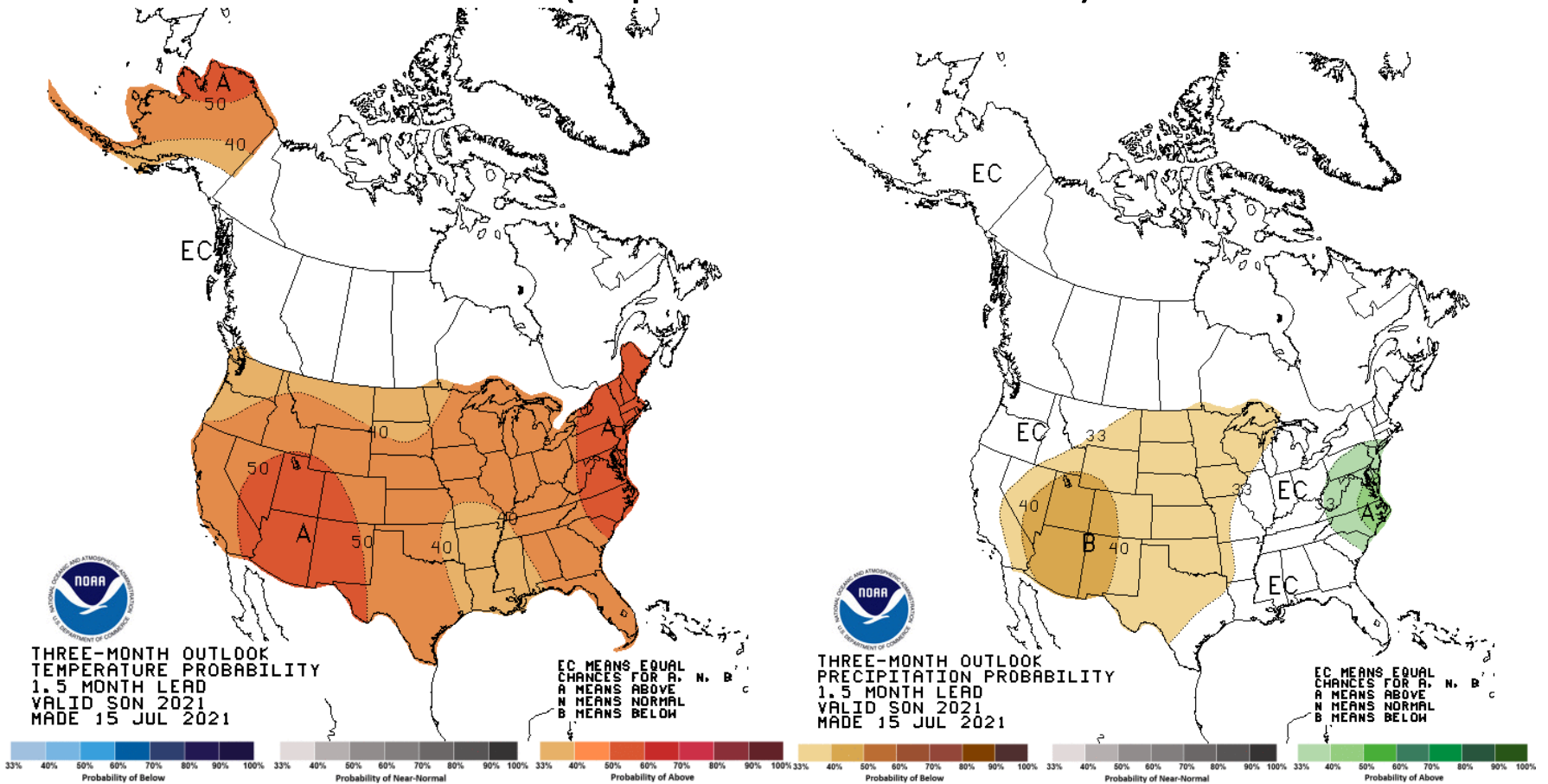
Precipitation

Climate Prediction Center Outlook: Late Summer-Autumn (Aug-Oct) 2021



<https://www.cpc.ncep.noaa.gov/products/predictions/90day/>

Climate Prediction Center Outlook: Autumn (September-November) 2021

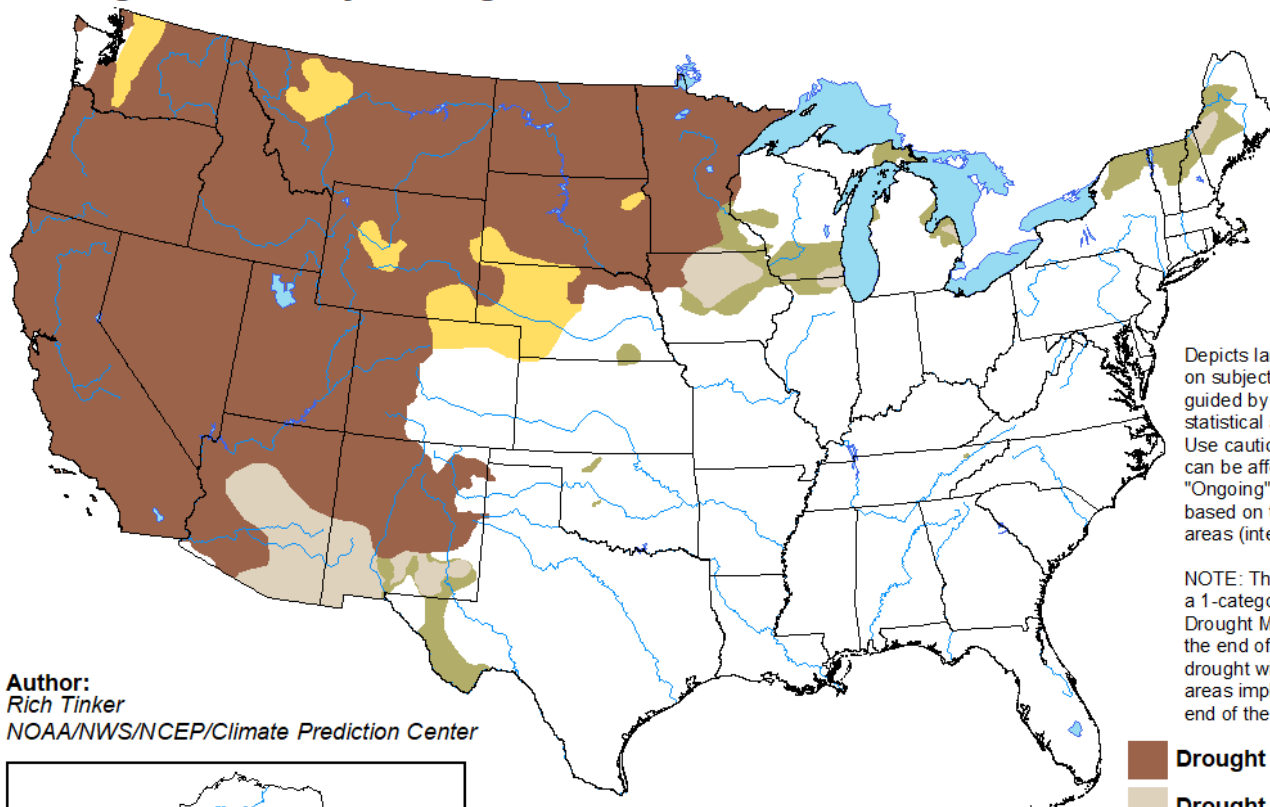


https://www.cpc.ncep.noaa.gov/products/predictions/long_range/lead02

Seasonal Drought Outlook

U.S. Seasonal Drought Outlook Drought Tendency During the Valid Period

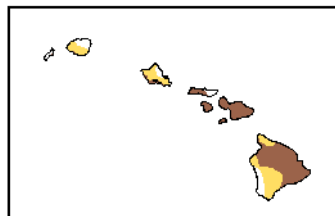
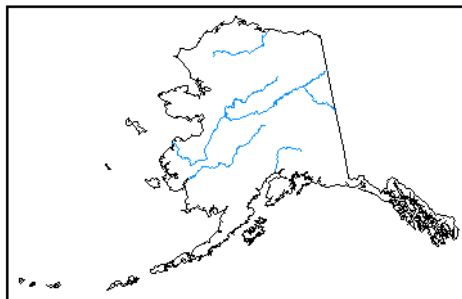
Valid for July 15 - October 31, 2021
Released July 15







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).

Author:
Rich Tinker
NOAA/NWS/NCEP/Climate Prediction Center



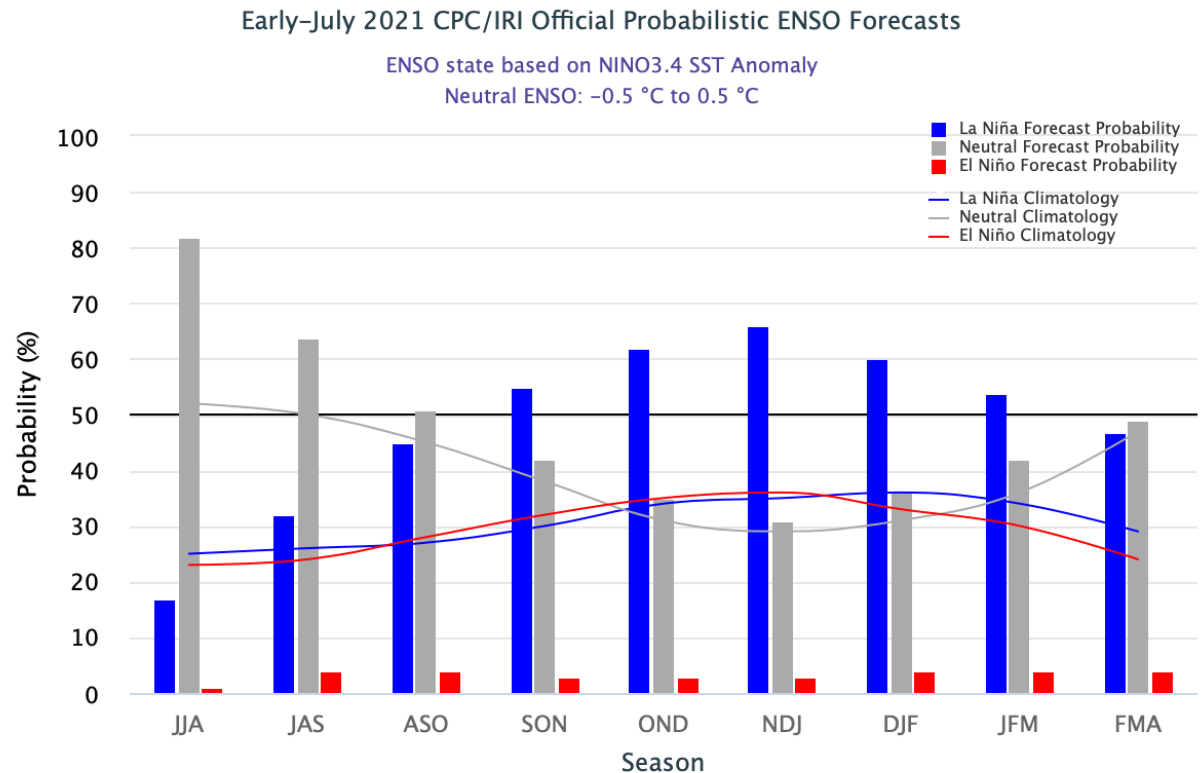
-  Drought persists
-  Drought remains but improves
-  Drought removal likely
-  Drought development likely



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

EL NIÑO/SOUTHERN OSCILLATION (ENSO)

Under a La Nina advisory which means greater than 50% chance of development. Right now it appears to be a weak to moderate event. Watch future webinars for developments.



Outlook Summary

- Drought persists over the north, some improvement over Iowa and Wisconsin.
- Above normal temperatures continue through the autumn.
- A tendency for below normal precipitation to persist into the autumn.

Further Information - Partners

- **Today's and Past Recorded Presentations:**

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

- <https://hprcc.unl.edu/webinars.php>

NOAA's National Centers for Environmental Information: 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

- <https://mrcc.illinois.edu>

- <http://www.hprcc.unl.edu>

Thank You and Questions?

- Questions:
 - **Climate:**
 - Pete Boulay: Peter.Boulay@state.mn.us , 612-390-1301
 - Dennis Todey: dennis.todey@ars.usda.gov , 515-294-2013
 - Doug Kluck: doug.kluck@noaa.gov, 816-994-3008
 - Mike Timlin: mtimlin@illinois.edu; 217-333-8506
 - Natalie Umphlett: numphlett2@unl.edu ; 402-472-6764
 - Brian Fuchs: bfuchs2@unl.edu 402-472-6775

- **Weather:**
- crhroc@noaa.gov

Sunset at Long Lake, WI
June 27,2021
Courtesy Pete Boulay

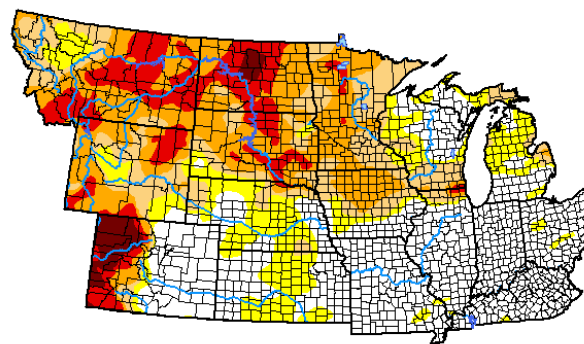


Central Region Webinar

July Agricultural Supplement

Brad Rippey, USDA Meteorologist
Office of the Chief Economist
World Agricultural Outlook Board
Washington, D.C.

U.S. Drought Monitor NWS Central

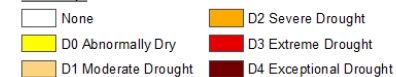


July 13, 2021
(Released Thursday, Jul. 15, 2021)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	37.24	62.76	48.24	33.17	13.41	2.13
Last Week 07-06-2021	37.19	62.81	48.52	32.20	11.32	2.30
3 Months Ago 04-13-2021	40.21	59.79	37.11	21.27	11.47	1.32
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 07-14-2020	47.45	52.55	19.58	7.46	3.53	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:

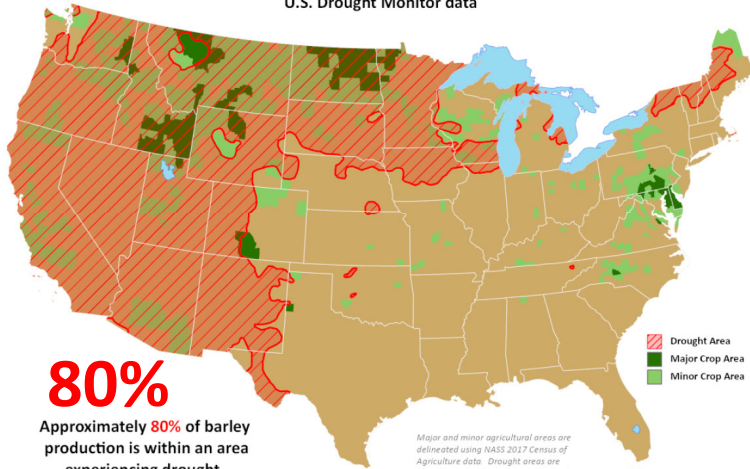
Adam Hartman
NOAA/NWS/NCEP/CPC



droughtmonitor.unl.edu

Barley Areas in Drought

Reflects July 13, 2021
 U.S. Drought Monitor data



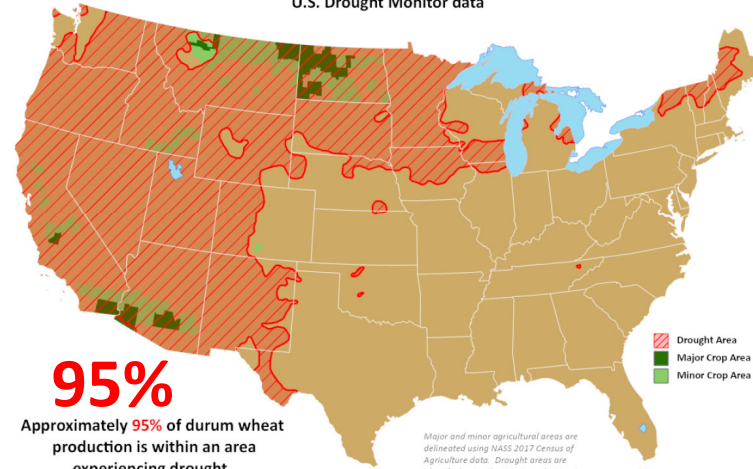
80%

Approximately 80% of barley production is within an area experiencing drought.

Major and minor agricultural areas are delineated using NASS 2017 Census of Agriculture data. Drought areas are identified using the U.S. Drought Monitor product.

Durum Wheat Areas in Drought

Reflects July 13, 2021
 U.S. Drought Monitor data



95%

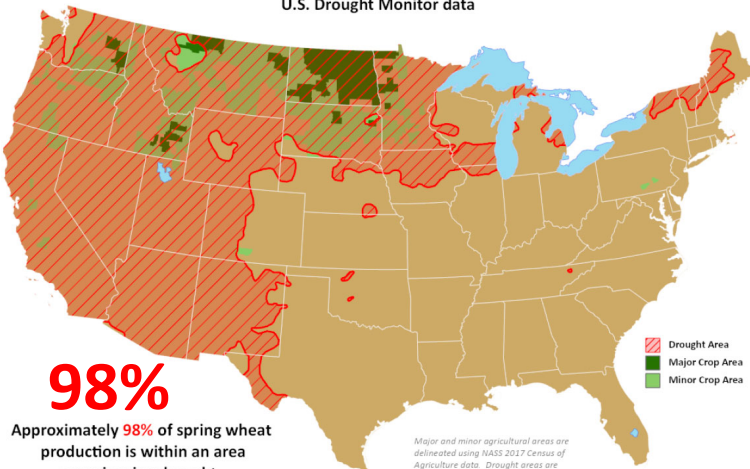
Approximately 95% of durum wheat production is within an area experiencing drought.

Major and minor agricultural areas are delineated using NASS 2017 Census of Agriculture data. Drought areas are identified using the U.S. Drought Monitor product.

<https://www.usda.gov/sites/default/files/documents/AgInDrought.pdf>

Spring Wheat Areas in Drought

Reflects July 13, 2021
 U.S. Drought Monitor data



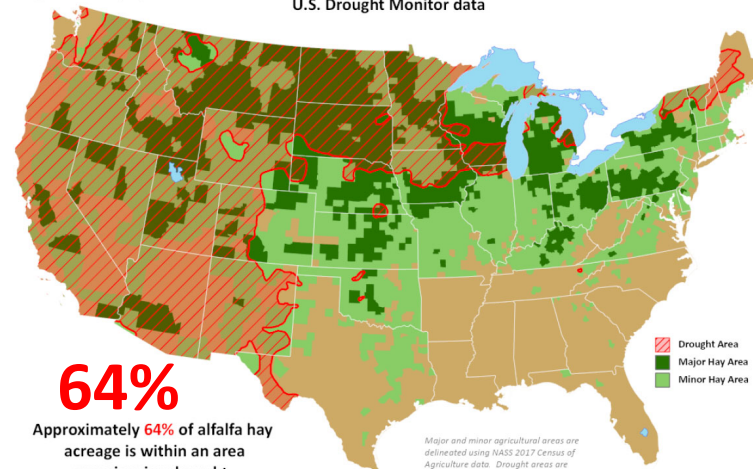
98%

Approximately 98% of spring wheat production is within an area experiencing drought.

Major and minor agricultural areas are delineated using NASS 2017 Census of Agriculture data. Drought areas are identified using the U.S. Drought Monitor product.

Alfalfa Hay Areas in Drought

Reflects July 13, 2021
 U.S. Drought Monitor data



64%

Approximately 64% of alfalfa hay acreage is within an area experiencing drought.

Major and minor agricultural areas are delineated using NASS 2017 Census of Agriculture data. Drought areas are identified using the U.S. Drought Monitor product.



ISSN: 1936-3737

Crop Production

Released July 12, 2021, by the National Agricultural Statistics Service (NASS), Agricultural Statistics Board, United States Department of Agriculture (USDA).

Winter Wheat Production Up 4 Percent from June Forecast (Yield Up 1 Percent from June)
Durum Wheat Production Down 46 Percent from 2020 (Yield Down 38 Percent from 2020)
Other Spring Wheat Production Down 41 Percent from 2020 (Yield Down 37 Percent from 2020)

Also... barley production down 31% from last year; yield down 28% from 77.5 to 55.9 bushels/acre.
Finally... oat production down 37% from last year; yield down 12% from 65.1 to 57.2 bushels/acre.

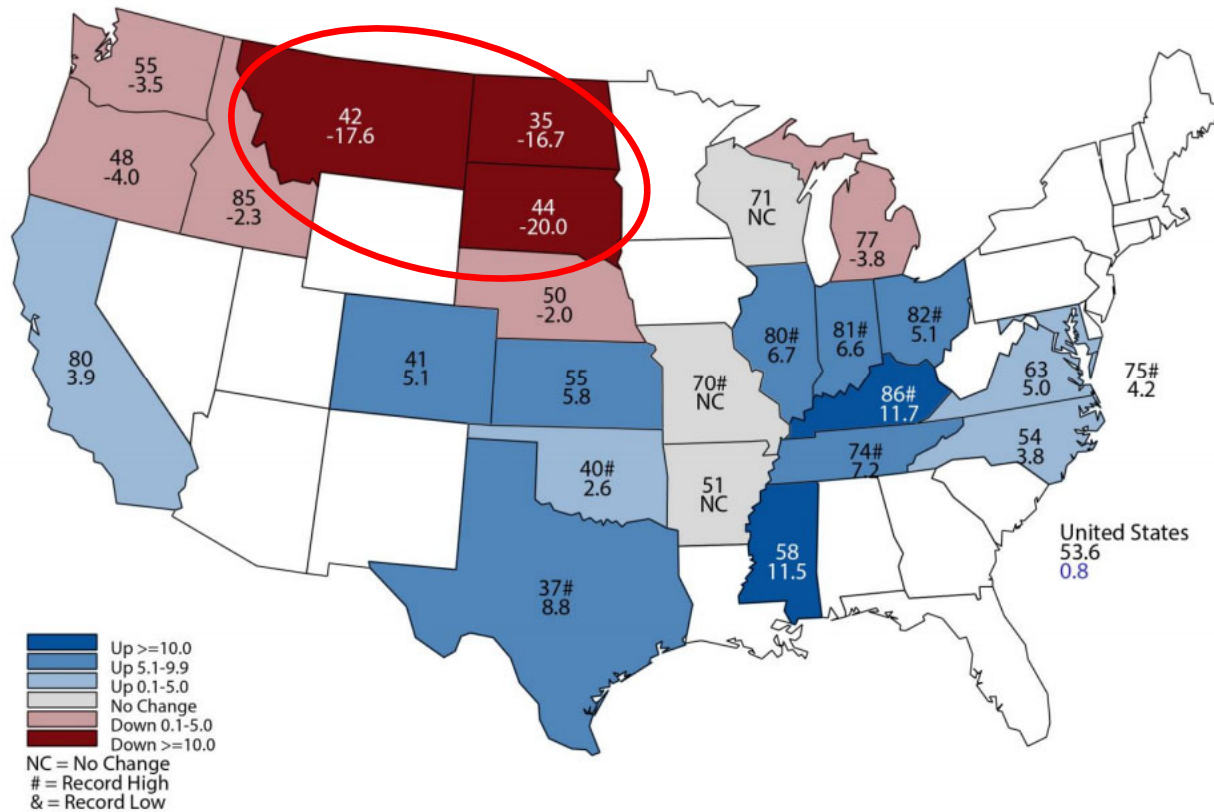
Real-Time Agricultural Drought Impacts

- Real-world agricultural impacts are unfolding across drought-affected sections of the **northern Plains** and **upper Midwest**.
- Primary affected crops include winter wheat, spring wheat, durum wheat, barley, and oats, as well as rangeland and pastures.
- USDA's July 12 *Crop Production* report estimates U.S. spring wheat yield will be the lowest since 2002. The U.S. durum wheat yield is estimated to be the lowest since 1989.
- Producers intend to harvest 51.5 million acres of all hay in 2021, down 1 percent from 2020, based on USDA's June 30 *Acreage* report. If realized, this will represent the lowest total hay harvested area since 1907. The decrease in acreage is primarily due to [drought] across the **[northern] Great Plains**.



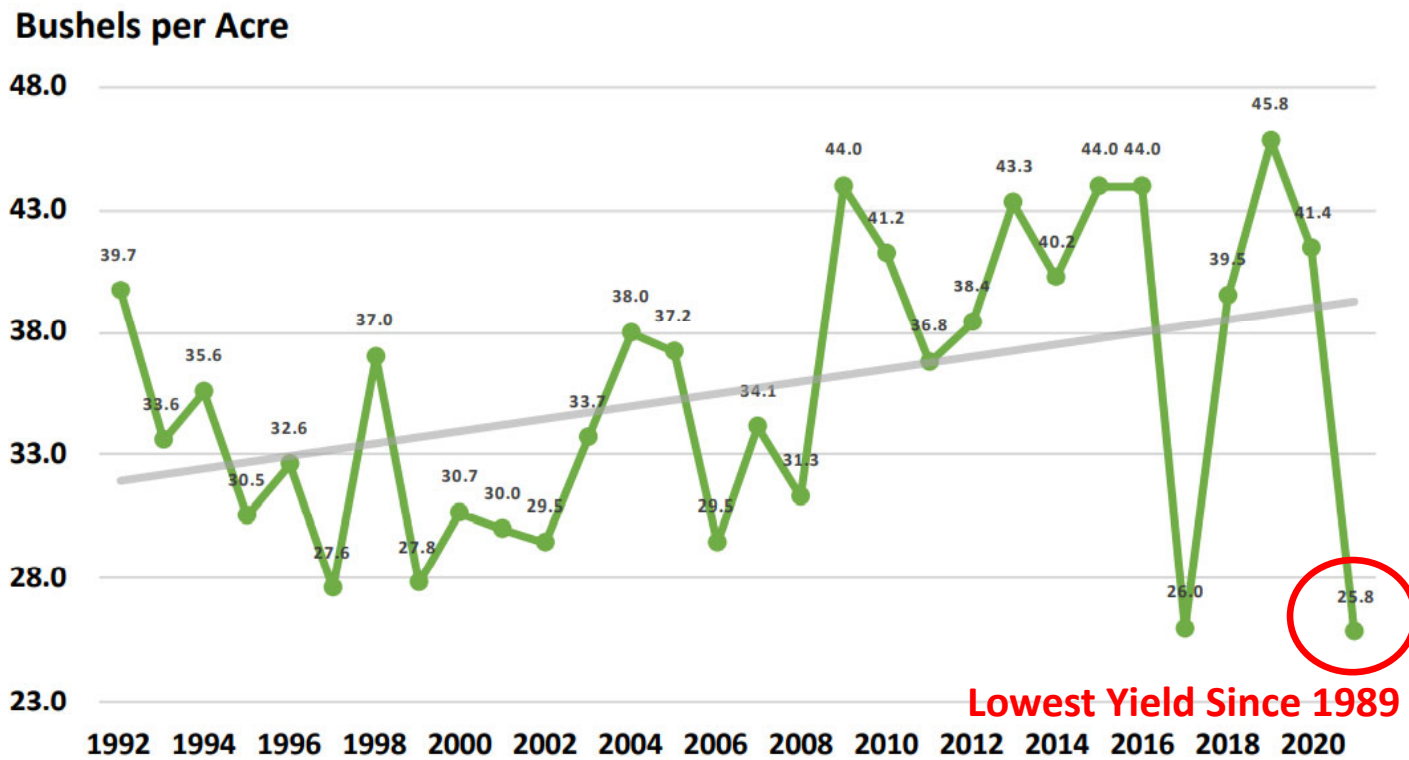
July 2021 Winter Wheat Yield

Bushels and Percent Change from Previous Month





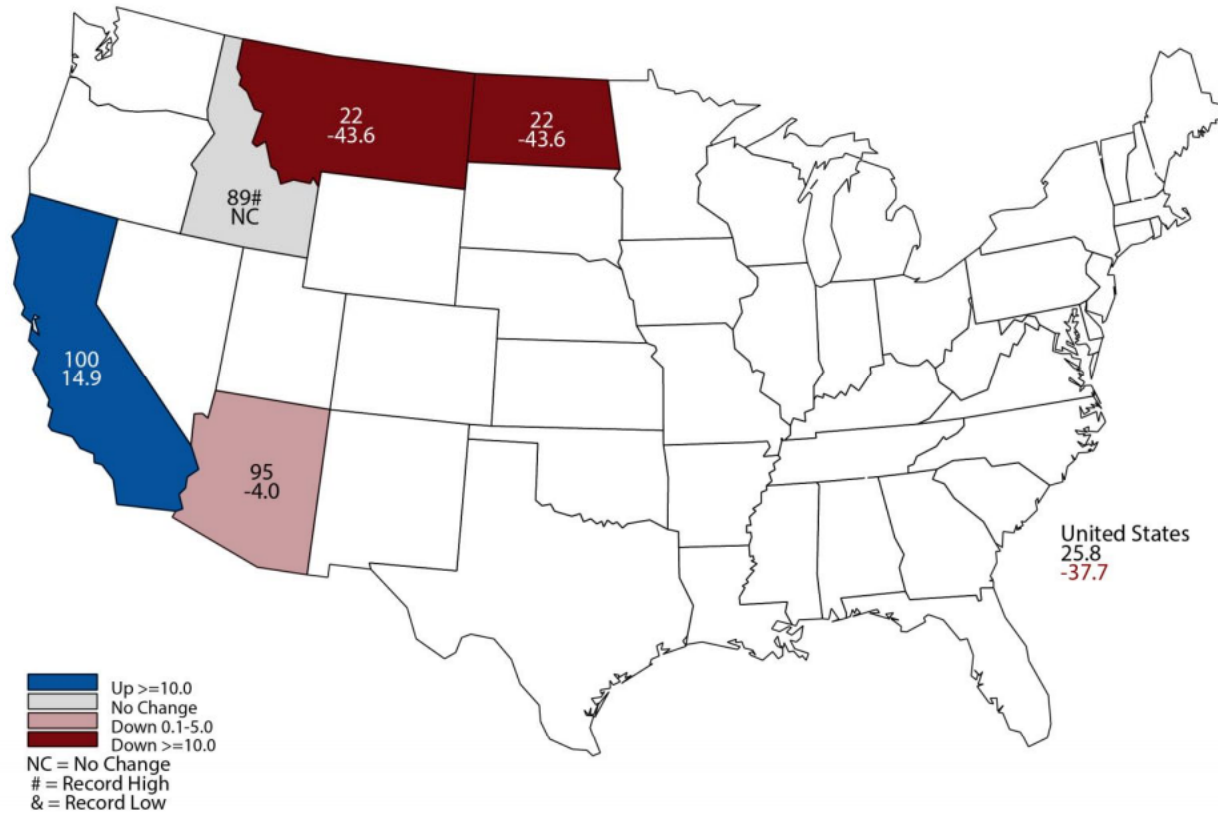
Durum Wheat Yield United States





July 2021 Durum Wheat Yield

Bushels and Percent Change from Previous Year

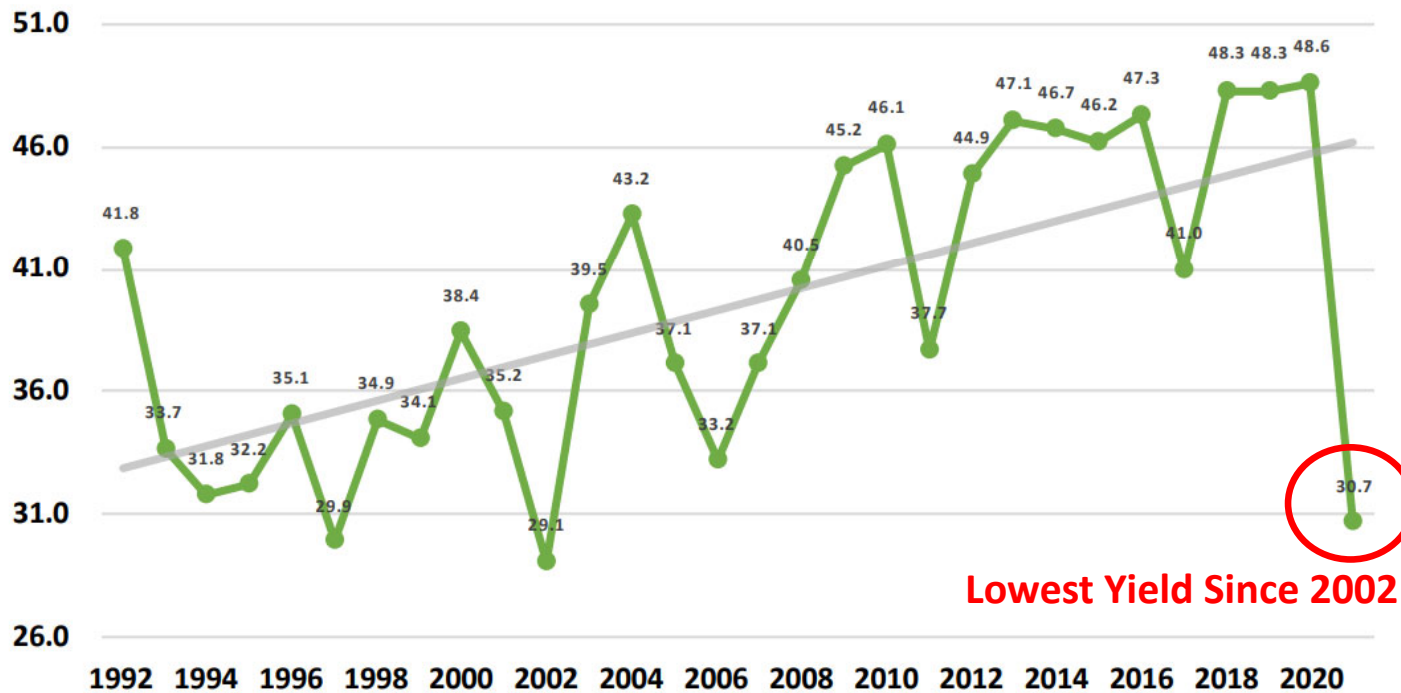




Other Spring Wheat Yield United States



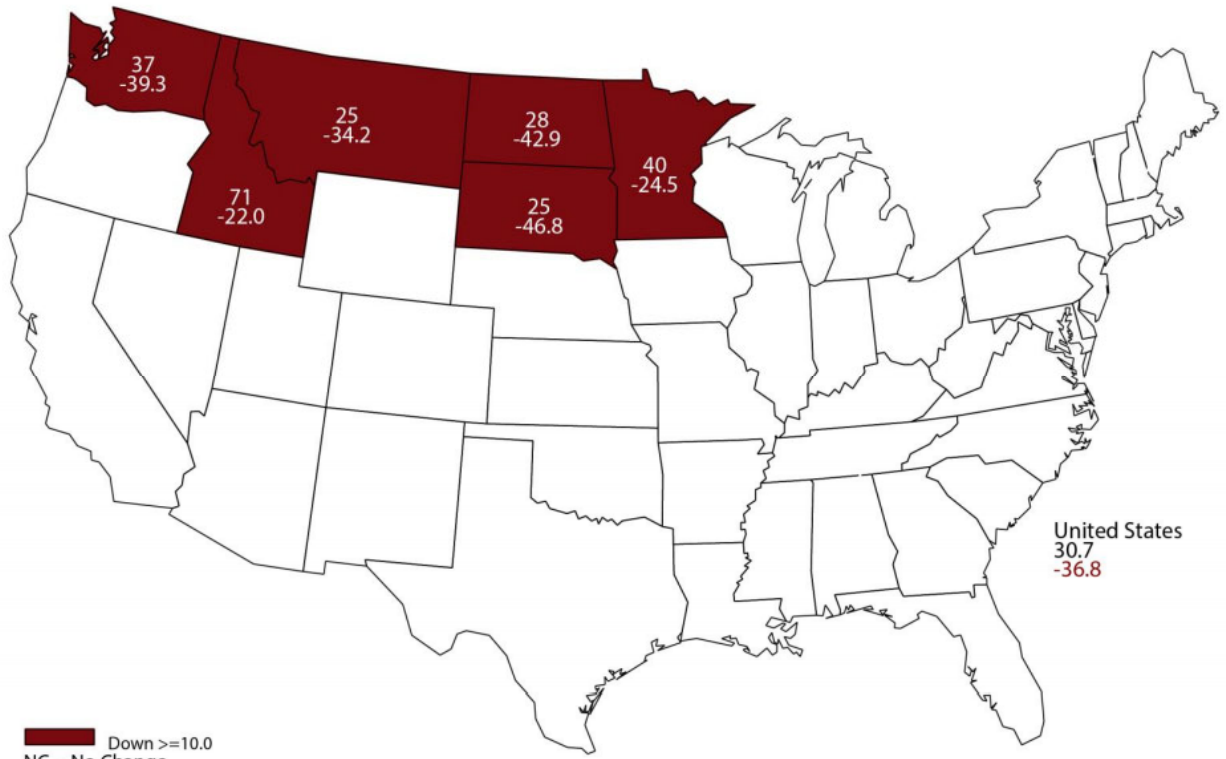
Bushels per Acre



Lowest Yield Since 2002



July 2021 Other Spring Wheat Yield Bushels and Percent Change from Previous Year

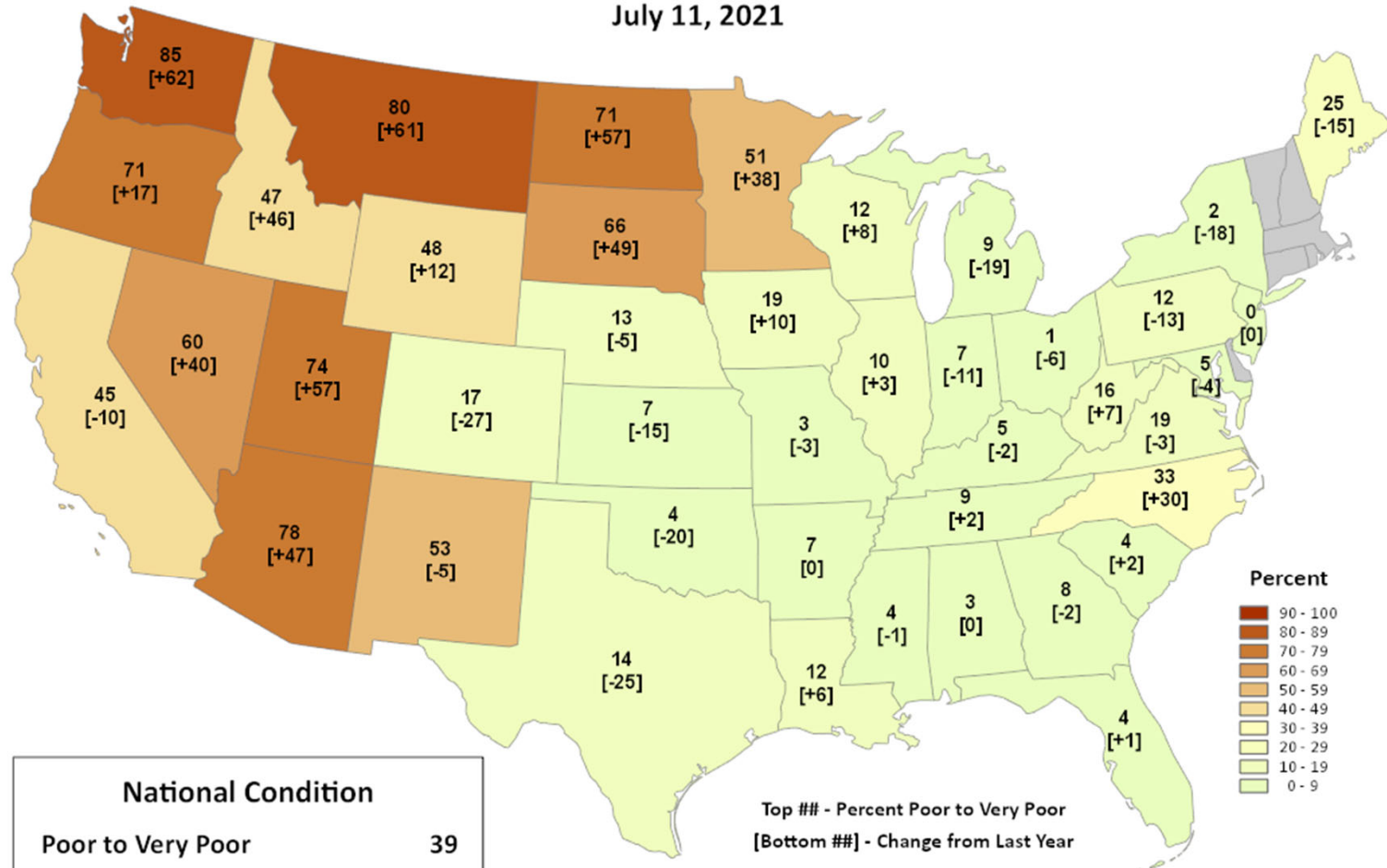


Down ≥ 10.0
NC = No Change
= Record High
& = Record Low

Pasture and Range Conditions

Percent Poor to Very Poor

July 11, 2021



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