

# North Central US Climate- Drought Outlook 5 August 2021 **\*\* Special \*\***

Dr. Dennis Todey  
Director – USDA Midwest Climate Hub  
Nat'l Lab. for Ag. and Env.  
Ames, IA  
dennis.todey@usda.gov  
515-294-2013



Photo:  
Ray Wolf  
NWS Quad Cities

Photo taken Feb 19, 2013



**United States Department of Agriculture  
Midwest Climate Hub**

# 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
    - National Integrated Drought Information System
- **Next Regular Climate/Drought Outlook Webinar**
  - August 19, 2021 (1 PM CDT) Montana State Climate Office
- **Access to Future Climate Webinars and Information**
- <https://www.drought.gov/events/north-central-us-monthly-climate-and-drought-summary-and-outlook-9>
  - <https://mrcc.illinois.edu/multimedia/webinars.jsp>
  - <https://hprcc.unl.edu/webinars.php>
- **Open for questions at the end (enter them along the way).**

# Agenda

- **Current Conditions**
- **Impacts**
  - Hydro
  - Ag
  - Fire/Smoke
- **Outlooks**
  - Near-term
  - Autumn
  - Drought



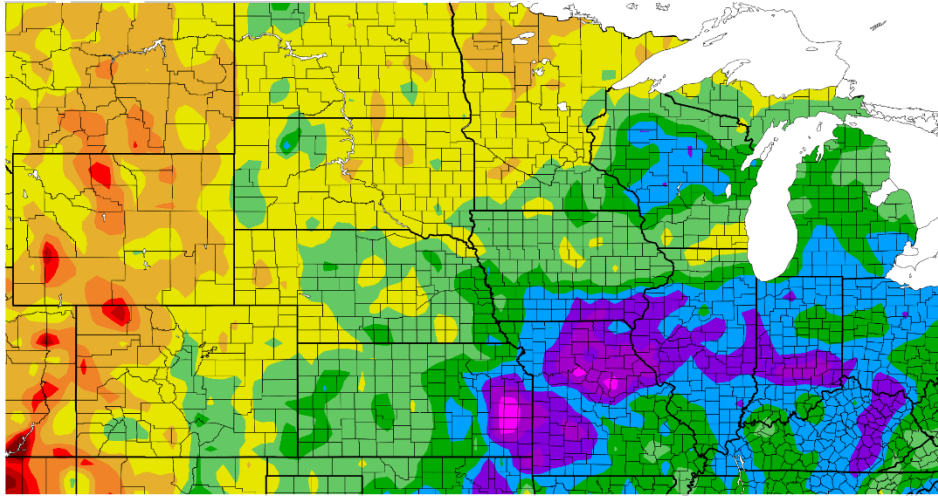
Photo:  
Dennis Todey Boone, IA 2 June 2021



Photo:  
CMOR Foster County ND

# REVIEW/CURRENT CONDITIONS

Precipitation (in)  
5/5/2021 - 8/2/2021

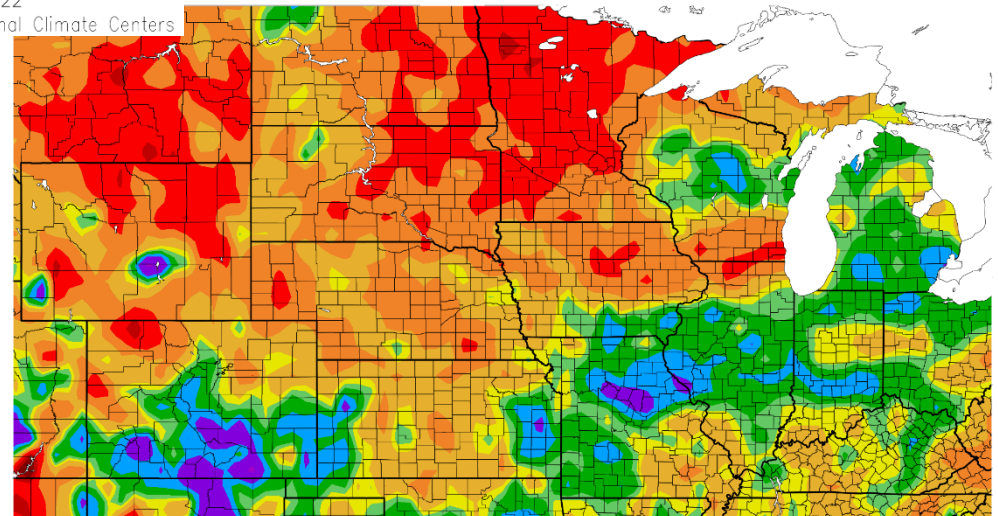


# Last 90 days Precipitation

Percent of Normal Precipitation (%)  
5/5/2021 - 8/2/2021

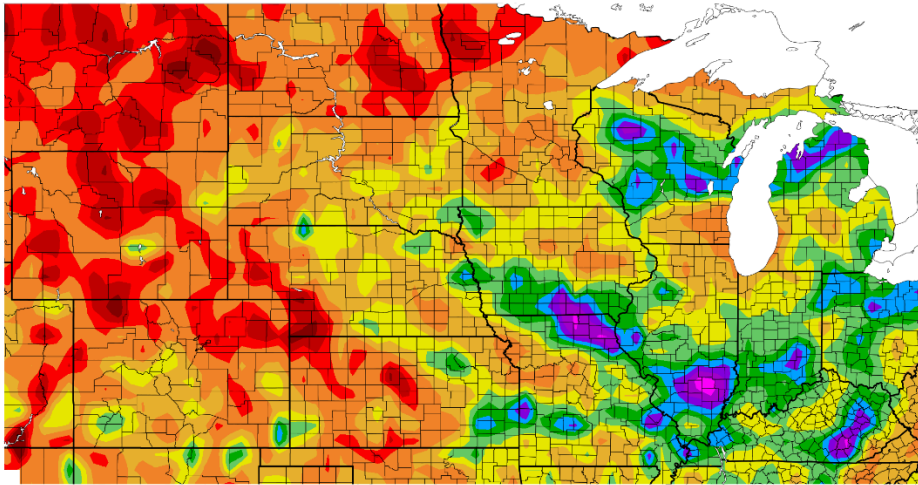
Generated 8/3/2021 at HPRCC using provisional data. NOAA Regional Climate Centers

- Very dry northern plains/central plains
- Wetter MO to MI



Generated 8/3/2021 at HPRCC using provisional data. NOAA Regional Climate Centers

Precipitation (in)  
7/4/2021 – 8/2/2021

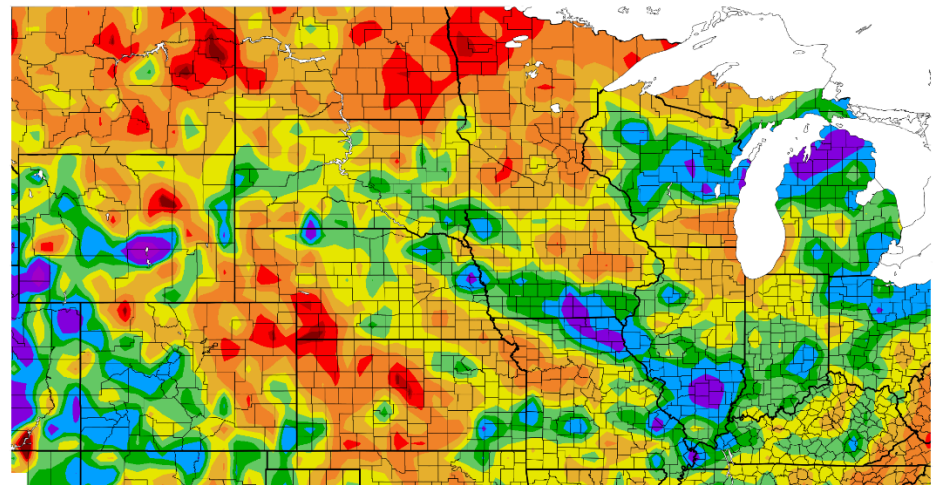


# Last 30 days Precipitation

Percent of Normal Precipitation (%)  
7/4/2021 – 8/2/2021

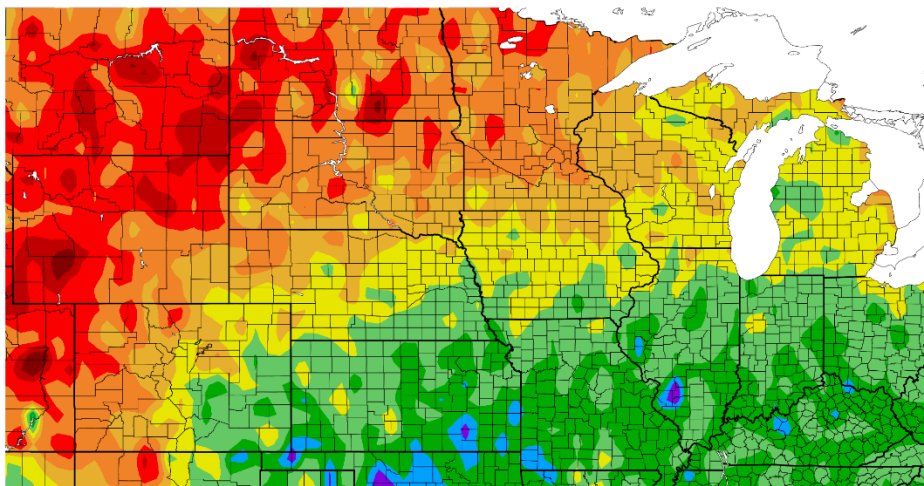
Generated 8/3/2021 at HPRCC using provisional data. NOAA Regional Climate Centers

- Mixed precipitation (typical summer)
- Dry northern plains/central plains
- Pockets of wet
- Improved conditions nrn Plains a little.



Generated 8/3/2021 at HPRCC using provisional data. NOAA Regional Climate Centers

Departure from Normal Temperature (F)  
5/5/2021 – 8/2/2021



# Last 90/30 days Temperature

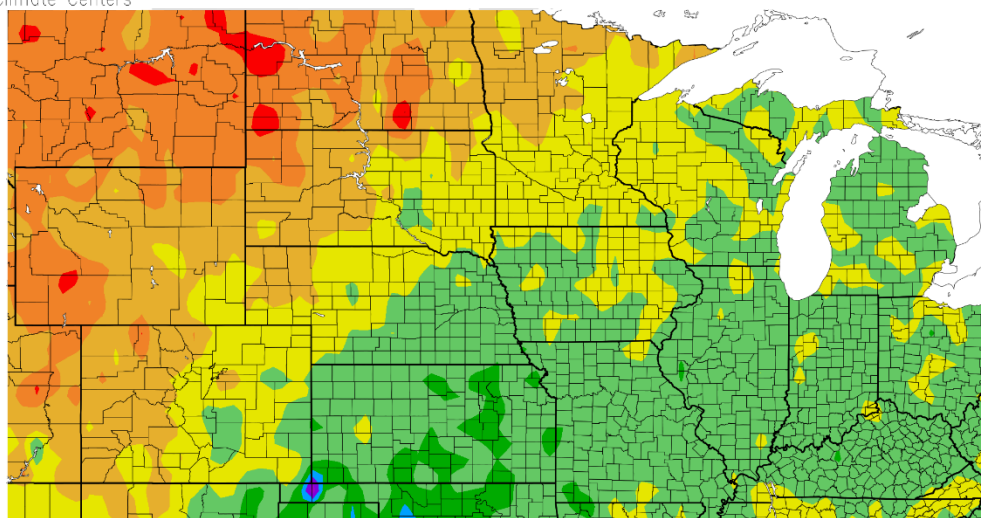
Departure from Normal Temperature (F)  
7/4/2021 – 8/2/2021



Generated 8/3/2021 at HPRCC using provisional data.

NOAA Regional Climate Centers

- North and Plains mostly warmer.
- 30 days not as hot



Generated 8/3/2021 at HPRCC using provisional data.

NOAA Regional Climate Centers

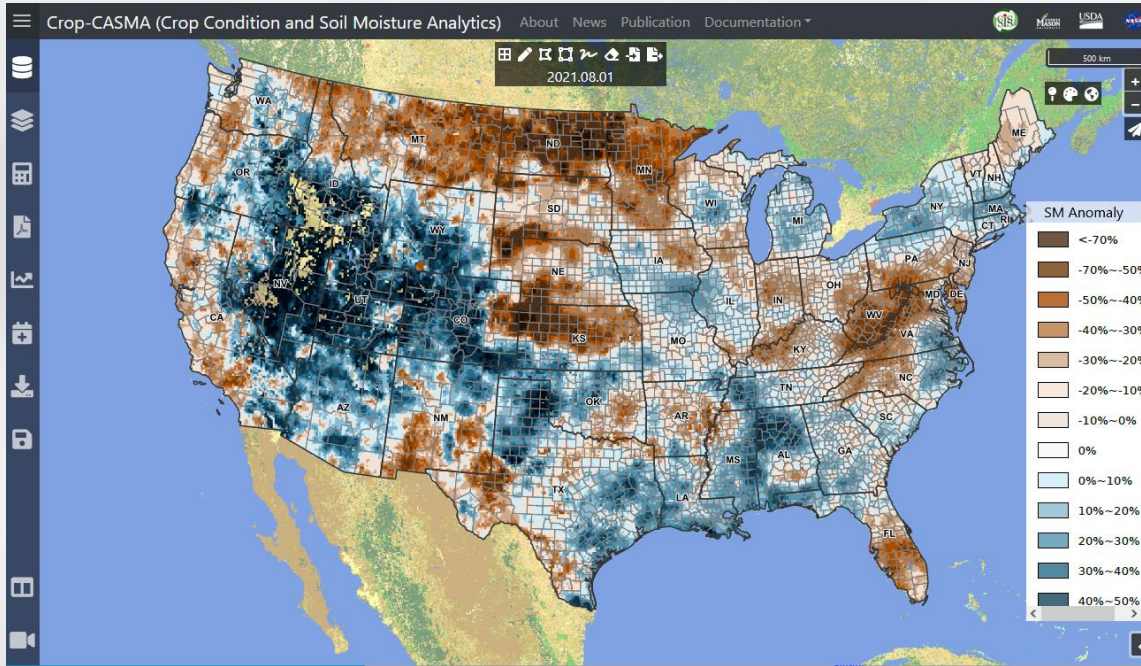


# HYDROLOGY

Photo:  
CMOR Pipestem Creek ND

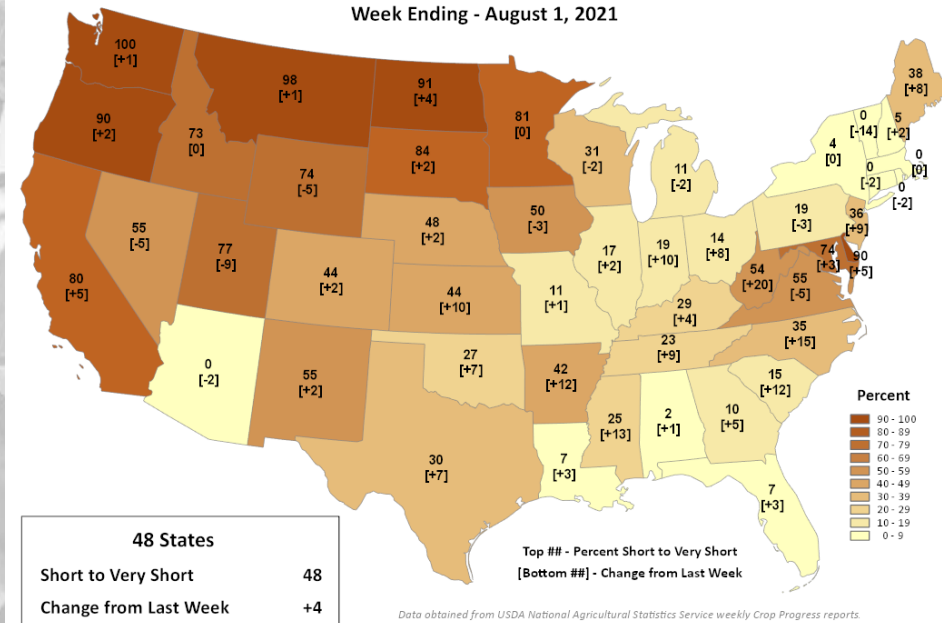


# Soil Moisture

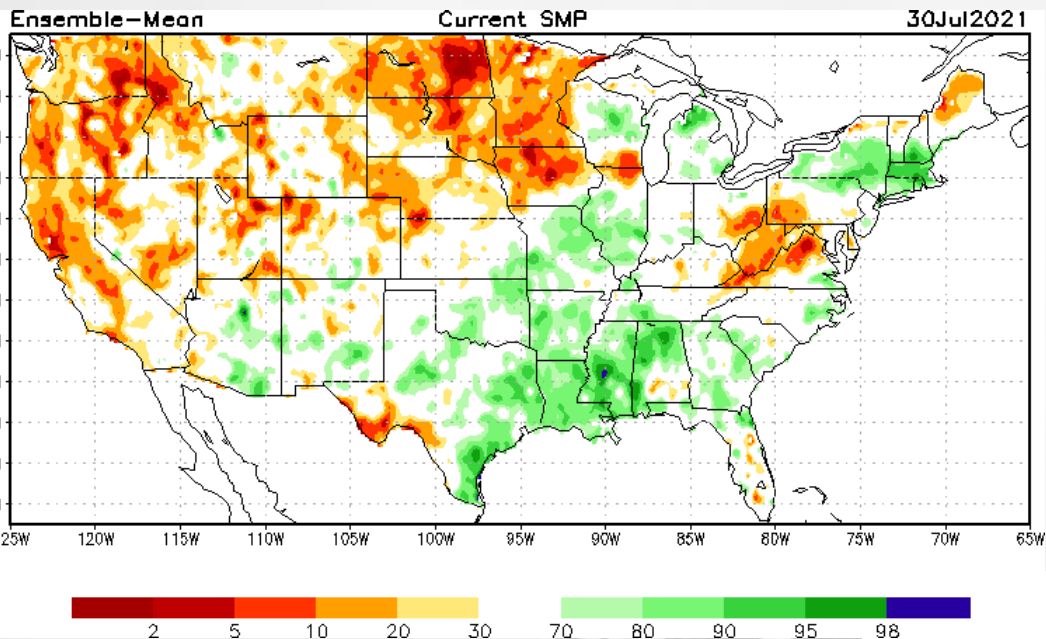


- Dry nrn plains consistently
- Varying results eastern Corn Belt.
- NASS topsoil reports extensive S-VS

**Topsoil Moisture**  
**Percent Short to Very Short**  
 Week Ending - August 1, 2021

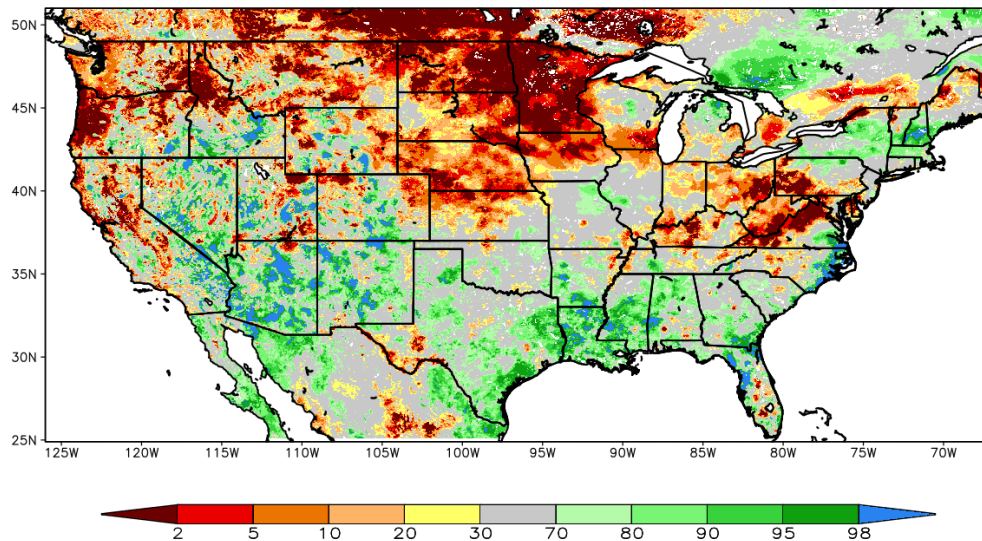


# Soil Moisture



- Dry nrn plains consistently
- Varying results eastern Corn Belt.
- Decreasing area of moderate to wet.

SPoRT-LIS 0-100 cm Soil Moisture percentile valid 05 Aug 2021

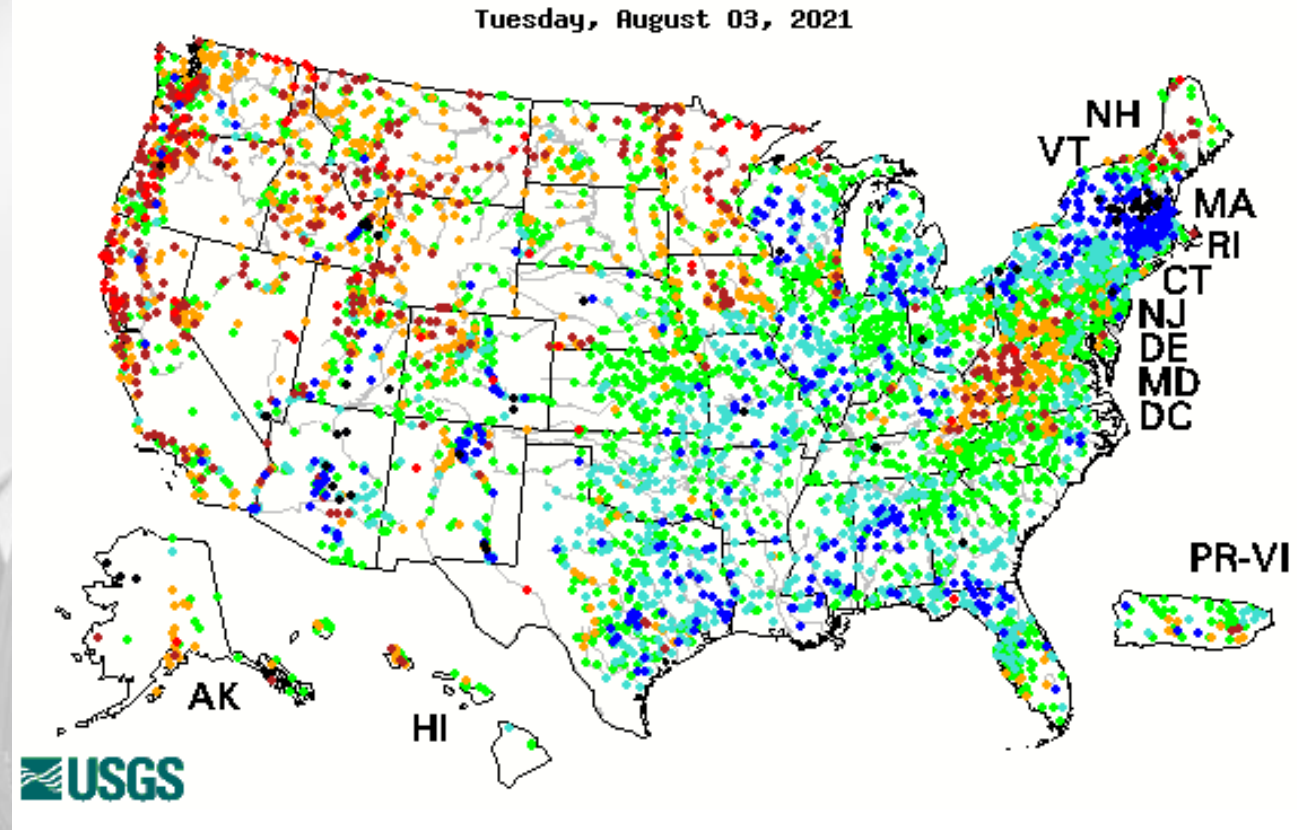


[http://www.cpc.ncep.noaa.gov/products/Soilmst\\_Monitoring/US/Soilmst/Soilmst.shtml#](http://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml#)  
<https://cloud.csiss.gmu.edu/Crop-CASMA/>  
[https://weather.msfc.nasa.gov/sport/case\\_studies/lis\\_CONUS.html](https://weather.msfc.nasa.gov/sport/case_studies/lis_CONUS.html)

# 7-Day Average Streamflow

Tuesday, 3 August 2021

- Streamflows moderate to above eastern states
- Mostly dry western states
- Much below in some areas.



<http://waterwatch.usgs.gov/index.php?id=pa07d>

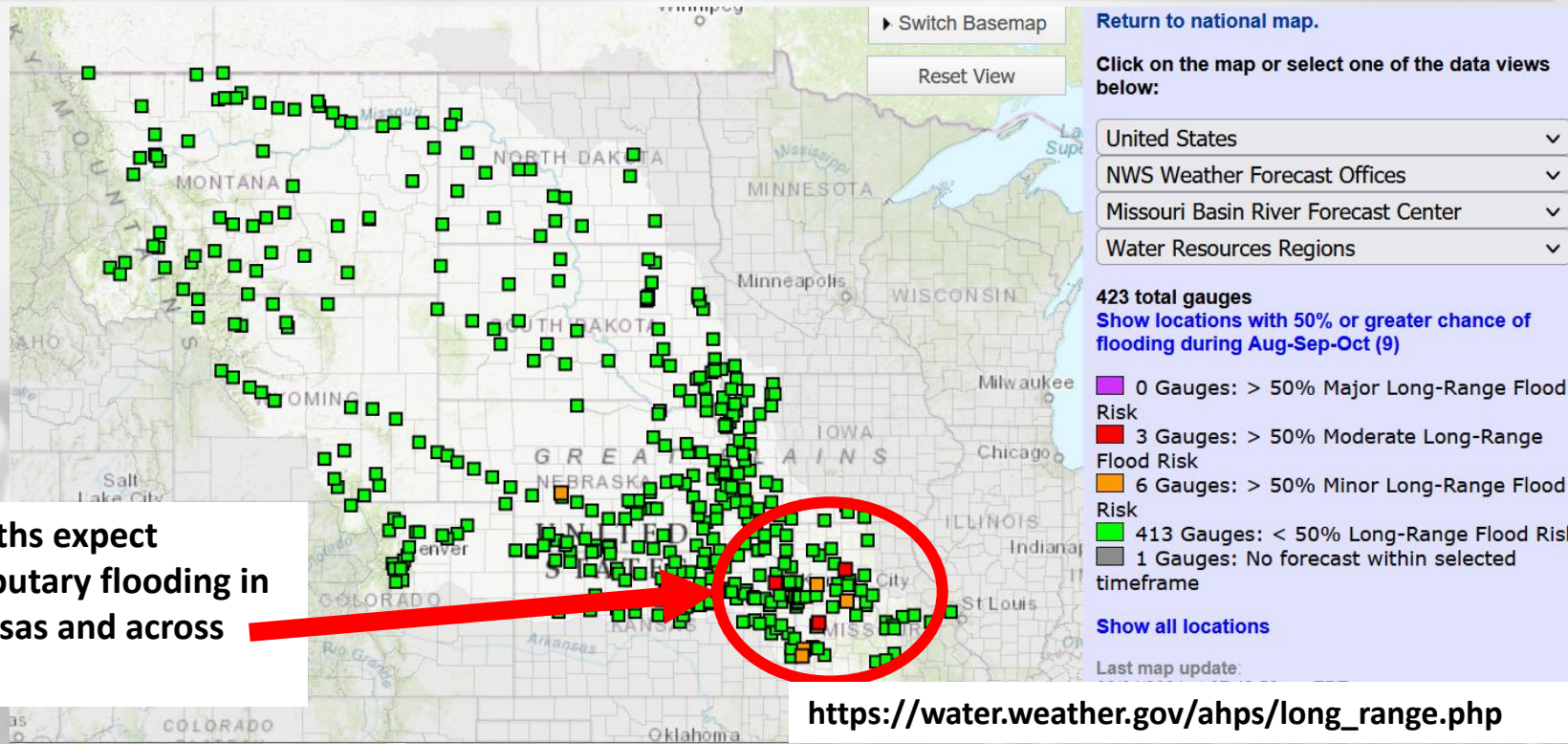
Explanation - Percentile classes						
Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	

# Various water issues

- Serious water quality problems in Dakotas (livestock). Water supply also.
- Fish kills Vermillion River (SE SD)
- Water limited other areas
  - Sioux Falls
  - Des Moines area
  - Some irrigation shut-off/reductions plains
- USACE Missouri River – reduced flows

# River Flood Outlook

## AUGUST-SEPTEMBER-OCTOBER



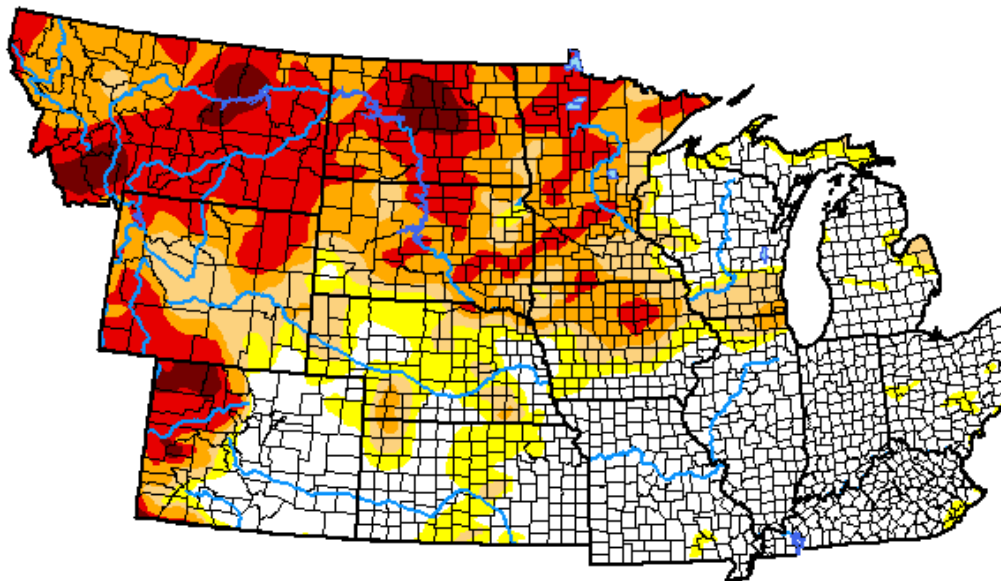
Next 3 months expect episodic tributary flooding in eastern Kansas and across Missouri

# U.S. Drought Monitor NWS Central

**August 3, 2021**  
(Released Thursday, Aug. 5, 2021)  
Valid 8 a.m. EDT

*Drought Conditions (Percent Area)*

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	39.82	60.18	49.52	39.09	21.50	2.88
<b>Last Week</b> <i>07-27-2021</i>	40.75	59.25	49.65	36.48	17.49	2.76
<b>3 Months Ago</b> <i>05-04-2021</i>	33.42	66.58	44.03	21.34	11.82	1.48
<b>Start of Calendar Year</b> <i>12-29-2020</i>	30.52	69.48	46.07	24.23	12.18	2.52
<b>Start of Water Year</b> <i>09-29-2020</i>	29.60	70.40	37.34	17.96	7.13	0.24
<b>One Year Ago</b> <i>08-04-2020</i>	51.06	48.94	23.79	9.90	3.16	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:

Richard Tinker  
CPC/NOAA/NWS/NCEP



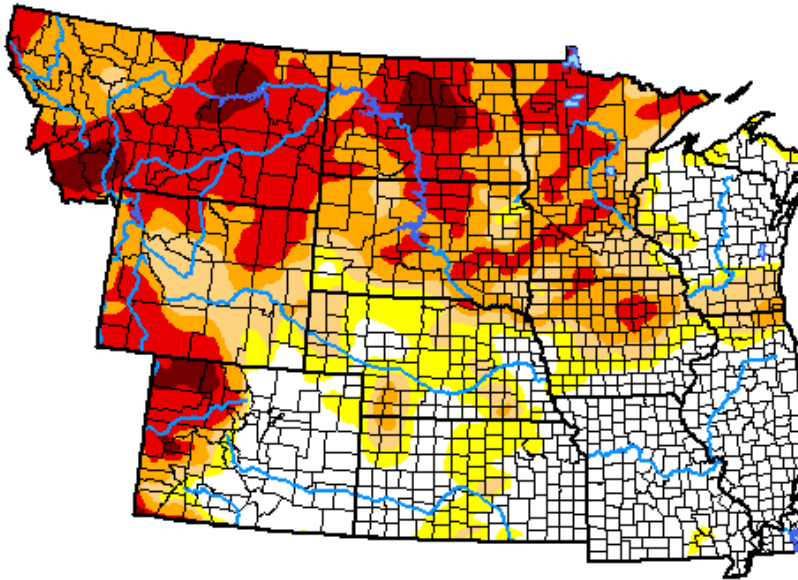
[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)

# U.S. Drought Monitor NWS Central

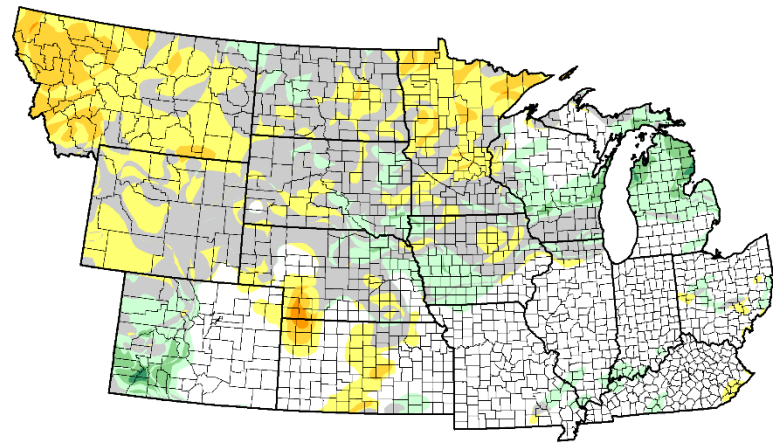
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U.S. Drought Monitor Class Change - NWS Central  
4 Week



August 3, 2021  
compared to  
July 6, 2021



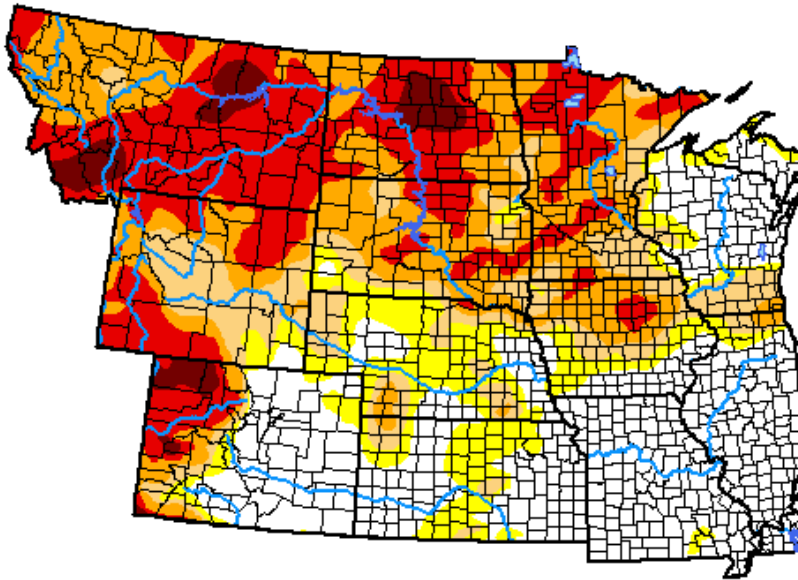
- 5 Class Degradation
- 4 Class Degradation
- 3 Class Degradation
- 2 Class Degradation
- 1 Class Degradation
- No Change
- 1 Class Improvement
- 2 Class Improvement
- 3 Class Improvement
- 4 Class Improvement
- 5 Class Improvement

# U.S. Drought Monitor NWS Central

**August 3, 2021**  
(Released Thursday, Aug. 5, 2021)  
Valid 8 a.m. EDT

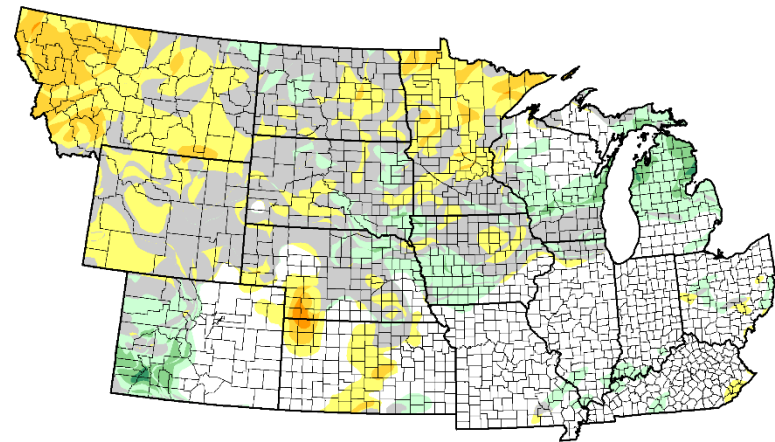
Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
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Largest regional coverage since  
spring 2013 (end of 2012 drought)

U.S. Drought Monitor Class Change - NWS Central  
4 Week



August 3, 2021  
compared to  
July 6, 2021



- 5 Class Degradation
- 4 Class Degradation
- 3 Class Degradation
- 2 Class Degradation
- 1 Class Degradation
- No Change
- 1 Class Improvement
- 2 Class Improvement
- 3 Class Improvement
- 4 Class Improvement
- 5 Class Improvement



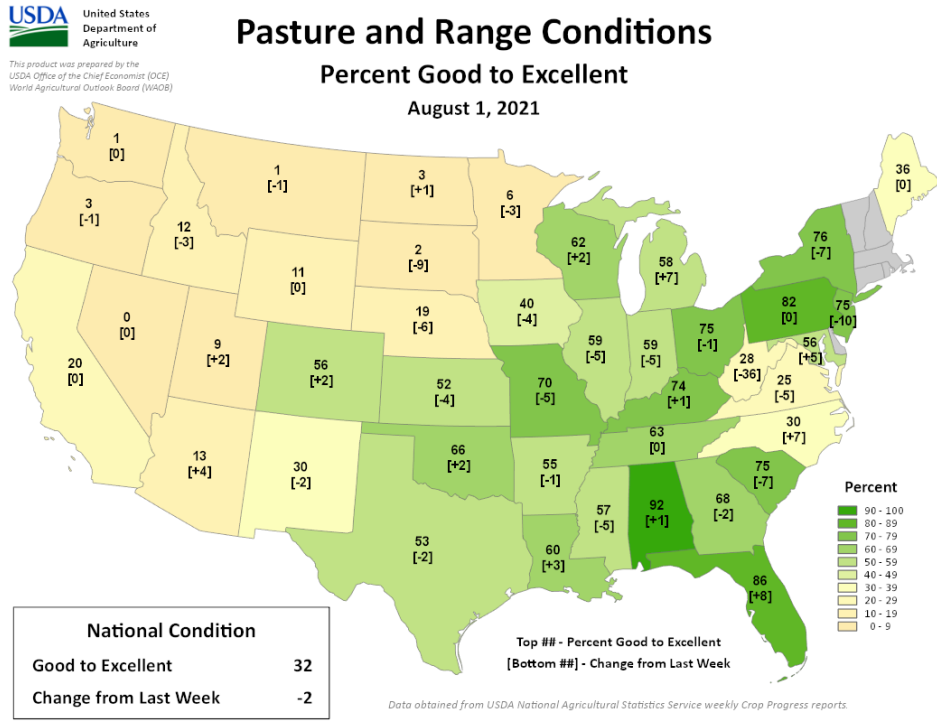
Leoti (fallow)



**AGRICULTURE**

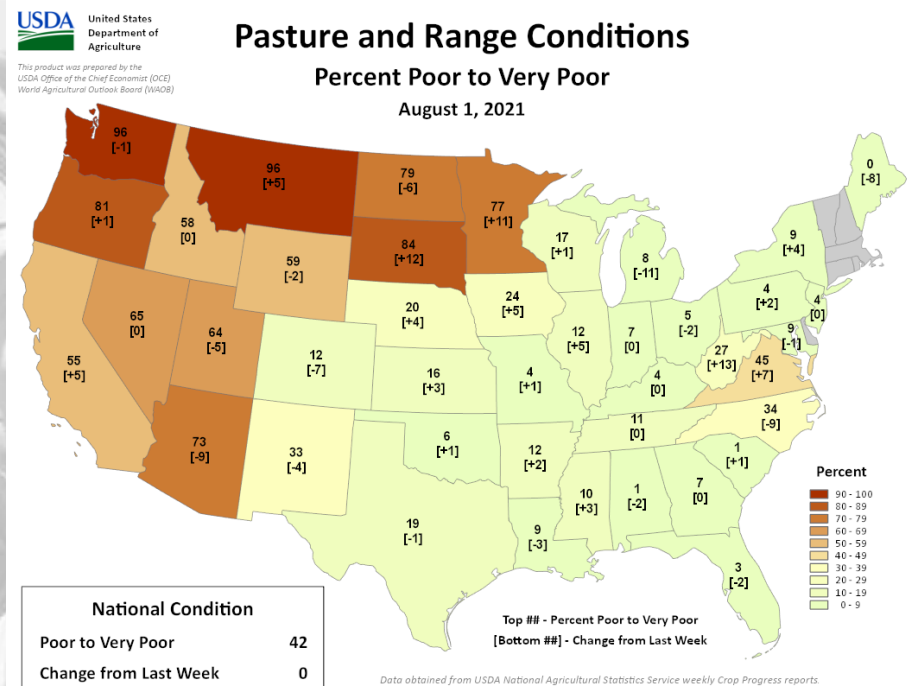
Photo:  
Romulo Lollato – KSU

# Pasture/Range Conditions (NASS)



Pasture and range conditions worsened slightly again nationally. Several central US states worsening. Similar general pattern.

Rangeland G-E (NASS): National 32% (-2%). Condition P-VP – National 42% (0%).

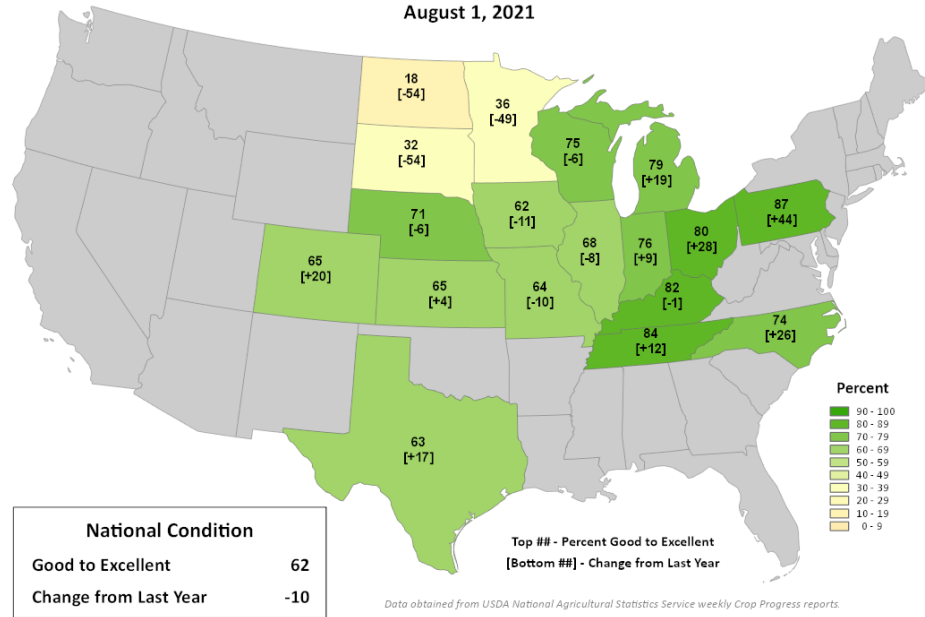


# Corn Conditions (NASS)



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

## Corn Conditions Percent Good to Excellent August 1, 2021



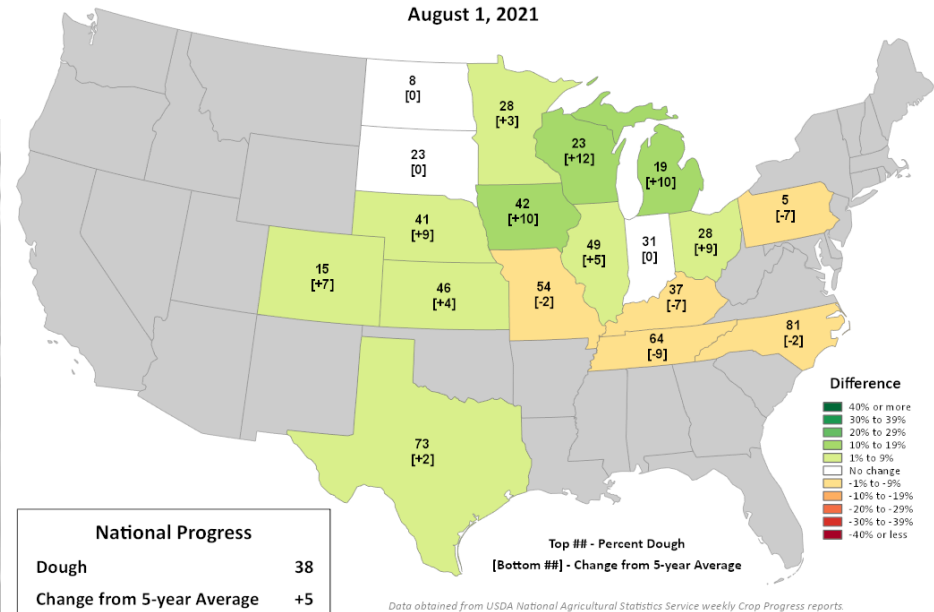
Crop conditions (corn) continues poor north/west. Progress ahead of average - dough in early stages nationally.

Corn condition (NASS): Good-excellent - National 62% (-10%). Dough - National 38% (+5%).



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

## Corn Progress Percent Dough August 1, 2021



# Soybean Conditions (NASS)

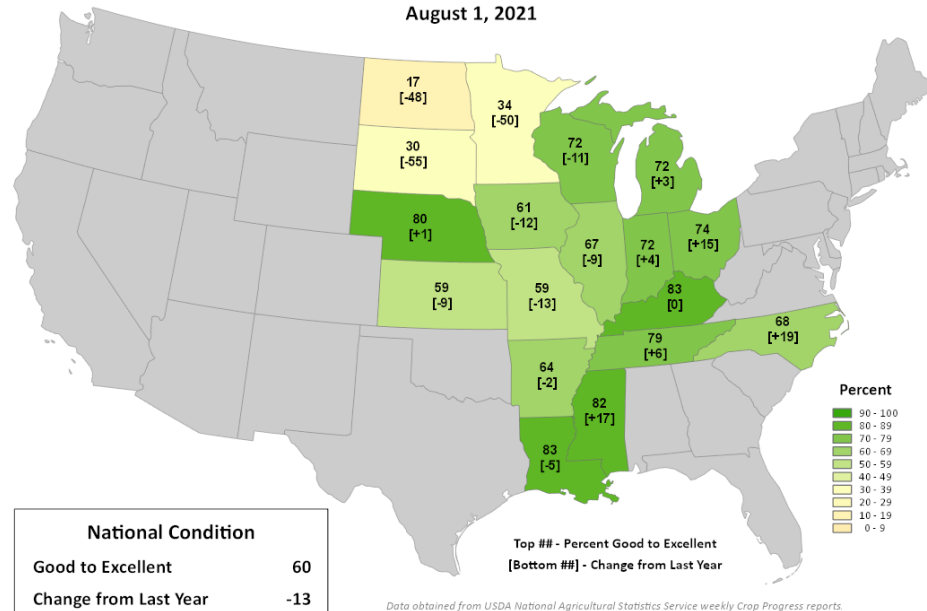


This product was prepared by the  
USDA Office of the Chief Economist (OCE)  
World Agricultural Outlook Board (WAOB)

## Soybean Conditions

Percent Good to Excellent

August 1, 2021



Crop progress (soybean) similar to corn – worst to north. Ahead 5 year avg setting pods.

Soybean condition (NASS): Good-excellent - National 60% (-13%). Setting pods - National 58% (+6%).

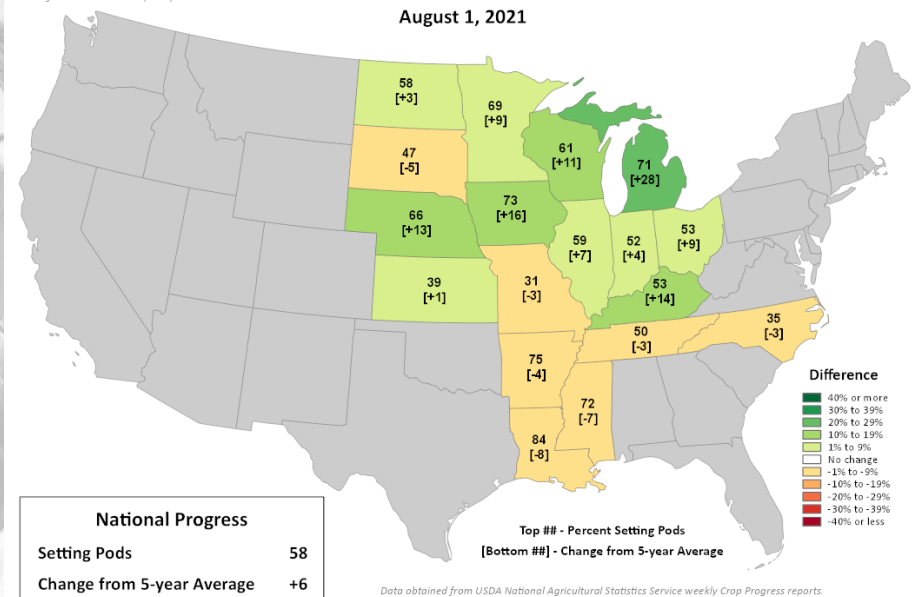


This product was prepared by the  
USDA Office of the Chief Economist (OCE)  
World Agricultural Outlook Board (WAOB)

## Soybeans Progress

Percent Setting Pods

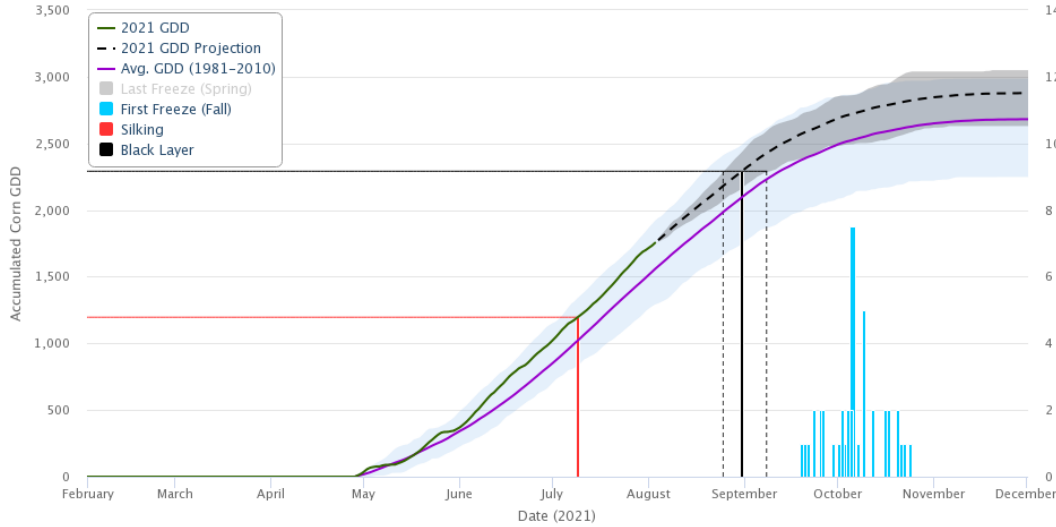
August 1, 2021



# GDDs (Spink, SD-NE SD Allen Co-NE IN)

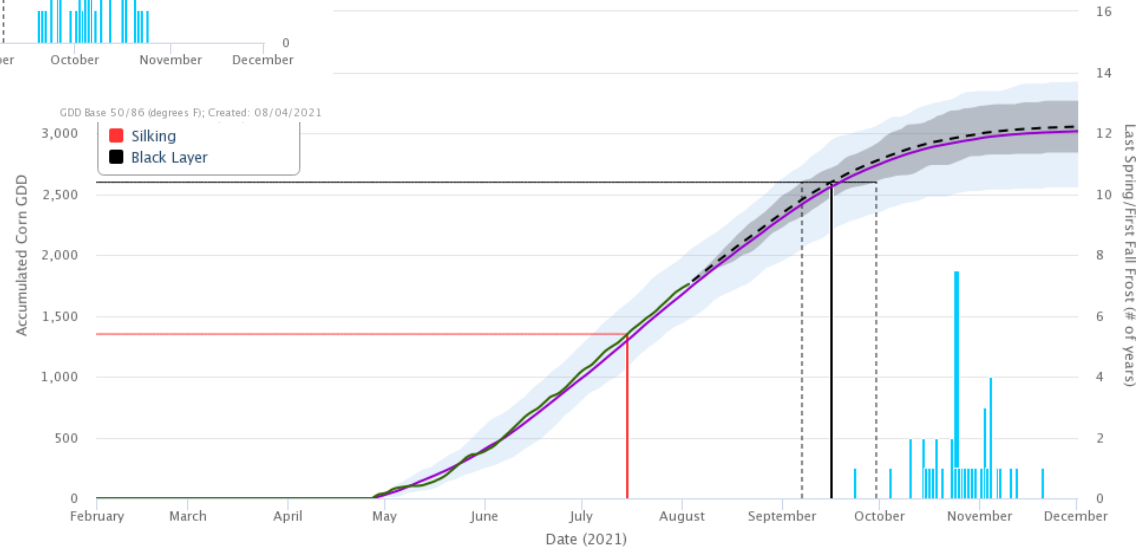
Corn Growing Degree Day Tool

Location: 45.02, -98.27 in Spink Co., SD, Start Date: April 28, Maturity Days: 95, Freeze Temp: 28°F, Variation: All Years



Corn Growing Degree Day Tool

Allen Co., IN, Start Date: April 27, Maturity Days: 108, Freeze Temp: 28°F, Variation: All Years



GDD Base 50/86 (degrees F); Created: 08/04/2021

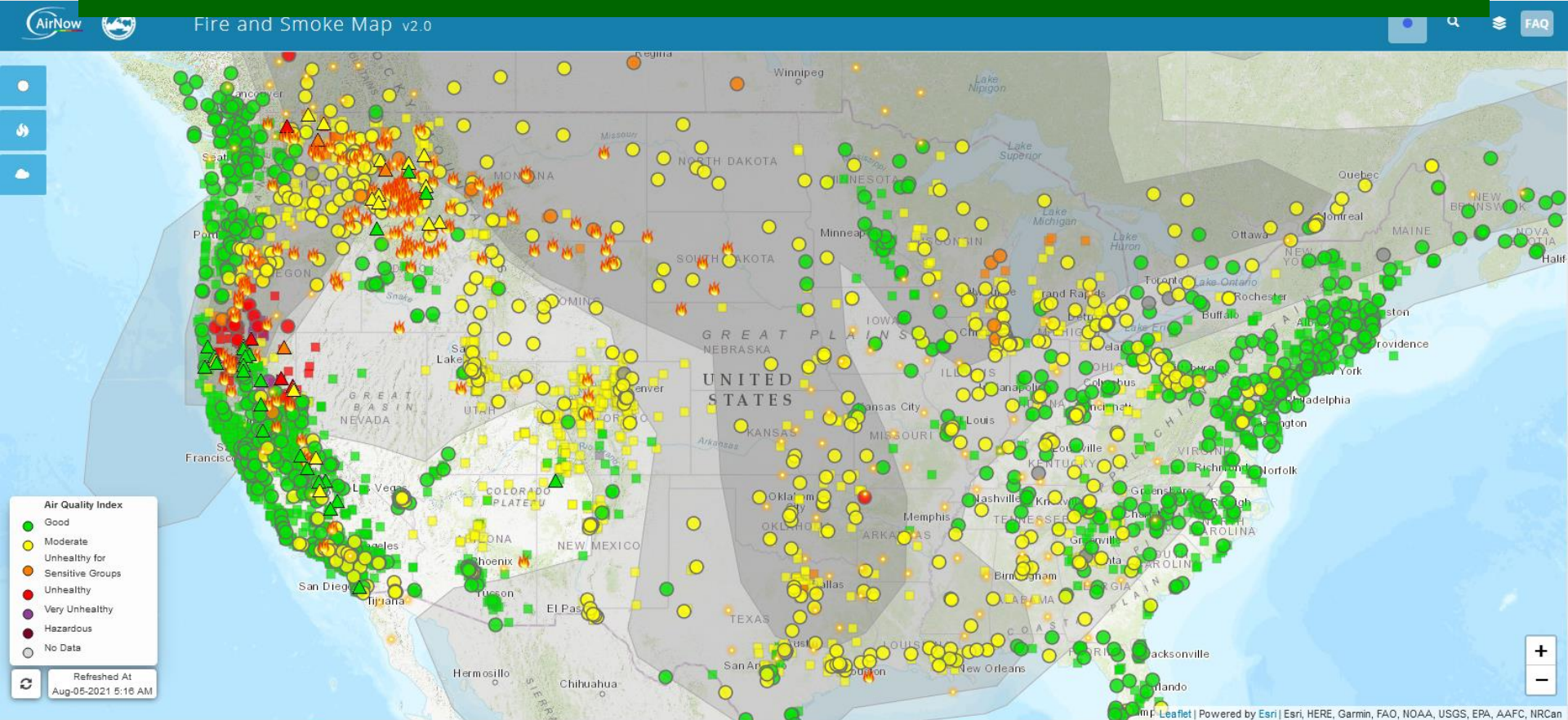
<https://hprcc.unl.edu/agroclimate/gdd/>  
<https://mrcc.illinois.edu/U2U/gdd/>

NW Corn belt well above average accumulation. Eastern Corn Belt slightly above average.

# Various ag issues

- Some disease east row and specialty crops – mostly good overall
- Crops central Corn Belt look good considering stress already
- Spring wheat lowest yield since late 1980s – much cut for hay
- Nitrate issues-some livestock deaths
- Forage availability – survey 25% in ND
- SD Winter wheat fairly good
- Cattle sales 13% ahead of last year (sell-offs)
- Water and feed for livestock – issues.

# SMOKE AND WILDFIRE



<https://fire.airnow.gov/#>

# FIRES

- Most major fires still west and NW US
- A number of smaller fires across northern plains-some 10Ks acres
- Need to continue monitoring with dryness/heat
- Outlooks little help (harvest)



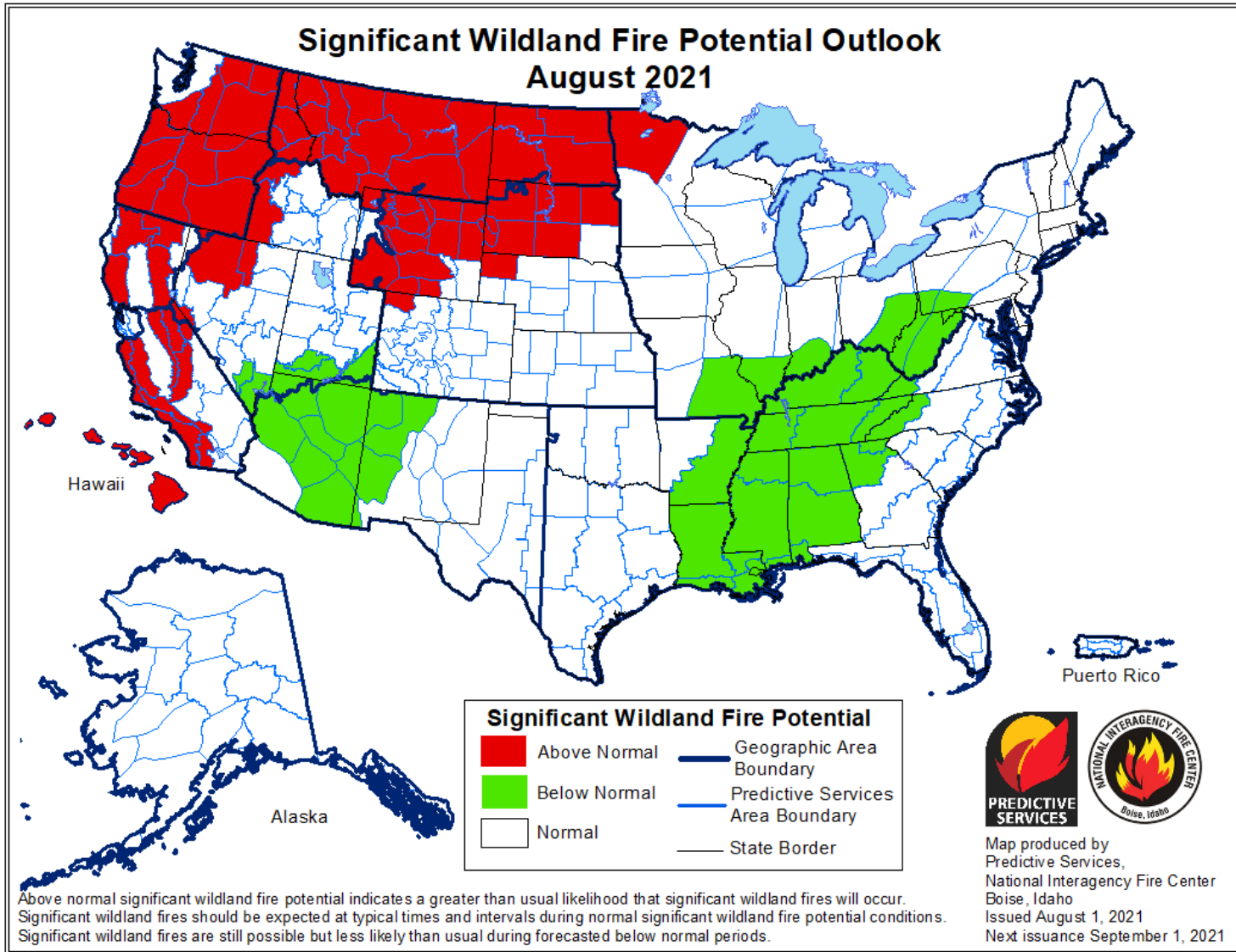


# SMOKE

- Varying levels of concern for human health – continue to monitor changes
- Agricultural (crop) – complicated
  - Reduced solar radiation
  - Also reduces max temperatures
  - New work – might be beneficial (diffused radiation)

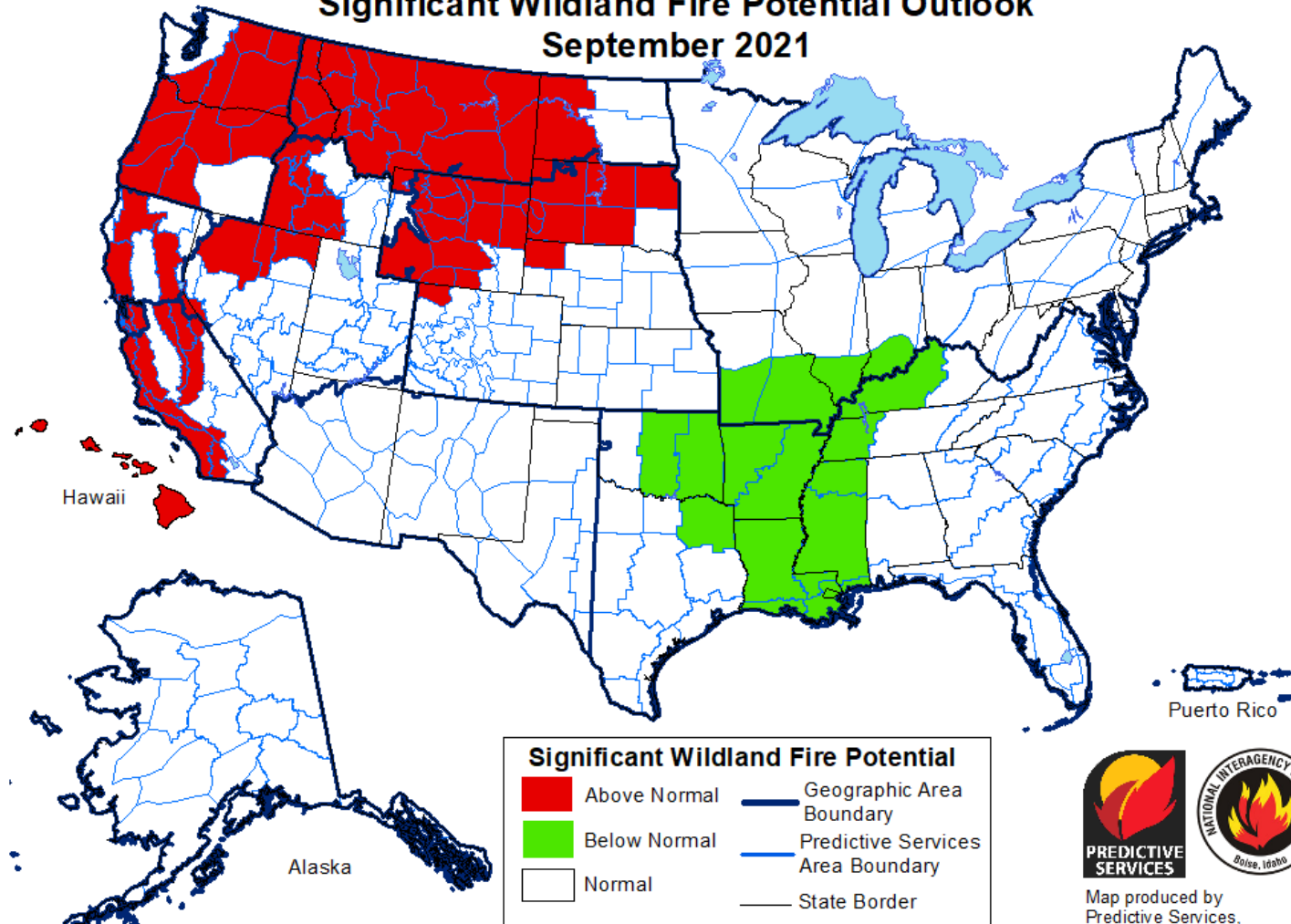


# WILDFIRE POTENTIAL



# WILDFIRE POTENTIAL

## Significant Wildland Fire Potential Outlook September 2021



Above normal significant wildland fire potential indicates a greater than usual likelihood that significant wildland fires will occur. Significant wildland fires should be expected at typical times and intervals during normal significant wildland fire potential conditions. Significant wildland fires are still possible but less likely than usual during forecasted below normal periods.

Map produced by  
Predictive Services,  
National Interagency Fire Center  
Boise, Idaho  
Issued August 1, 2021  
Next issuance September 1, 2021

# OUTLOOKS

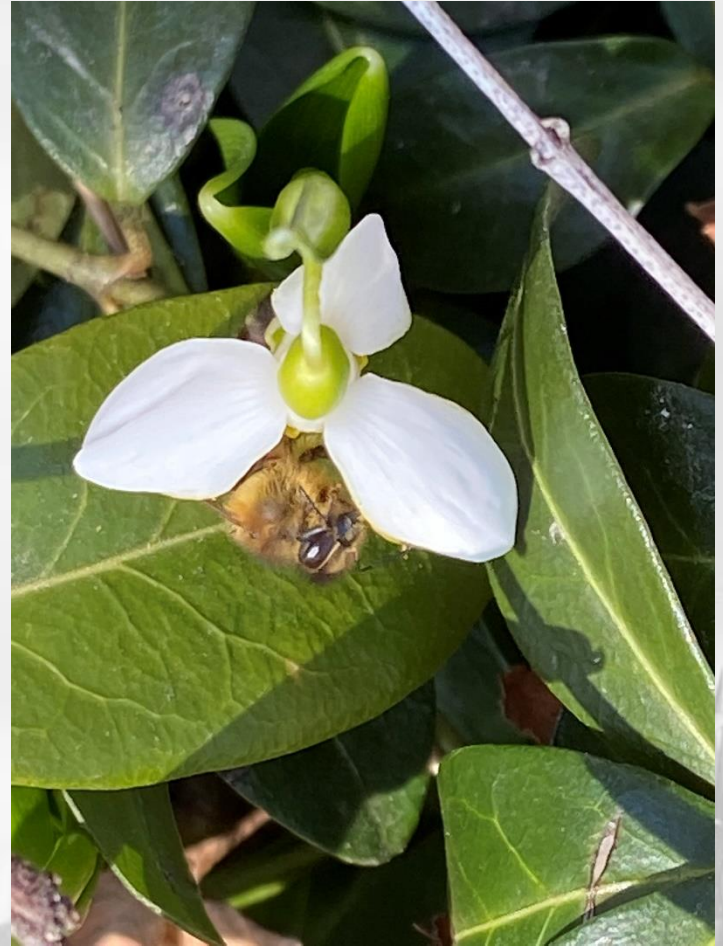


Photo: Ray Wolf  
NWS Quad Cities

# Climate Outlooks

- **La Niña status.....**
- **7-day precipitation forecast**
- **8-14 day outlook**
- **August**
- **Seasonal/Autumn season**

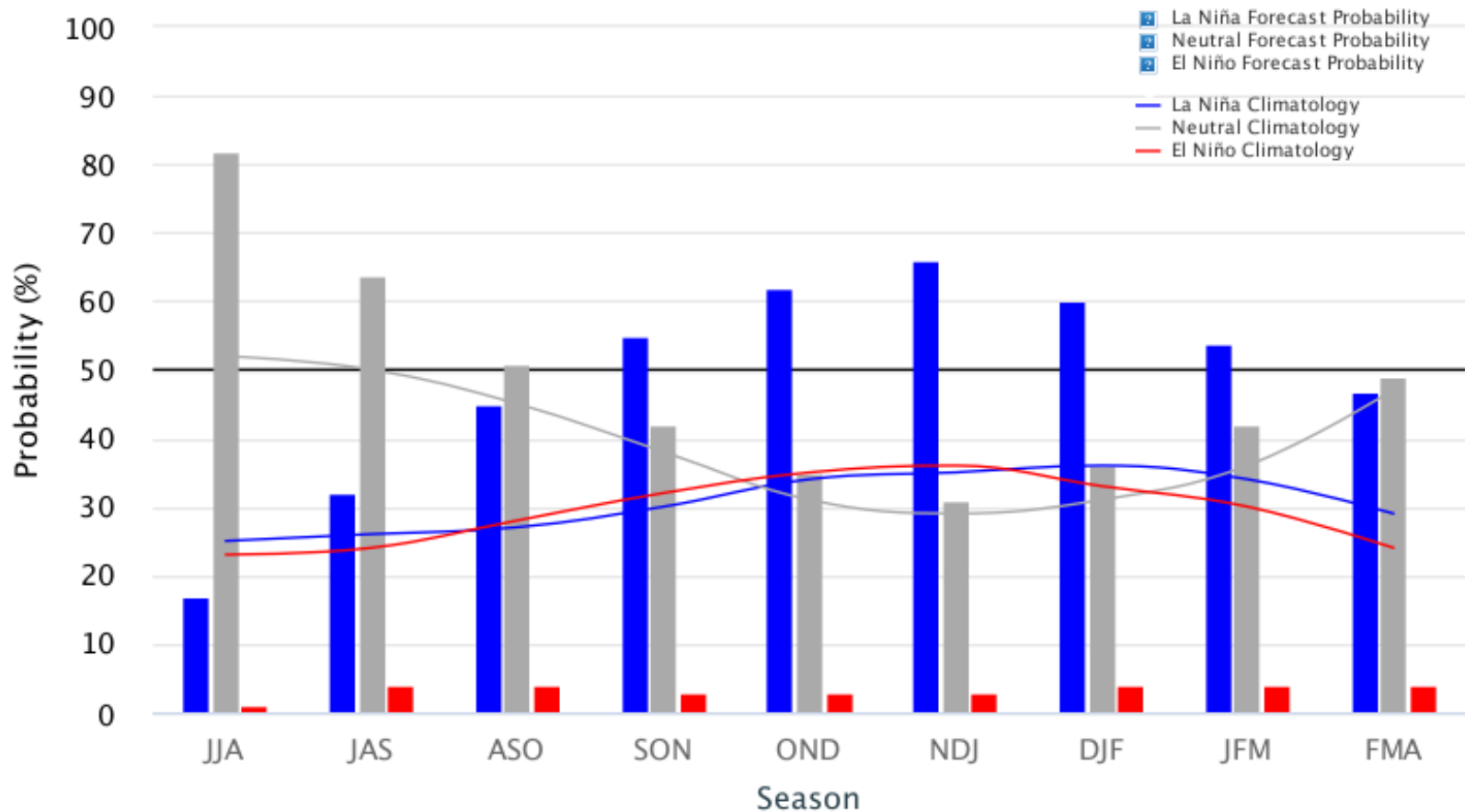


Photo:  
Natalie Umphlett – UNL HPRCC  
Lincoln, NE

# ENSO Outlook Status

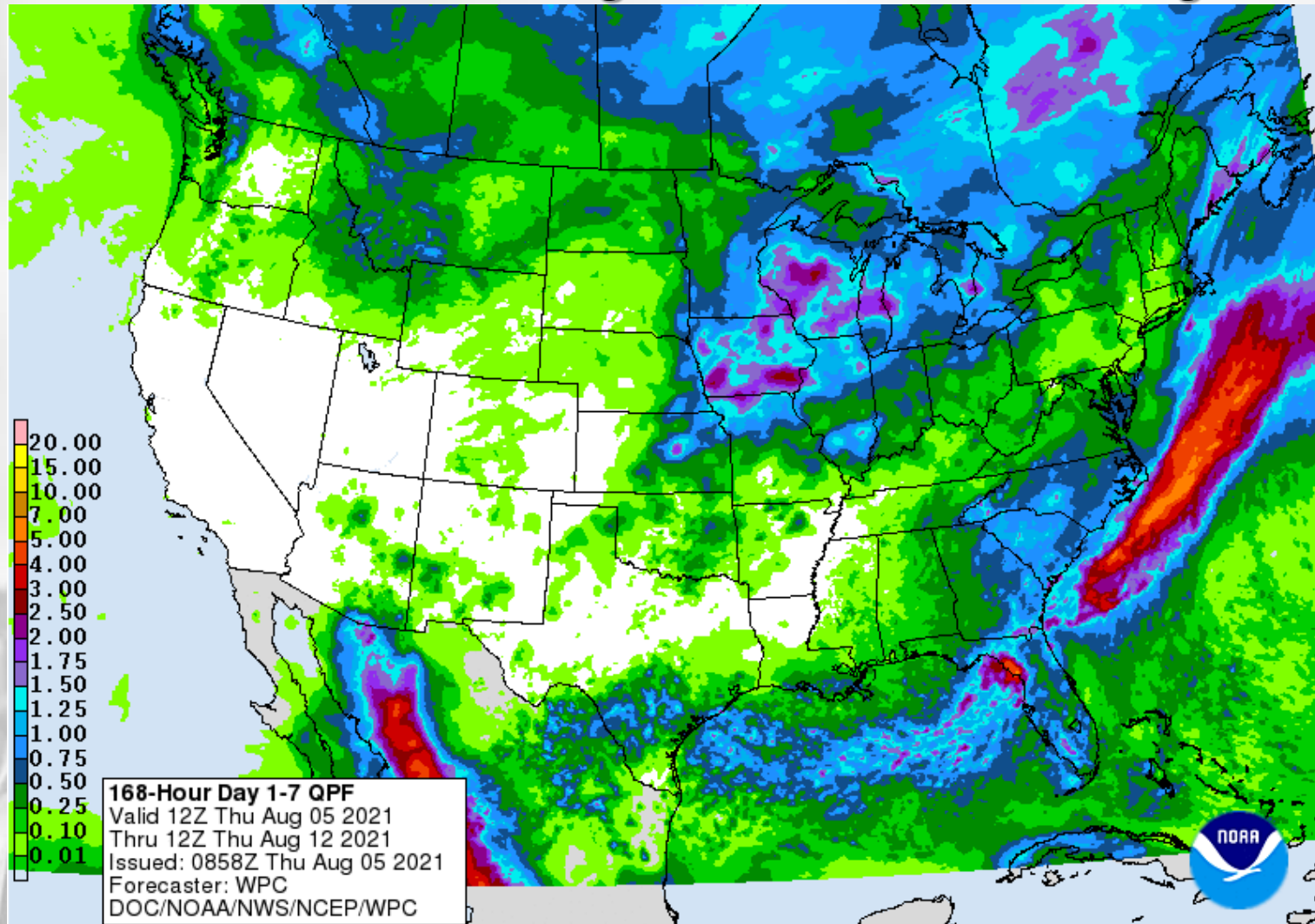
Early-July 2021 CPC/IRI Official Probabilistic ENSO Forecasts

ENSO state based on NINO3.4 SST Anomaly  
Neutral ENSO:  $-0.5\text{ }^{\circ}\text{C}$  to  $0.5\text{ }^{\circ}\text{C}$



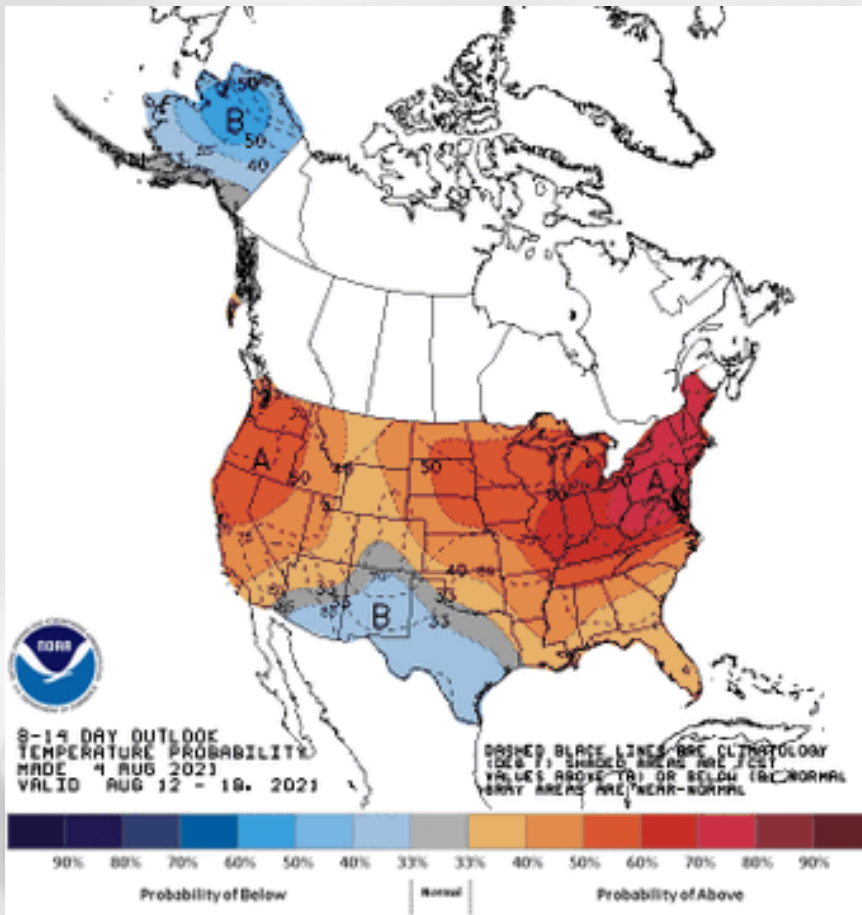
# 7-day Quantitative Precipitation Forecast

Valid: 7 AM CT Thu 5 August – 7 AM CT Thu 12 August

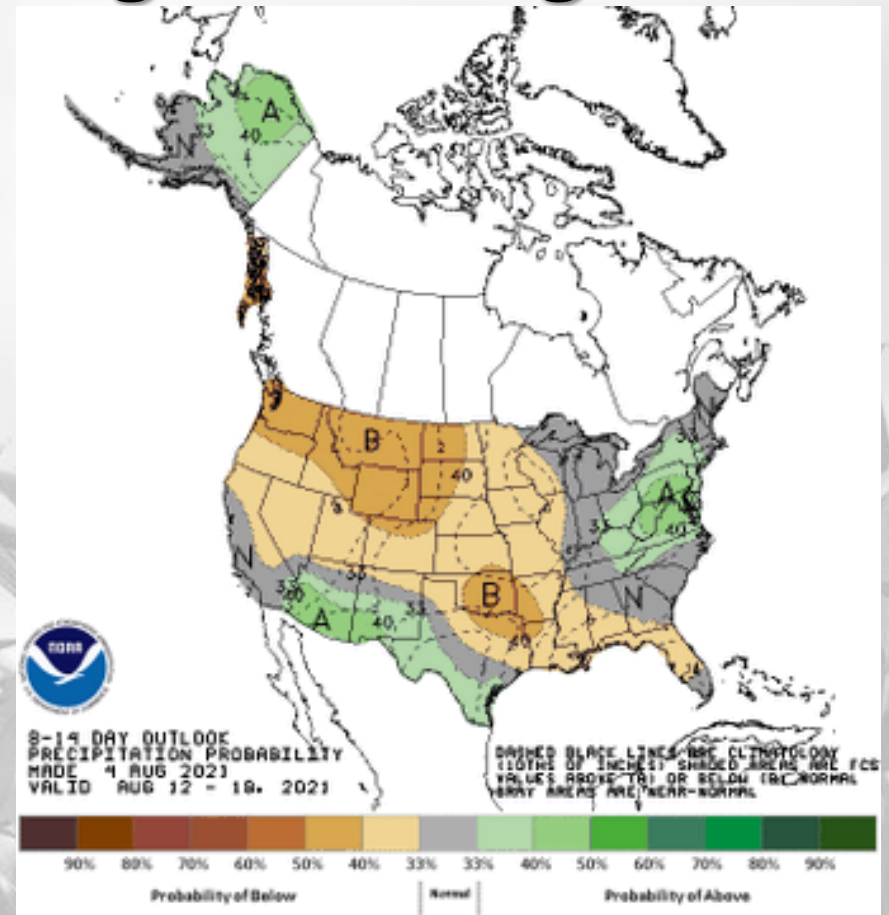


<http://www.wpc.ncep.noaa.gov/qpf/day1-7.shtml>

# Temperature and Precipitation Probabilities for 12 Aug. – 18 Aug. 2021



Temperature

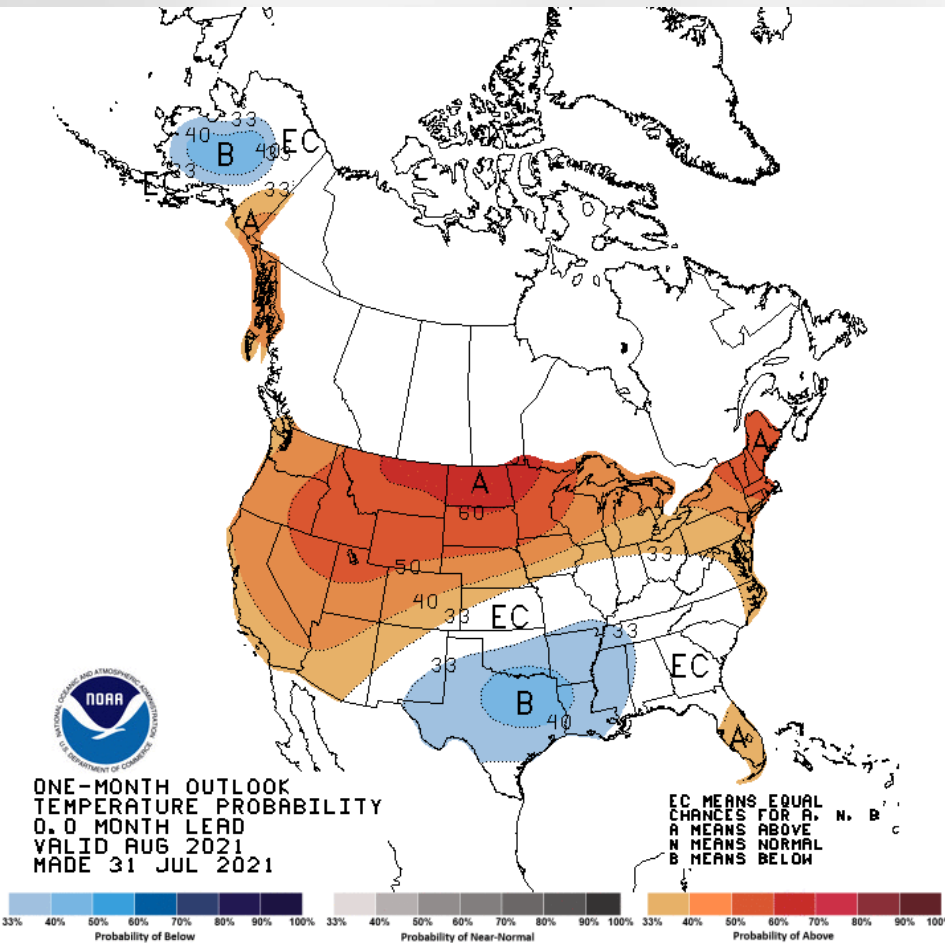


Precipitation

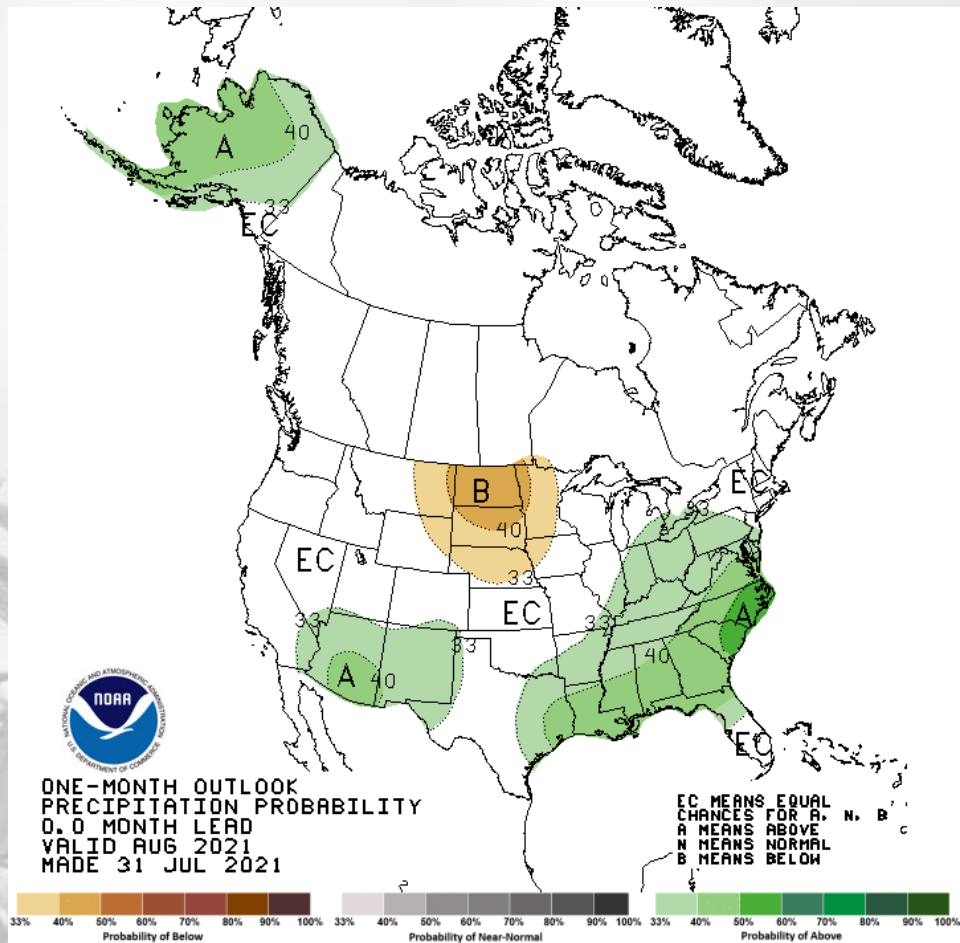
<http://www.cpc.ncep.noaa.gov/products/predictions/814day/index.php>



# August Temperature and Precipitation Probabilities



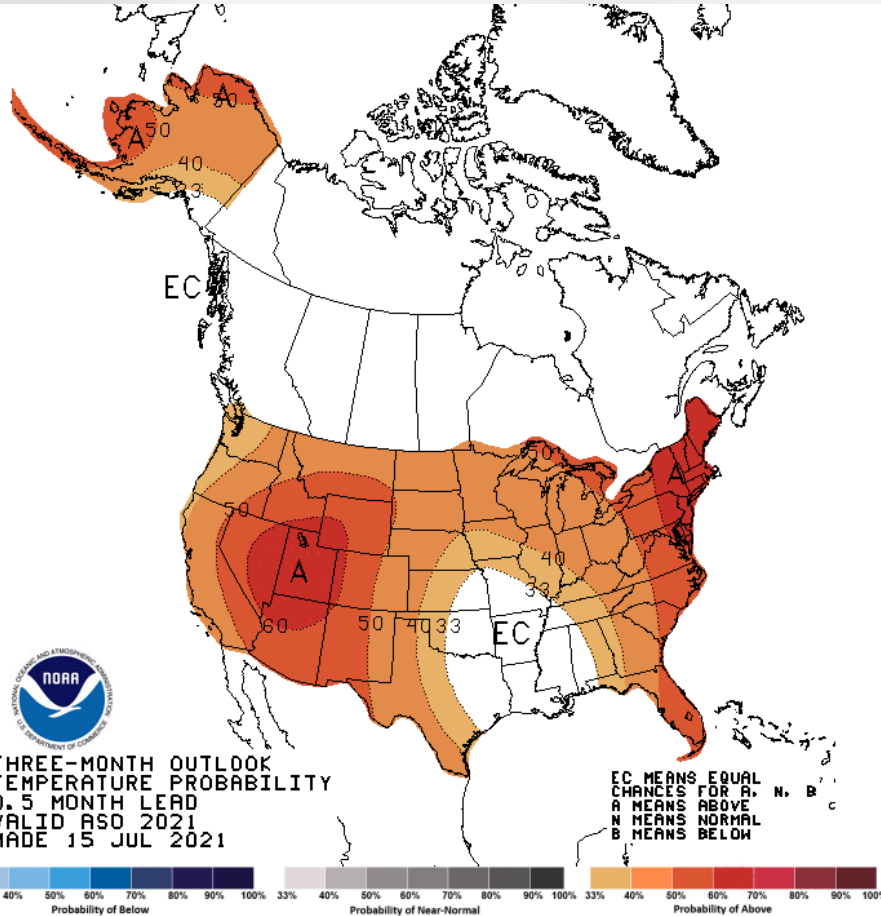
Temperature



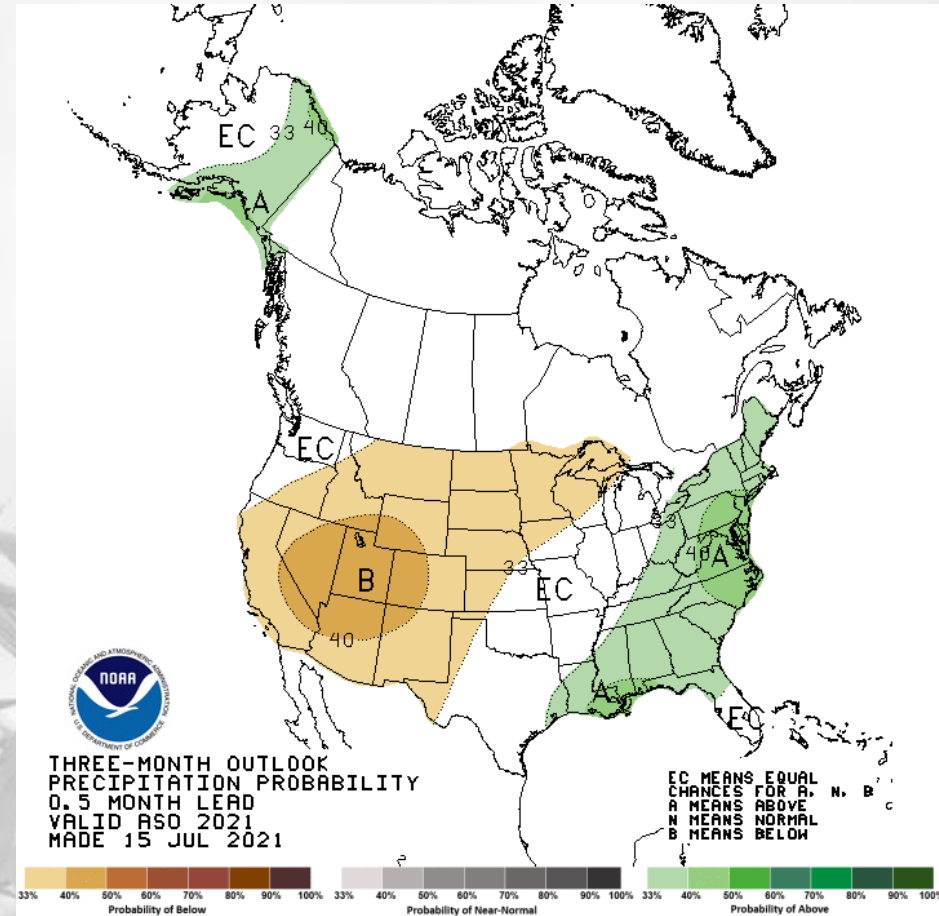
Precipitation

<http://www.cpc.ncep.noaa.gov/products/predictions/30day/>

# August-October Temperature and Precipitation Probabilities



Temperature



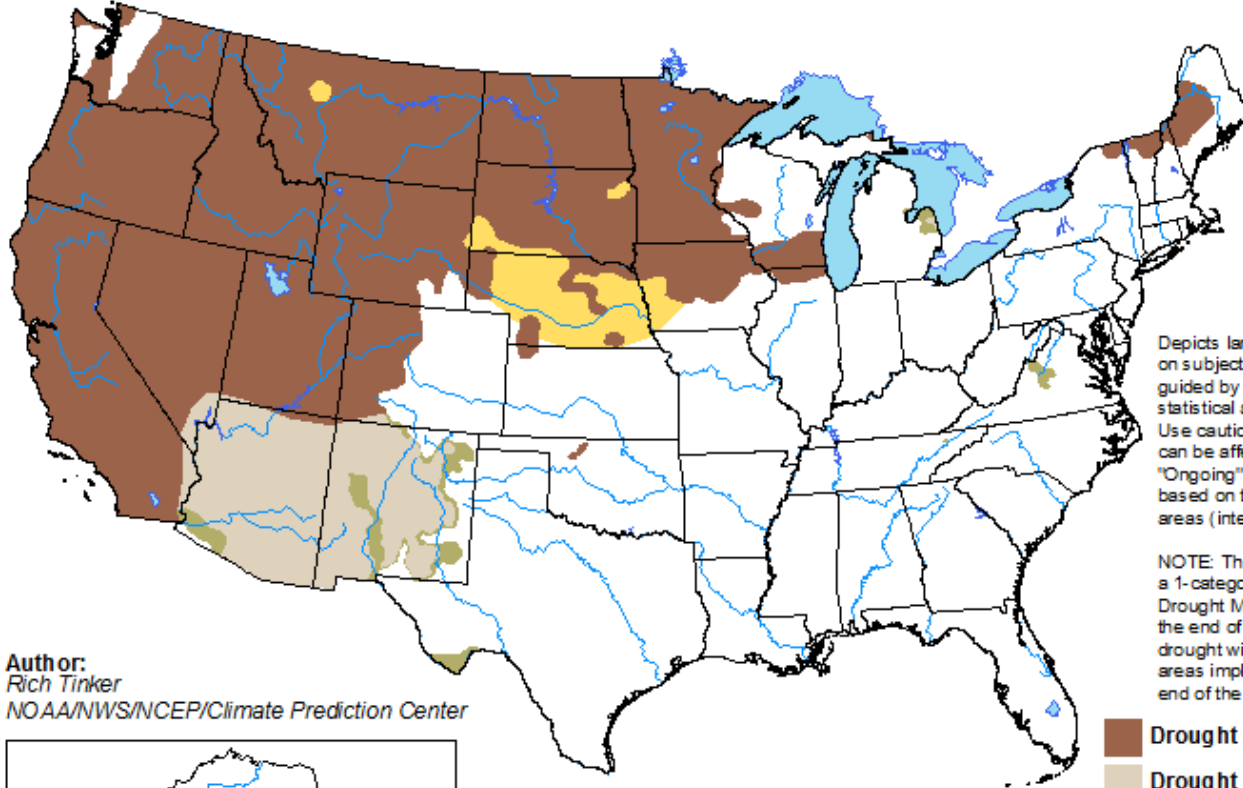
Precipitation

[http://www.cpc.ncep.noaa.gov/products/predictions/long\\_range/seasonal.php?lead=2](http://www.cpc.ncep.noaa.gov/products/predictions/long_range/seasonal.php?lead=2)

# Drought Outlook through 31 August

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

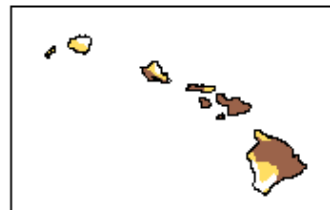
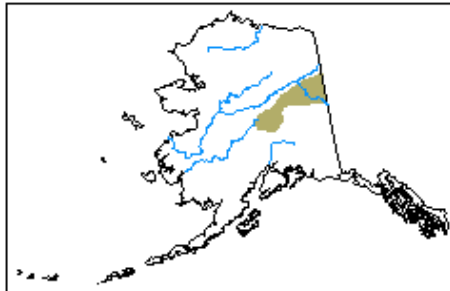
Valid for August 2021  
Released July 31, 2021







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/3eZGd>

# Summary - Conditions

- \* Mostly warmer than average north/west – cooler to south/east.
  - \* Generally dry in plains with a little recent improvement
  - \* Worsening central plains and some places eastward
  - \* East generally good.
- 
- \* Drought issues persist northern Plains. Smaller pockets elsewhere.
  - \* Various water issues – mostly west
  - \* Small wetness issues
  - \* Fire/smoke problems many areas

# Summary - Outlooks

- \* Not major changes seen
- \* Into August mostly warmer and western areas slightly likely drier.
- \* Eastern areas mixed signals but likely better overall
- \* Drought should persist and possibly expand into central plains.
- \* Crops will mimic this – generally better east and worse to the west.

## Further Information - Partners

- **Today's and Past Recorded Presentations and :**
  - <https://mrcc.illinois.edu/multimedia/webinars.jsp>
  - <https://hprcc.unl.edu/webinars.php>
- 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.isws.illinois.edu>
  - <http://www.hprcc.unl.edu>

# Thank You and Questions?

- Questions:
  - **Climate:**
  - Dennis Todey: [dennis.todey@usda.gov](mailto:dennis.todey@usda.gov) , 515-294-2013
  - Doug Kluck: [doug.kluck@noaa.gov](mailto:doug.kluck@noaa.gov), 816-994-3008
  - Mike Timlin: [mtimlin@illinois.edu](mailto:mtimlin@illinois.edu), 217-333-8506
  - Natalie Umphlett: [numphlett2@unl.edu](mailto:numphlett2@unl.edu) , 402 472-6764
  - Brian Fuchs: [bfuchs2@unl.edu](mailto:bfuchs2@unl.edu) , 402 472-6775
  - Molly Woloszyn [molly.woloszyn@noaa.gov](mailto:molly.woloszyn@noaa.gov), 217 244-7612
  - **Weather:**
  - [crhroc@noaa.gov](mailto:crhroc@noaa.gov)

# For More Information



@dennistoday

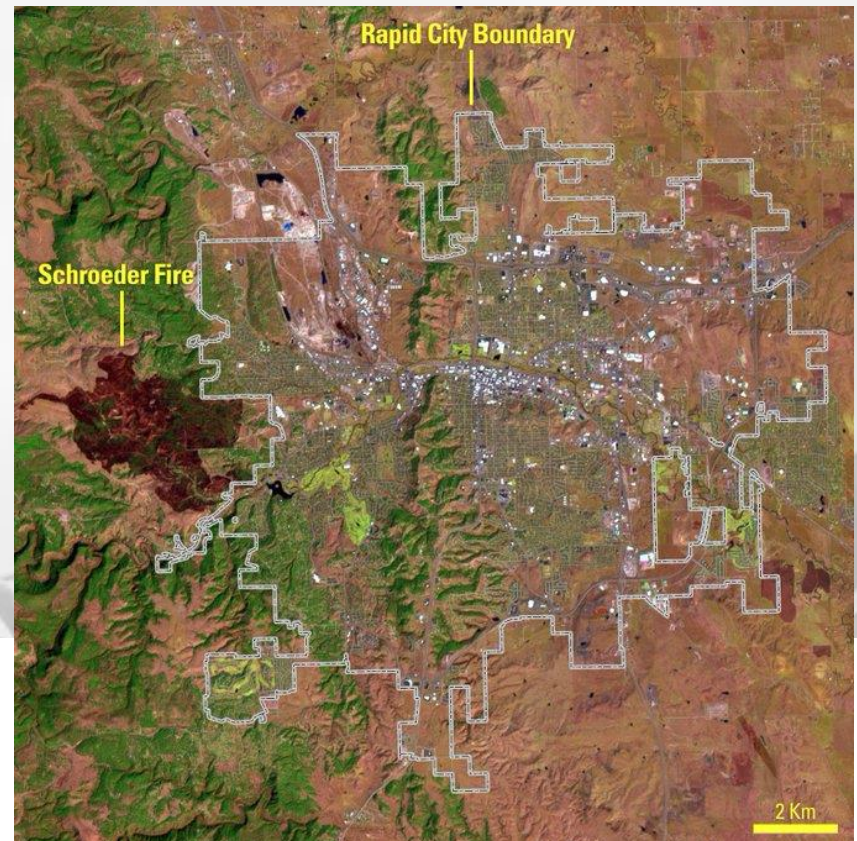


<https://www.climatehubs.usda.gov/hubs/midwest>

**Dennis Todey, Director**

515-294-2013

[Dennis.todey@ars.usda.gov](mailto:Dennis.todey@ars.usda.gov)



**National Laboratory for Agriculture and the Environment**

Attn: Midwest Climate Hub

1015 N University Blvd

Ames, Iowa 50011-3611



Midwest Climate Hub  
U.S. DEPARTMENT OF AGRICULTURE



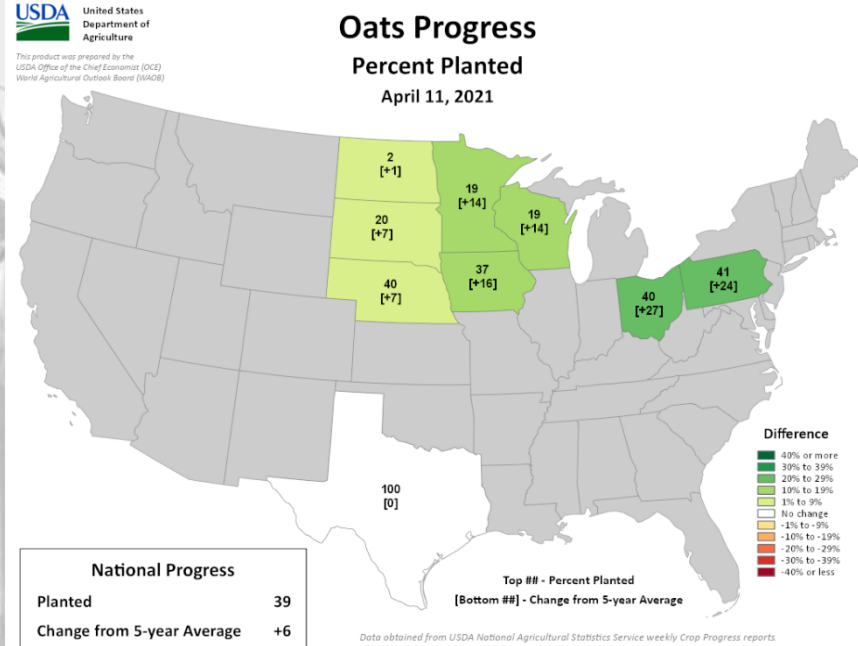
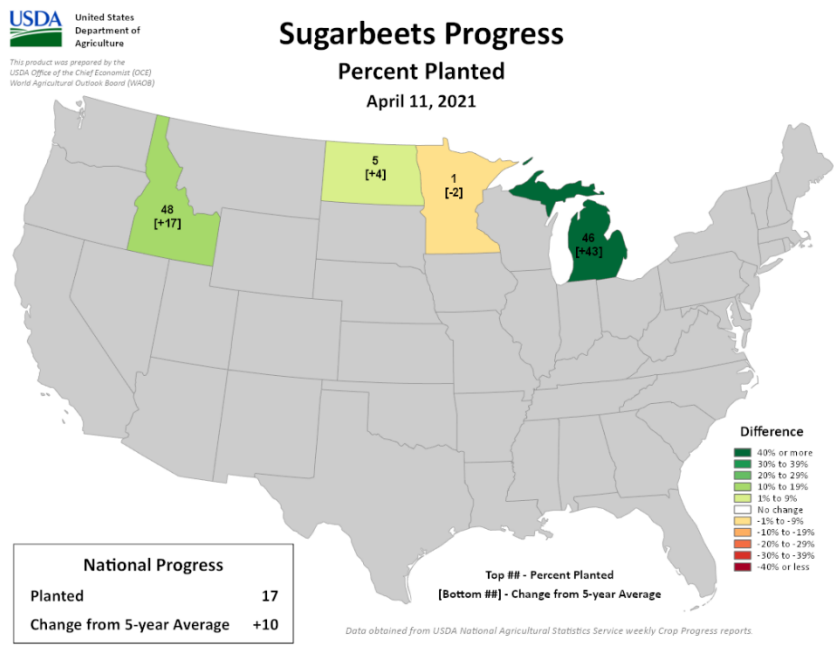
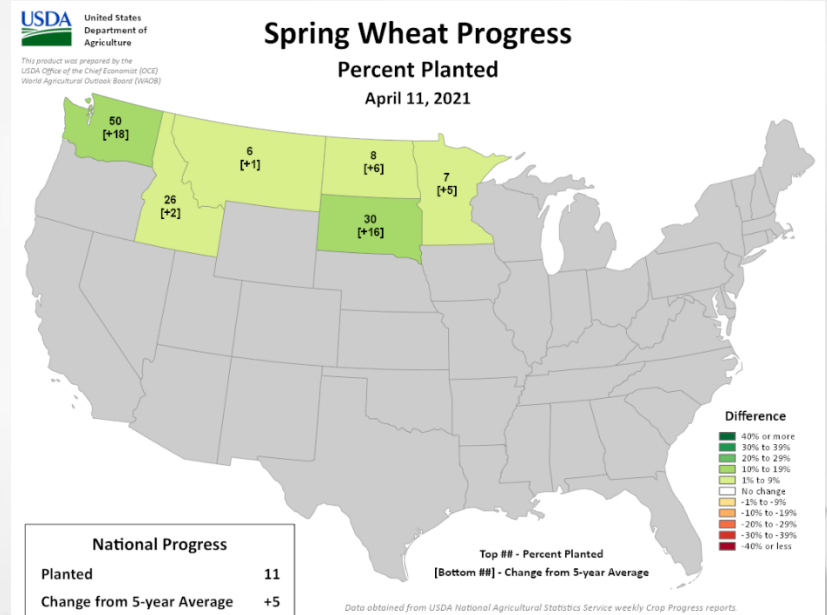
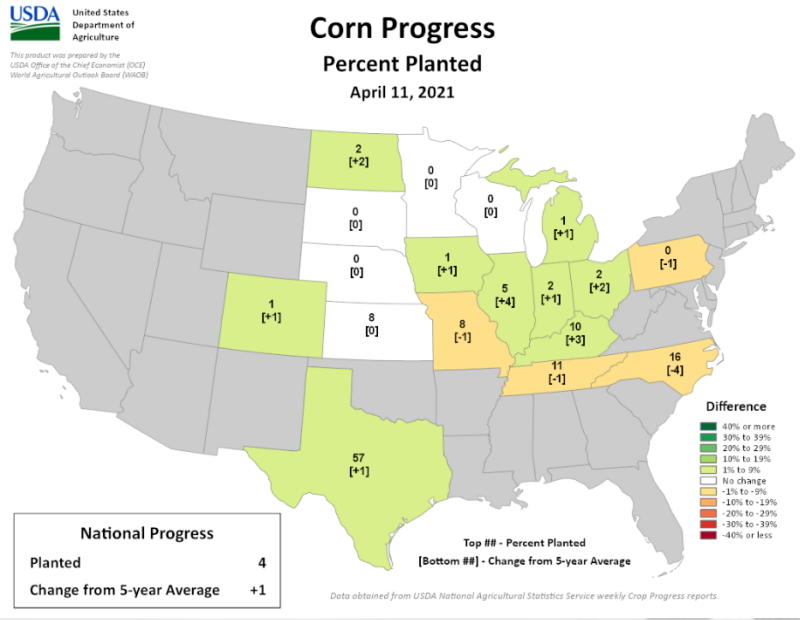
# March Precip Details

- Wettest March on record
  - Caspar, WY
  - Goodland, KS
  - Grand Island, NE
- Driest March
  - Dickinson, ND
  - Bismarck (3<sup>rd</sup>)
  - Mobridge, SD (4<sup>th</sup>)
- Snowiest March
  - Caspar, WY
  - Denver, CO



Photo: Ray Wolf  
NWS Quad Cities

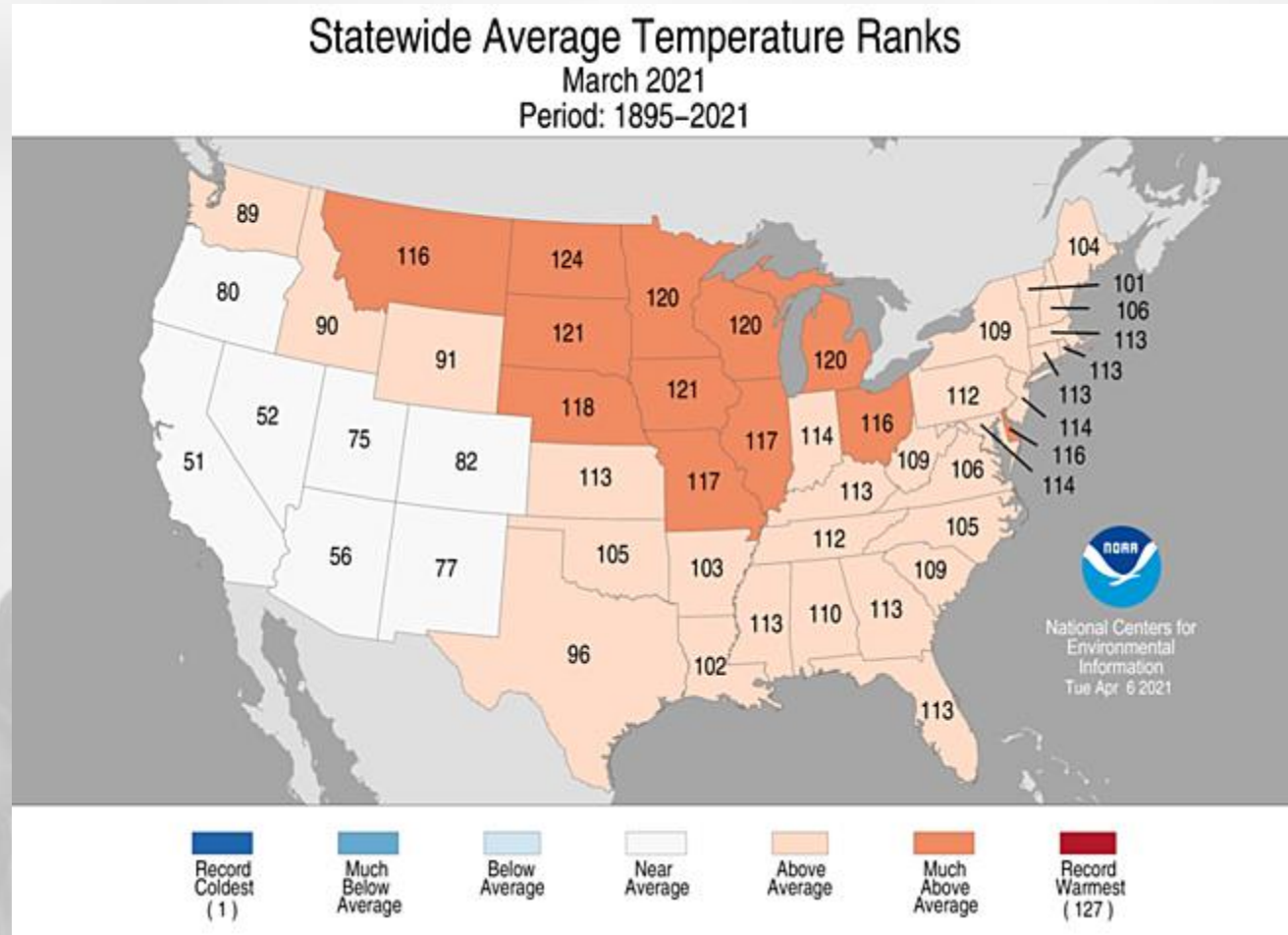
# USDA NASS Crop Progress



# March Temperature Recap

After a cold period in February March was very warm through the central US.

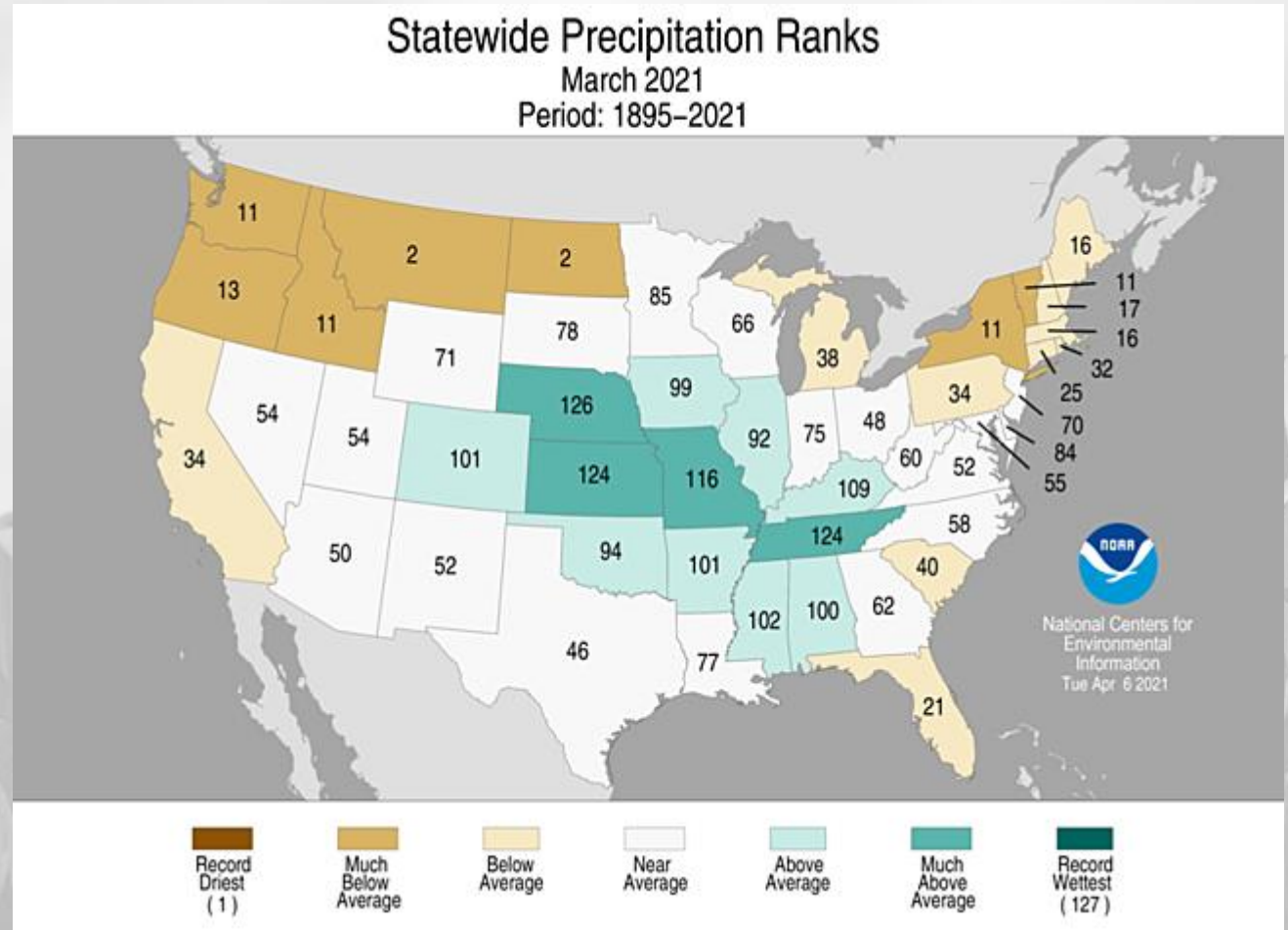
Top 10 warmest in most states in the region.



# March Precipitation Recap

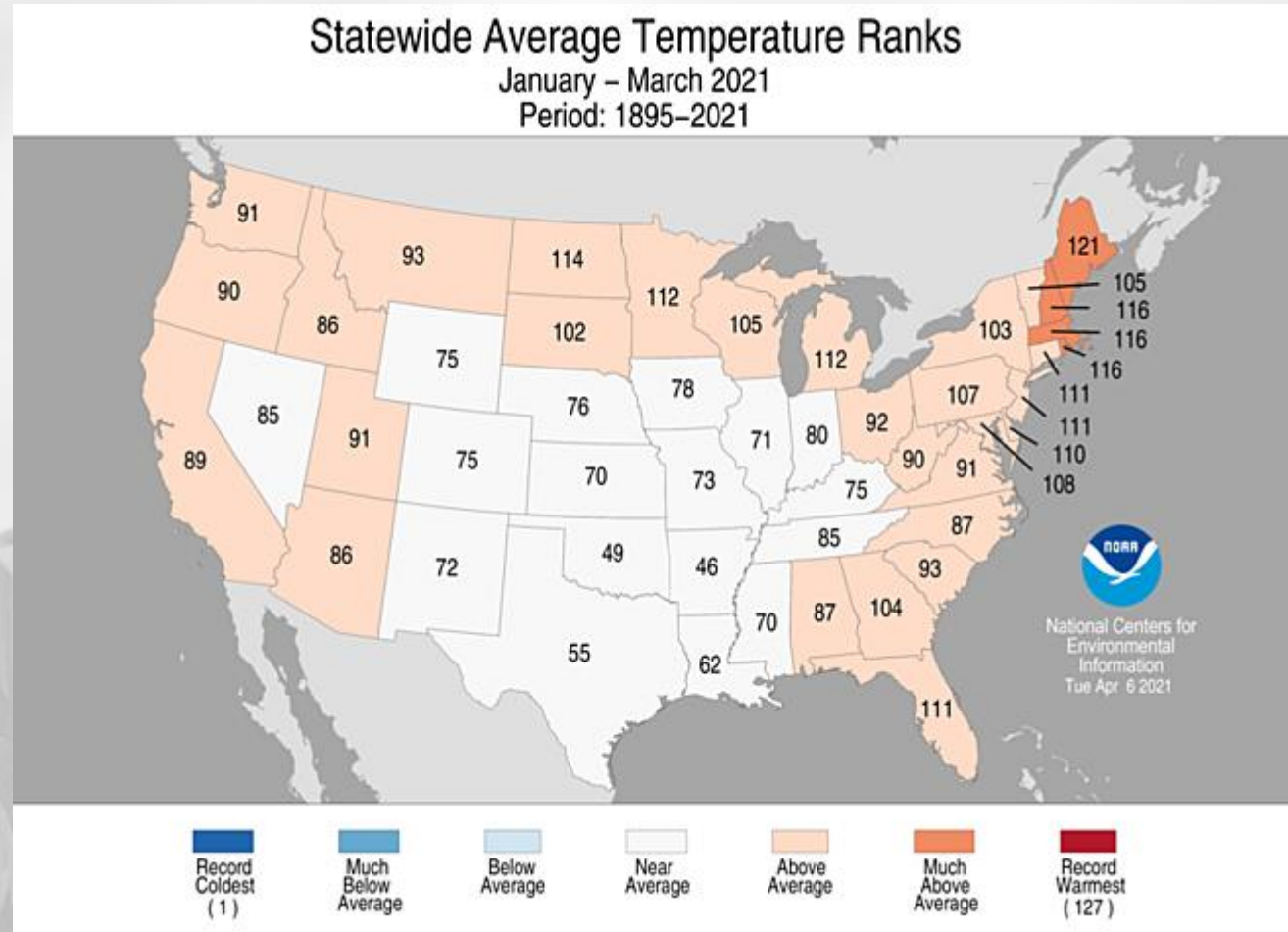
**Strong contrast across the region in precipitation. Wet to the south and dry to the north.**

**Top 5 wettest NE/KS. Top 5 driest ND/MT.**



# January-March Temperature Recap

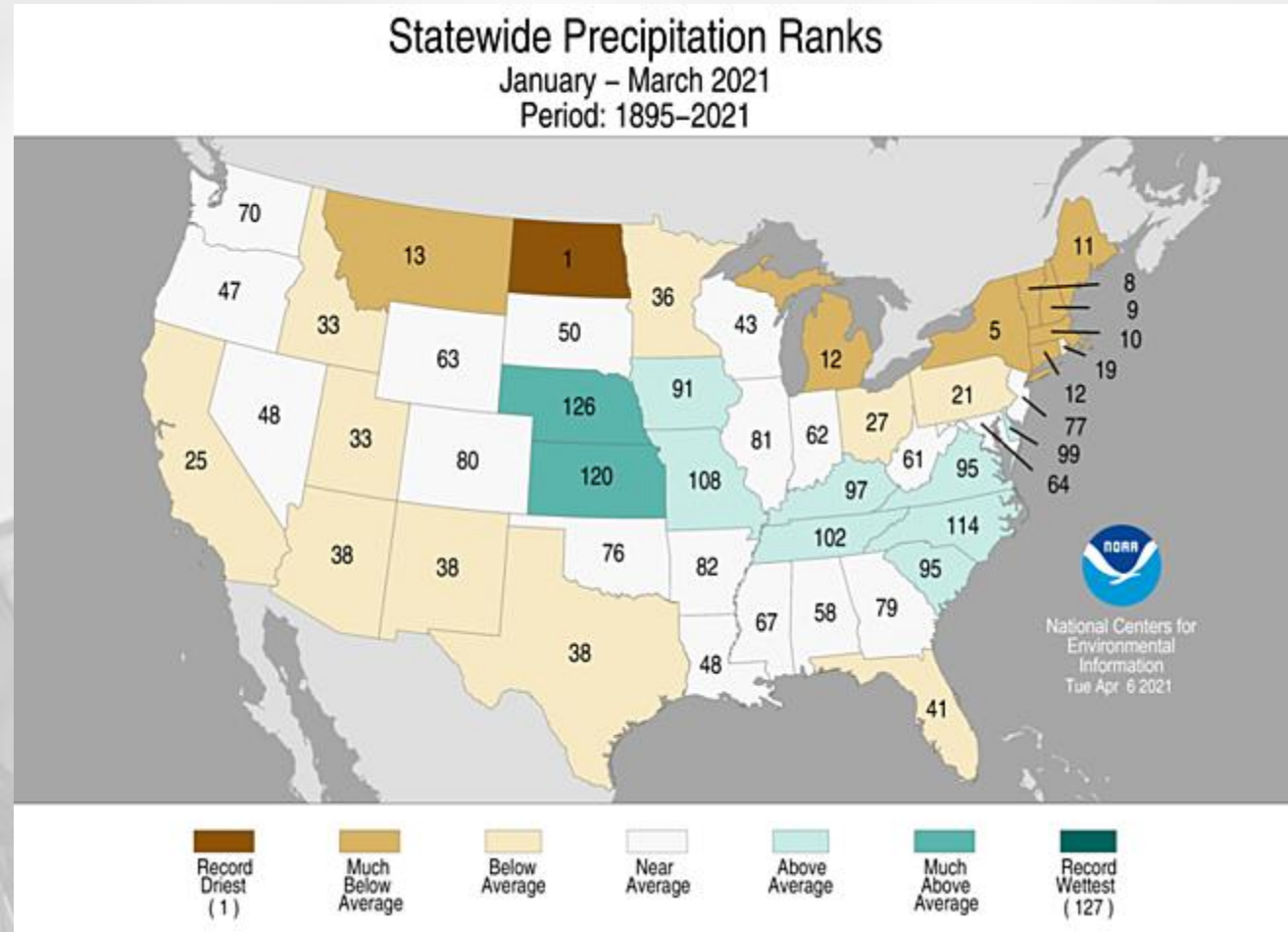
**Cold February had a large impact across the south, while northern areas stayed relatively warm.**



# January-March Precipitation Recap

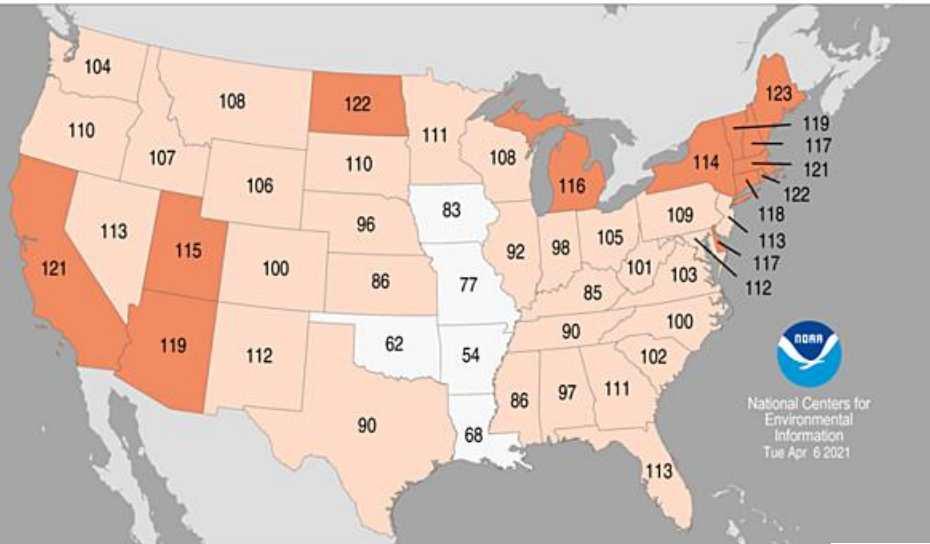
Precipitation contrast shows again Jan.-Mar. Wet across central areas and dry to north.

Second wettest on record for Nebraska, driest on record for North Dakota.



# Statewide Maximum Temperature Ranks

October 2020 – March 2021  
Period: 1895–2021



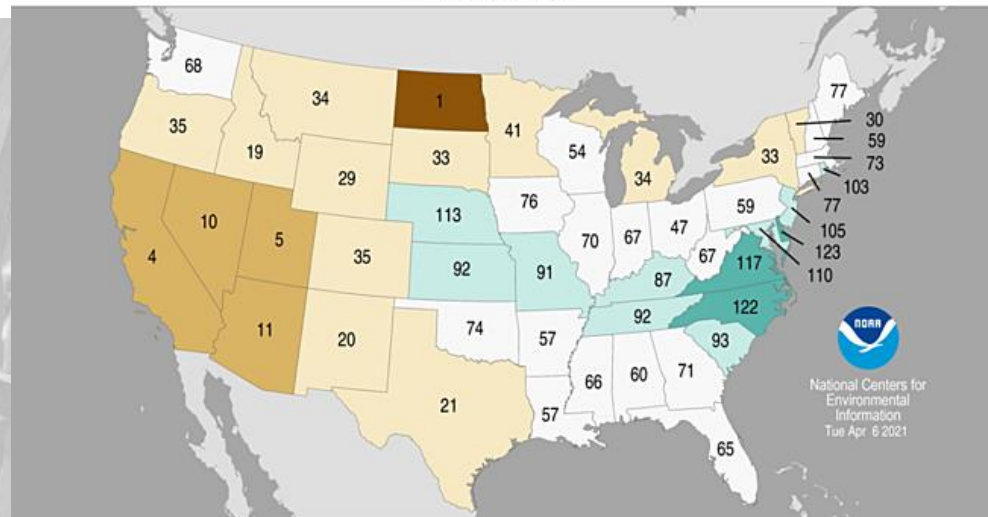
National Centers for Environmental Information  
Tue Apr 6 2021



# October-March

## Statewide Precipitation Ranks

October 2020 – March 2021  
Period: 1895–2021



National Centers for Environmental Information  
Tue Apr 6 2021

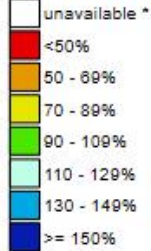


Generally warmer than average and dry across the north and west again.

# Westwide SNOTEL Current Snow Water Equivalent (SWE) % of Normal

Apr 14, 2021

Current Snow Water Equivalent (SWE) Basin-wide Percent of 1981-2010 Median



Data unavailable at time of posting or measurement is not representative at this time of year

Provisional data subject to revision



0 75 150 300 Miles

The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

Prepared by:  
USDA/NRCS National Water and Climate Center  
Portland, Oregon  
<http://www.wcc.nrcs.usda.gov>

# NRCS Snow Water Equivalent

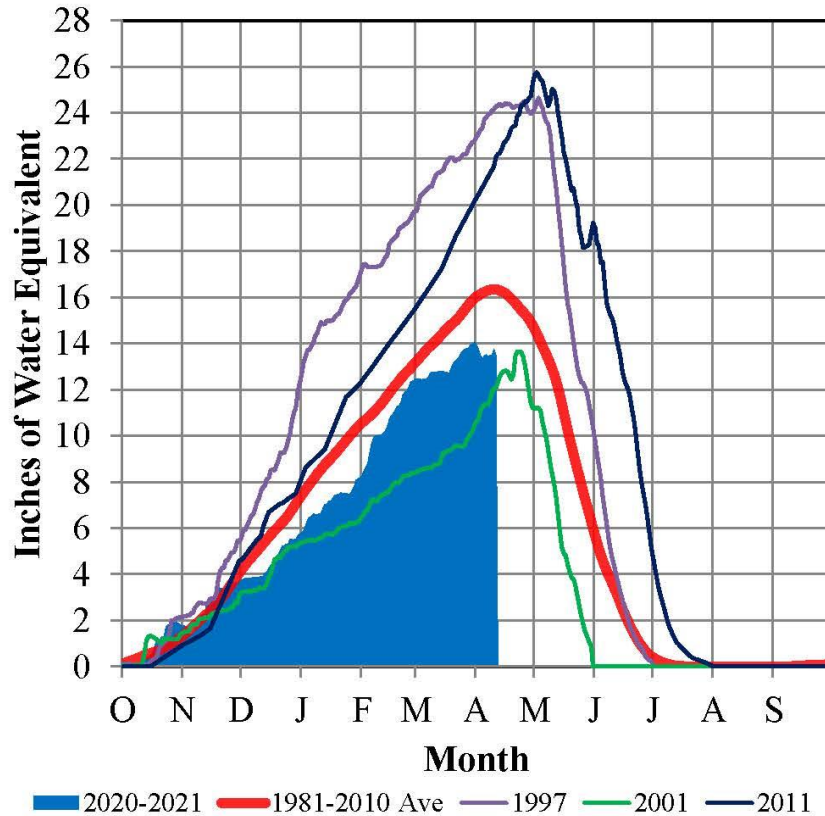
- Most front range close to average.
- Melting out early.



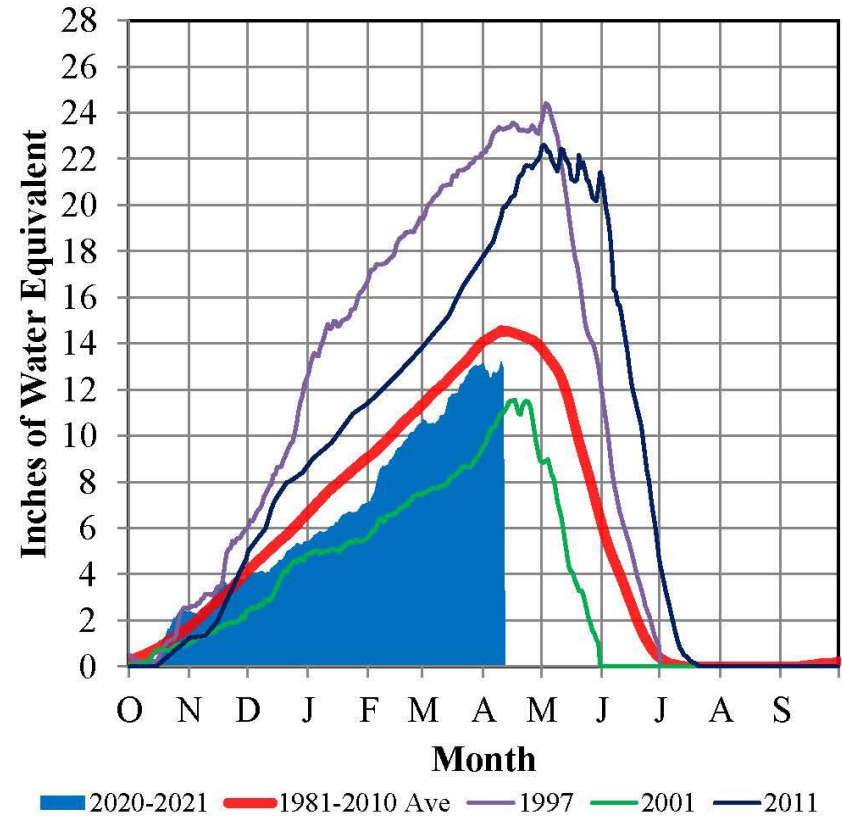
# Missouri River Basin – Mountain Snowpack Water Content 2020-2021 with comparison plots from 1997\*, 2001\*, and 2011

11-Apr-2021

### Total above Fort Peck



### Total Fort Peck to Garrison

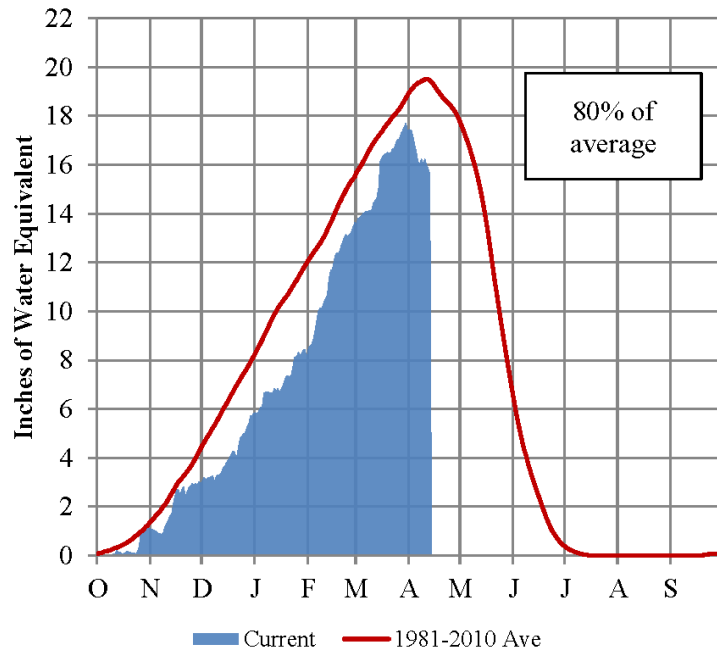


On April 11, 2021 the mountain Snow Water Equivalent (SWE) in the “Total above Fort Peck” reach was 13.5”, 82% of the April 11 average. On April 11, 2021 the mountain SWE in the “Fort Peck to Garrison” reach was 13.0”, 89% of the April 11 average. The normal peak for both reaches is near April 15.

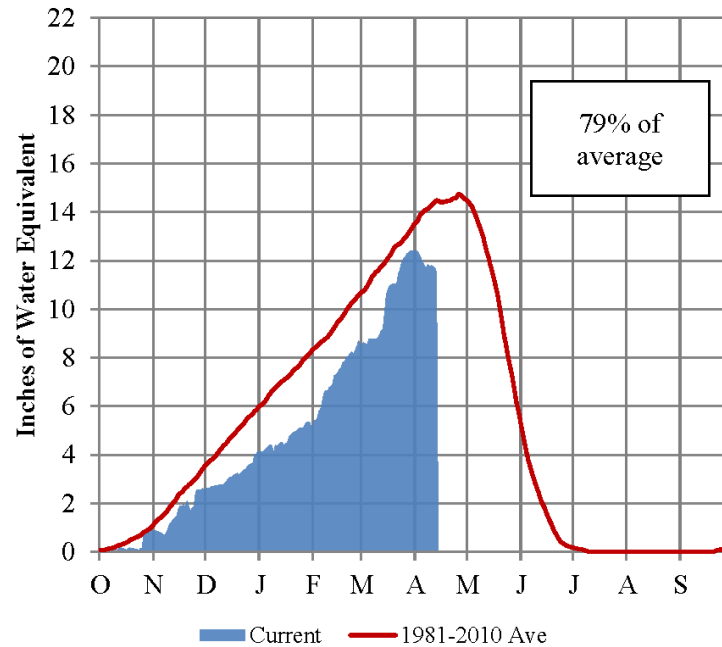
# Platte River Basin - Mountain Snowpack Water Content Water Year 2020-2021

April 14, 2021

### Total North Platte



### Total South Platte



The North and South Platte River Basin mountain snowpacks normally peak near April 15 and the end of April, respectively. As of April 13, 2021, the mountain snowpack SWE in the "Total North Platte" reach is currently 15.6", 80% of average. The mountain snowpack SWE in the "Total South Platte" reach is currently 11.5", 79% of average.

Source: USDA, Natural Resource Conservation Service

Provisional Data. Subject to Revision

[https://www.nwd-mr.usace.army.mil/rcc/reports/platte\\_snow.png](https://www.nwd-mr.usace.army.mil/rcc/reports/platte_snow.png)

# GREAT LAKES SURFACE ENVIRONMENTAL ANALYSIS (GLSEA)



Analysis Date: JD 104 04/14/2021

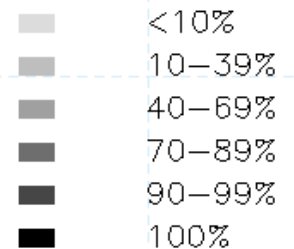
Percent Pixels with Data within +/-10 Days: 96.8%

Date of last ice analysis: 4/14/2021

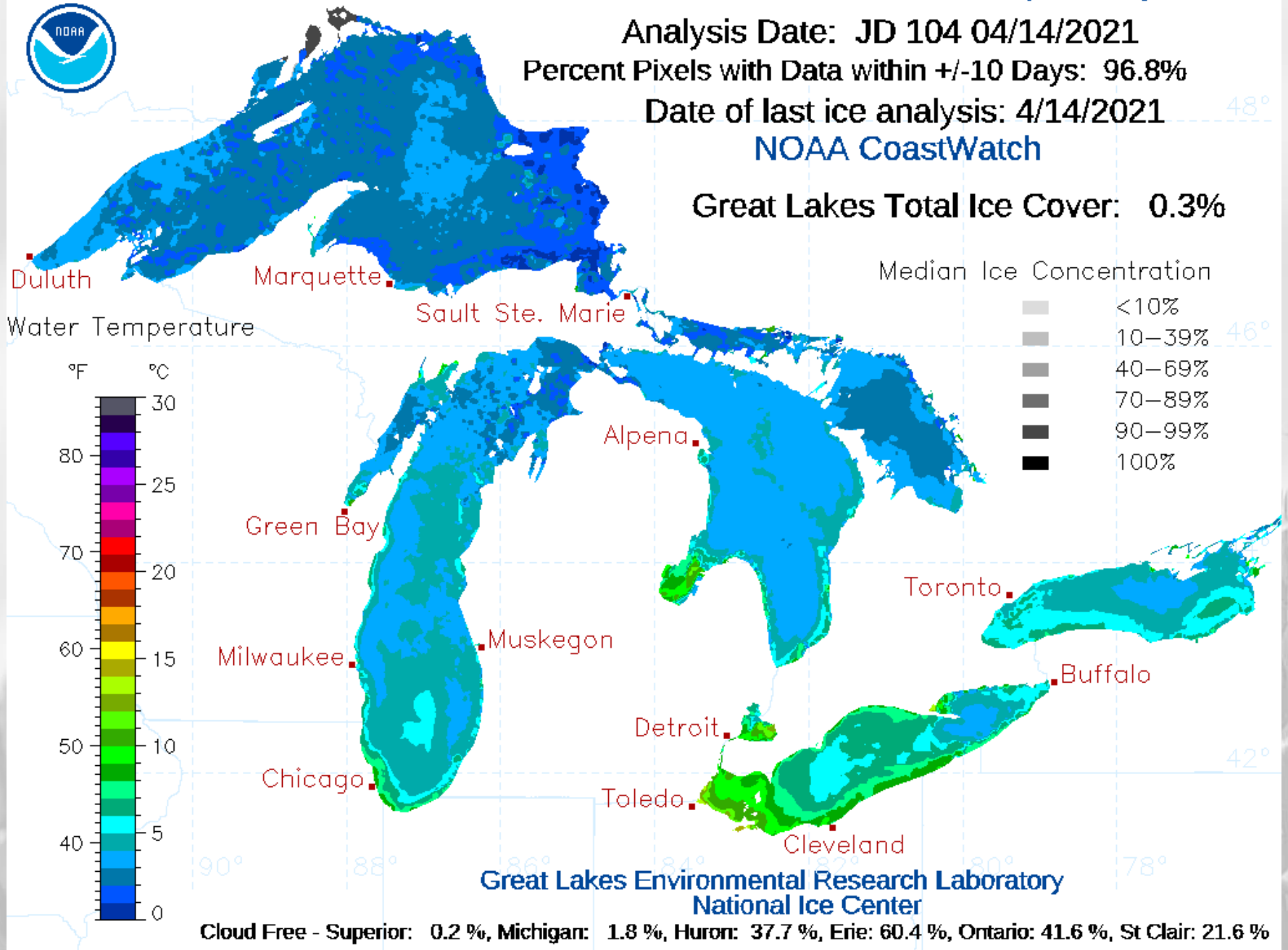
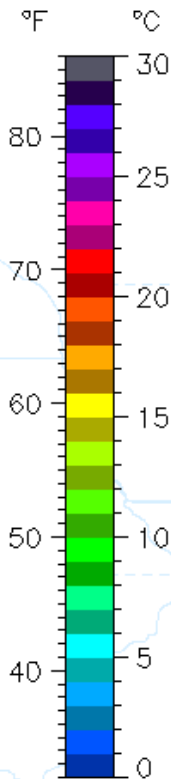
NOAA CoastWatch

Great Lakes Total Ice Cover: 0.3%

Median Ice Concentration



Water Temperature

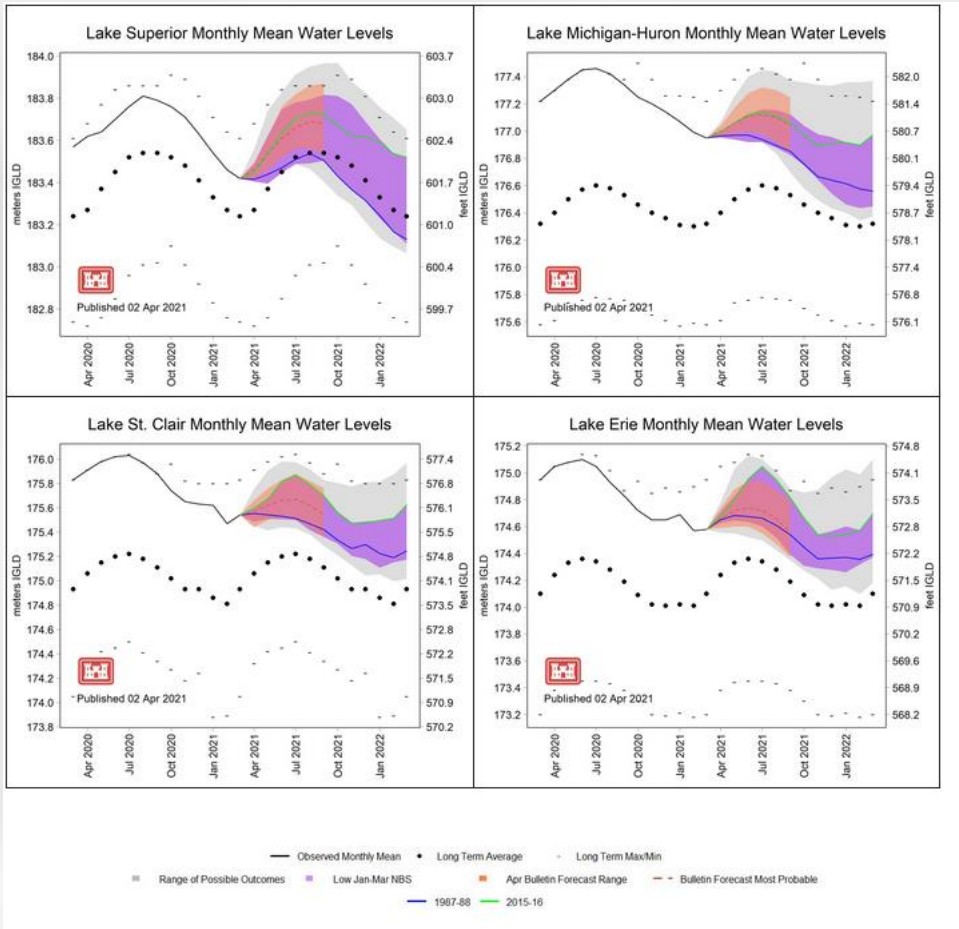


Great Lakes Environmental Research Laboratory  
National Ice Center

Cloud Free - Superior: 0.2 %, Michigan: 1.8 %, Huron: 37.7 %, Erie: 60.4 %, Ontario: 41.6 %, St Clair: 21.6 %

# Great Lakes Levels

- Lower lakes up slightly
- Others generally falling from record level but still above averages.
- Dryness in region contributing.
- Possible rebound, but unlikely back to record levels.



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

# Risk of Temperature < 32 F

## Minimum Temperatures (GEFS)

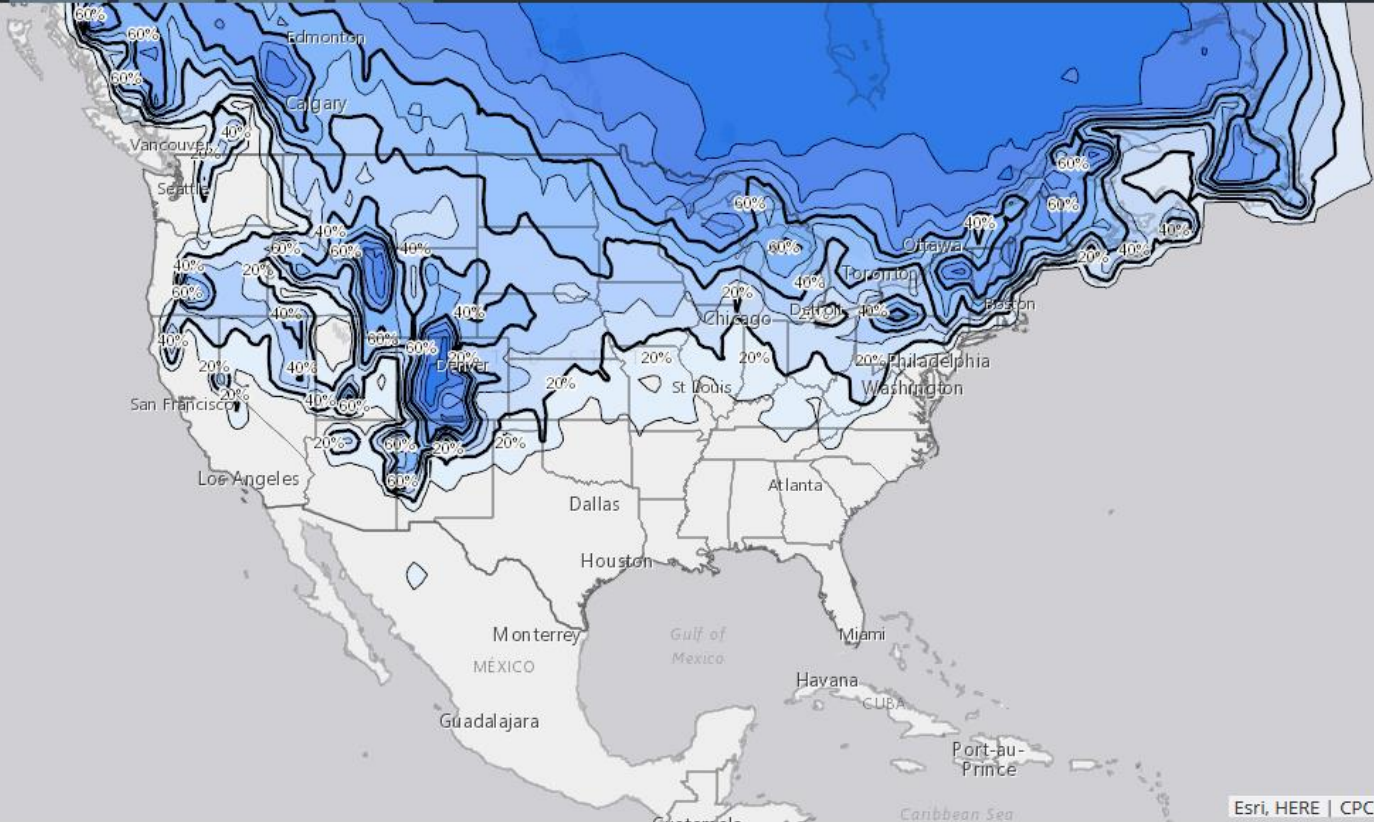
A Climate Prediction Center Product

Valid: (Day8) 04/23, **(Day9) 04/24**, (Day10) 04/25, (Day11) 04/26, (Day12) 04/27, (Day13) 04/28, (Day14) 04/29



< 15th Percentile < -40°F < 28°F < 32°F < 40°F > 80°F

Day 8 Day 9 Day 10 Day 11 Day 12 Day 13 Day 14



# Other Crop Impacts

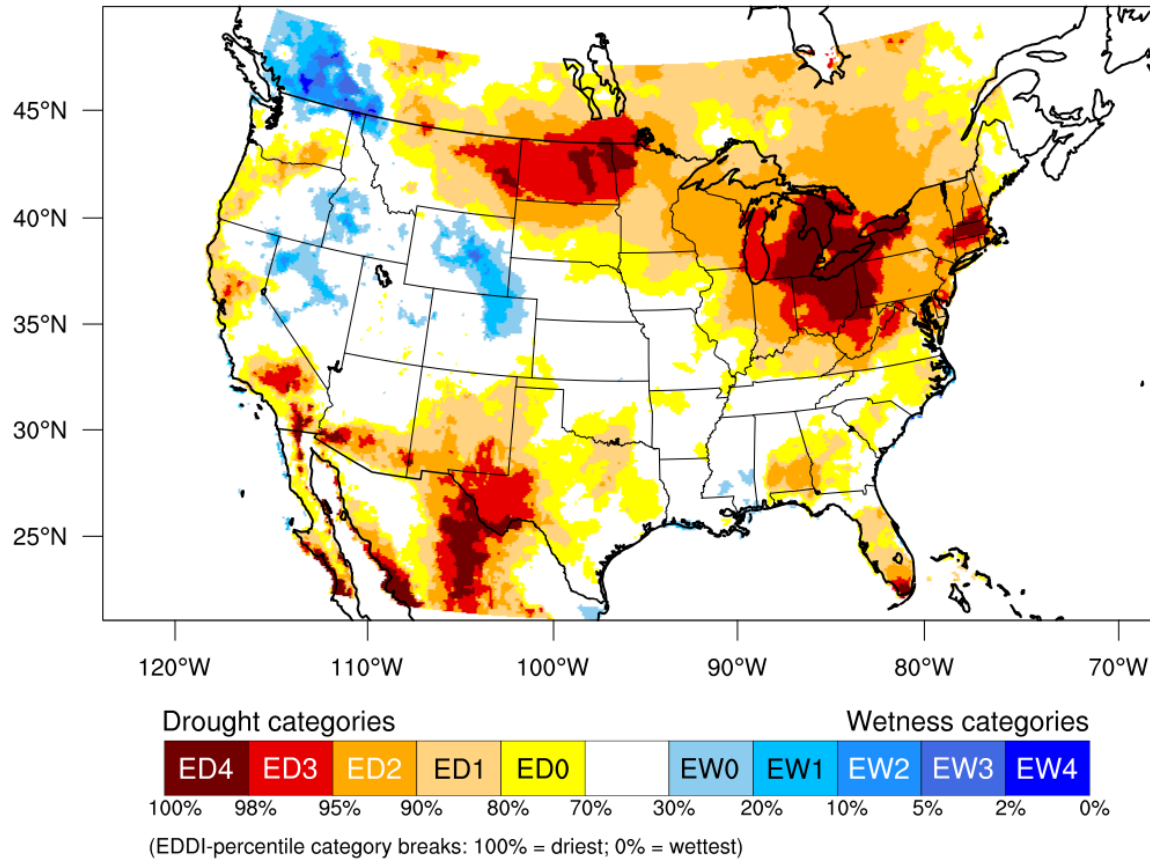


*Frozen soybeans IL Chelsea Harbach, Director of the U of I Northwestern Illinois Ag R&D Center*

- Other crop reports
  - Some small grain/cover crop damage in Northern Plains
  - Row crops mostly unaffected (corn, soybeans, others). Some early planted soybeans in IL probably lost.
  - Not emerged from soil or can recover from freeze

# EDDI – Evaporative Demand Index

1-month EDDI categories for April 9, 2021



Generated by NOAA/ESRL/Physical Sciences Laboratory