

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

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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



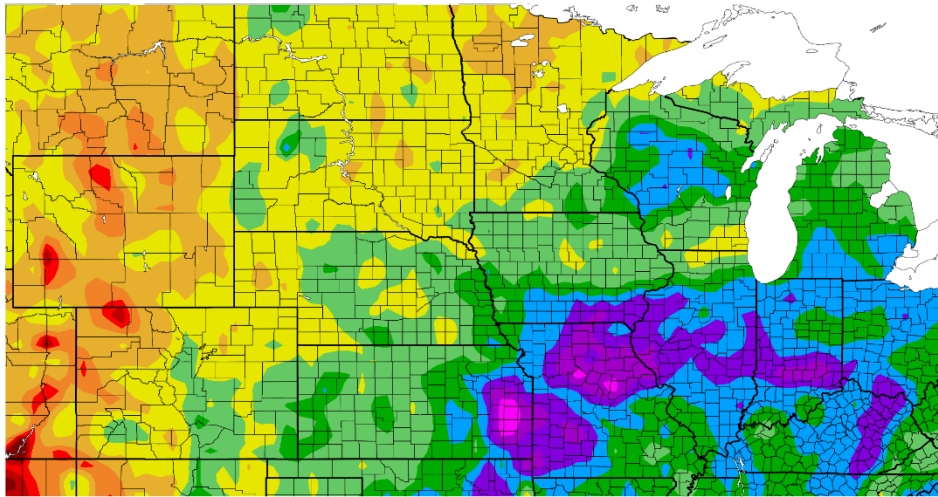
Photo:
Dennis Todey Boone, IA 2 June 2021



Photo:
CMOR Foster County ND

REVIEW/CURRENT CONDITIONS

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

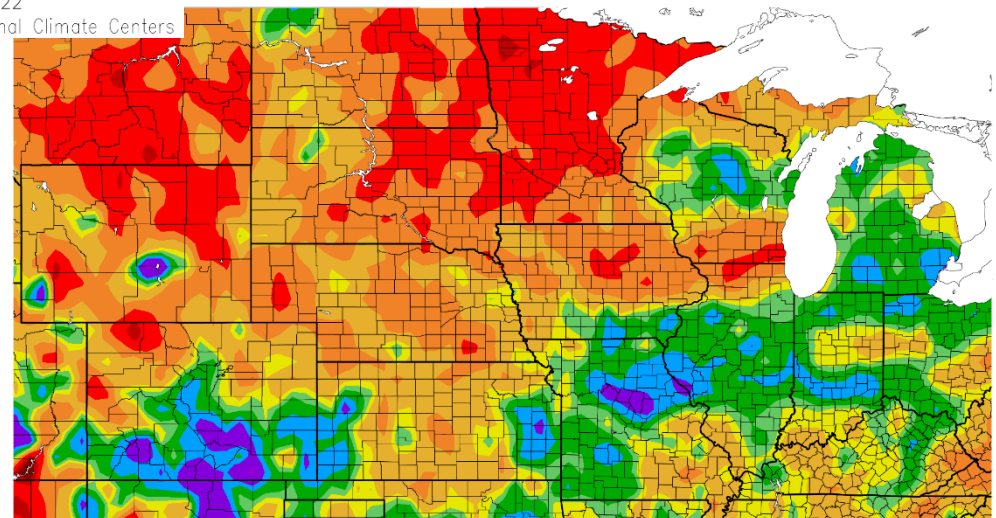


Last 90 days Precipitation

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

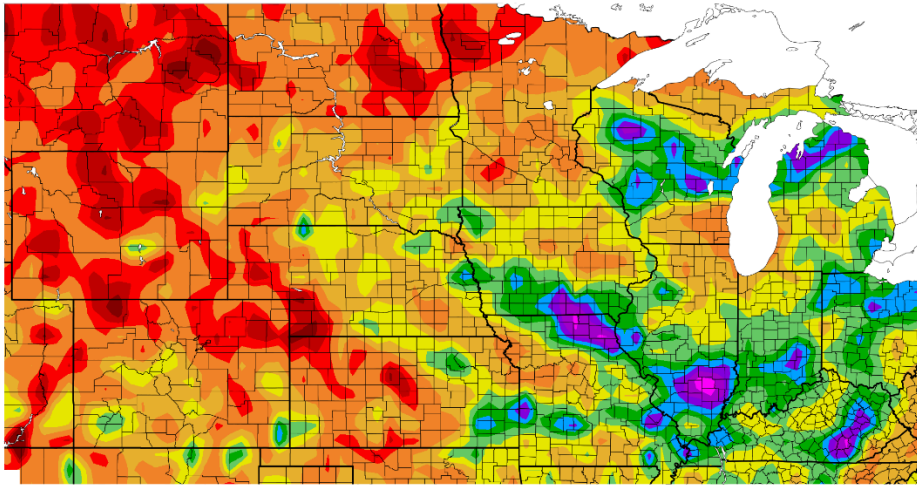
Generated 8/3/2021 at HPRCC using provisional data. NOAA Regional Climate Centers

- 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

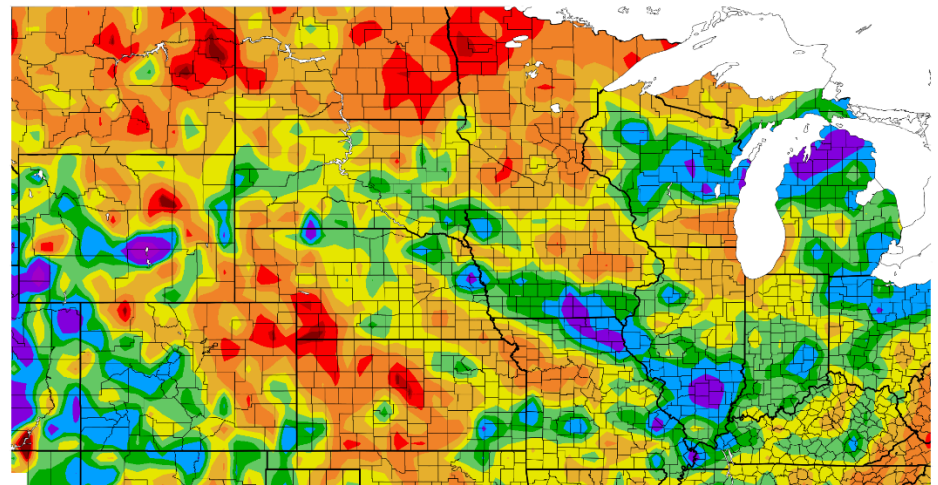


Last 30 days Precipitation

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

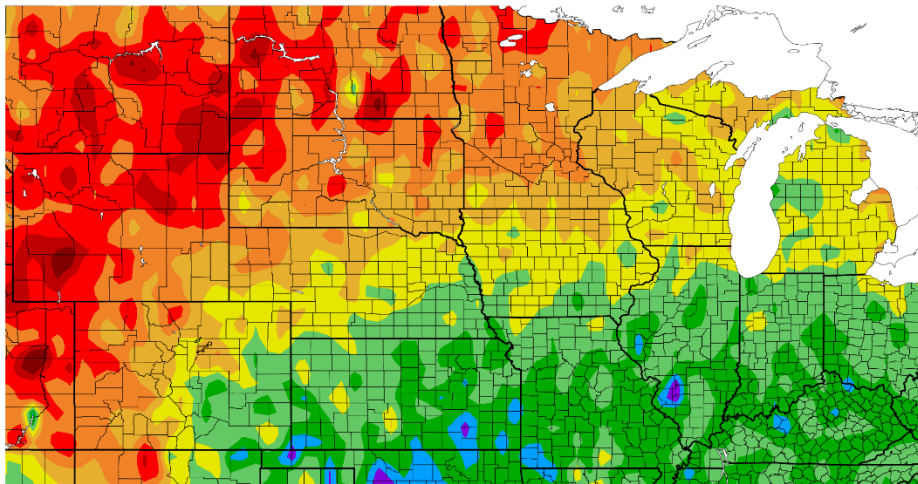
Generated 8/3/2021 at HPRCC using provisional data. NOAA Regional Climate Centers

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



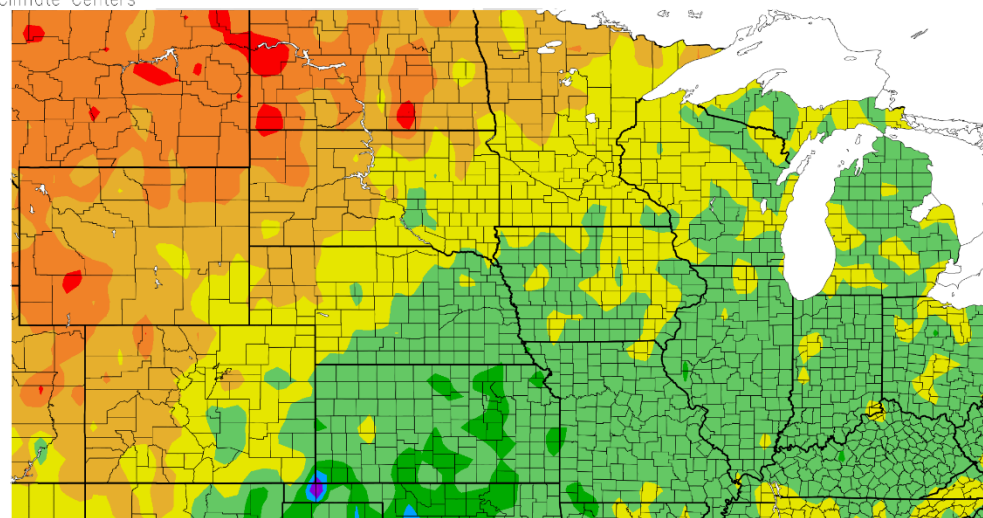
Generated 8/3/2021 at HPRCC using provisional data. NOAA Regional Climate Centers

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.

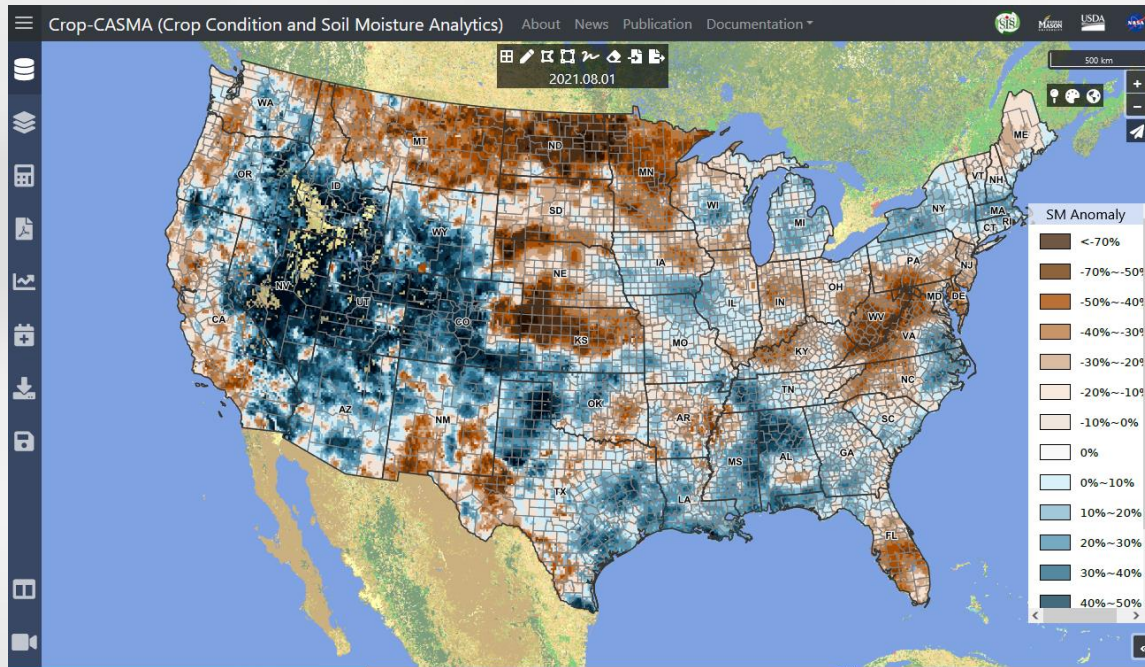
NOAA Regional Climate Centers



HYDROLOGY

Photo:
CMOR Pipestem Creek ND

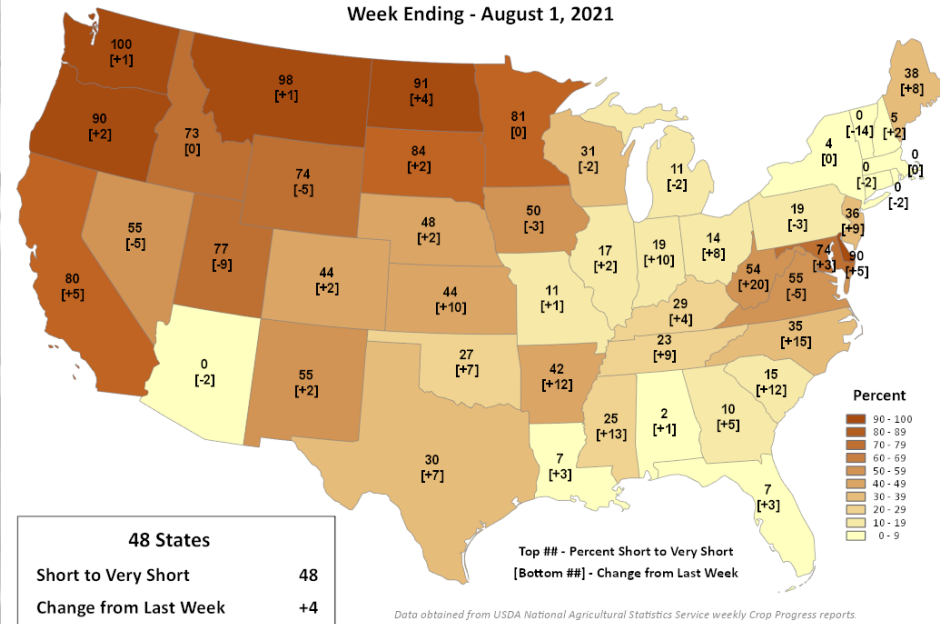
Soil Moisture



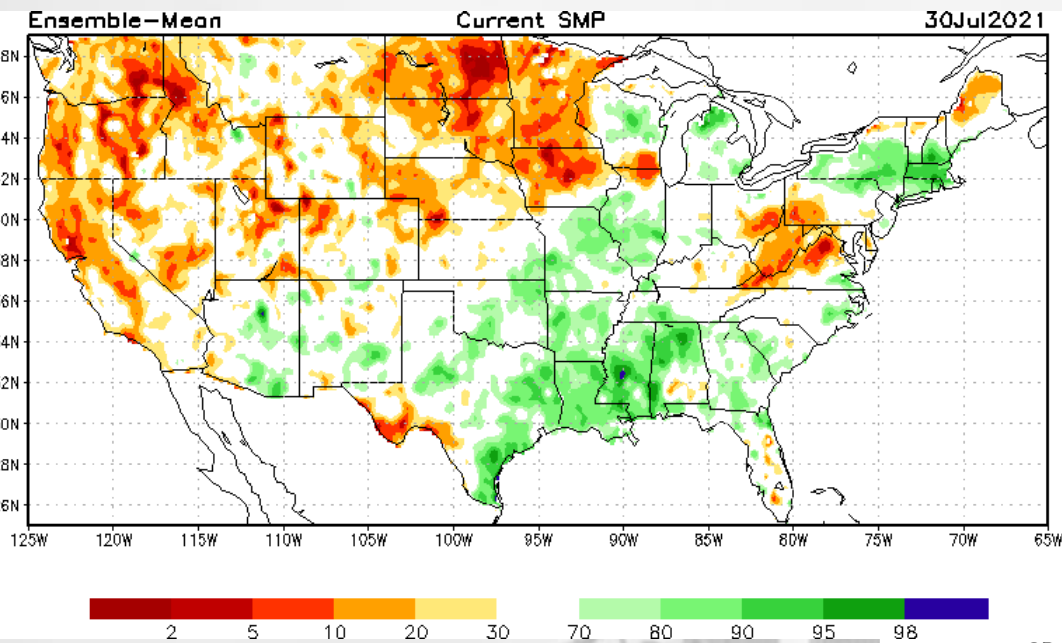
- Dry nrn plains consistently
- Varying results eastern Corn Belt.
- NASS topsoil reports extensive S-VS

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

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

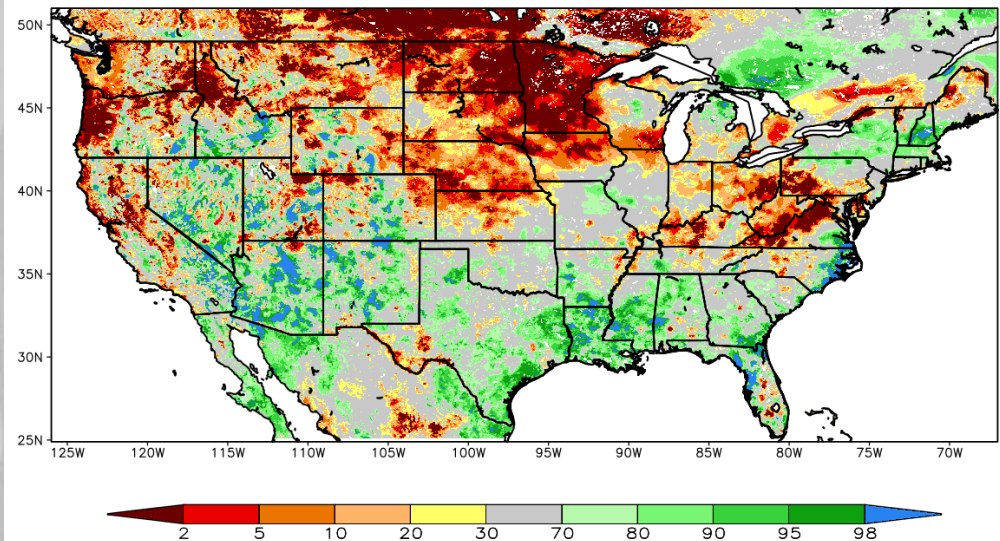


Soil Moisture



- 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

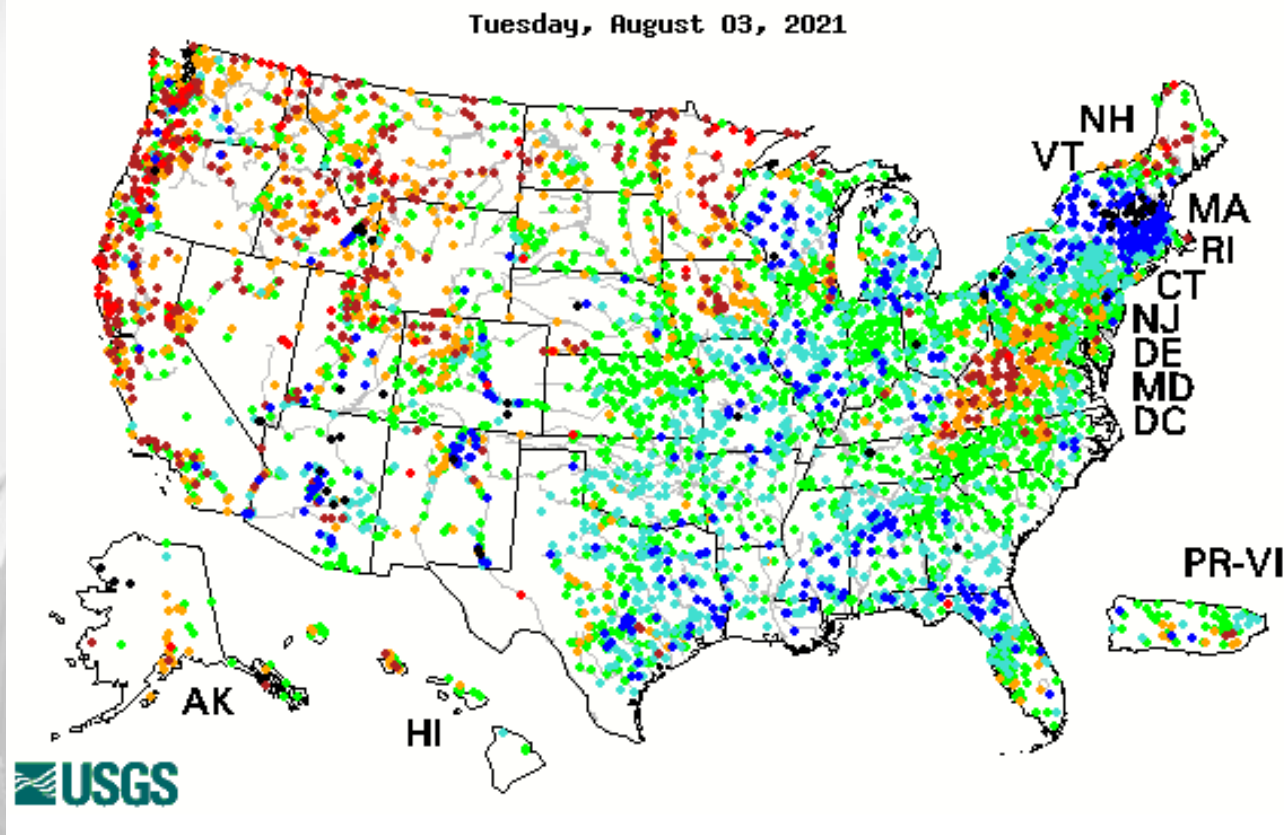


http://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml#
<https://cloud.csiss.gmu.edu/Crop-CASMA/>
https://weather.msfc.nasa.gov/sport/case_studies/lis_CONUS.html

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>

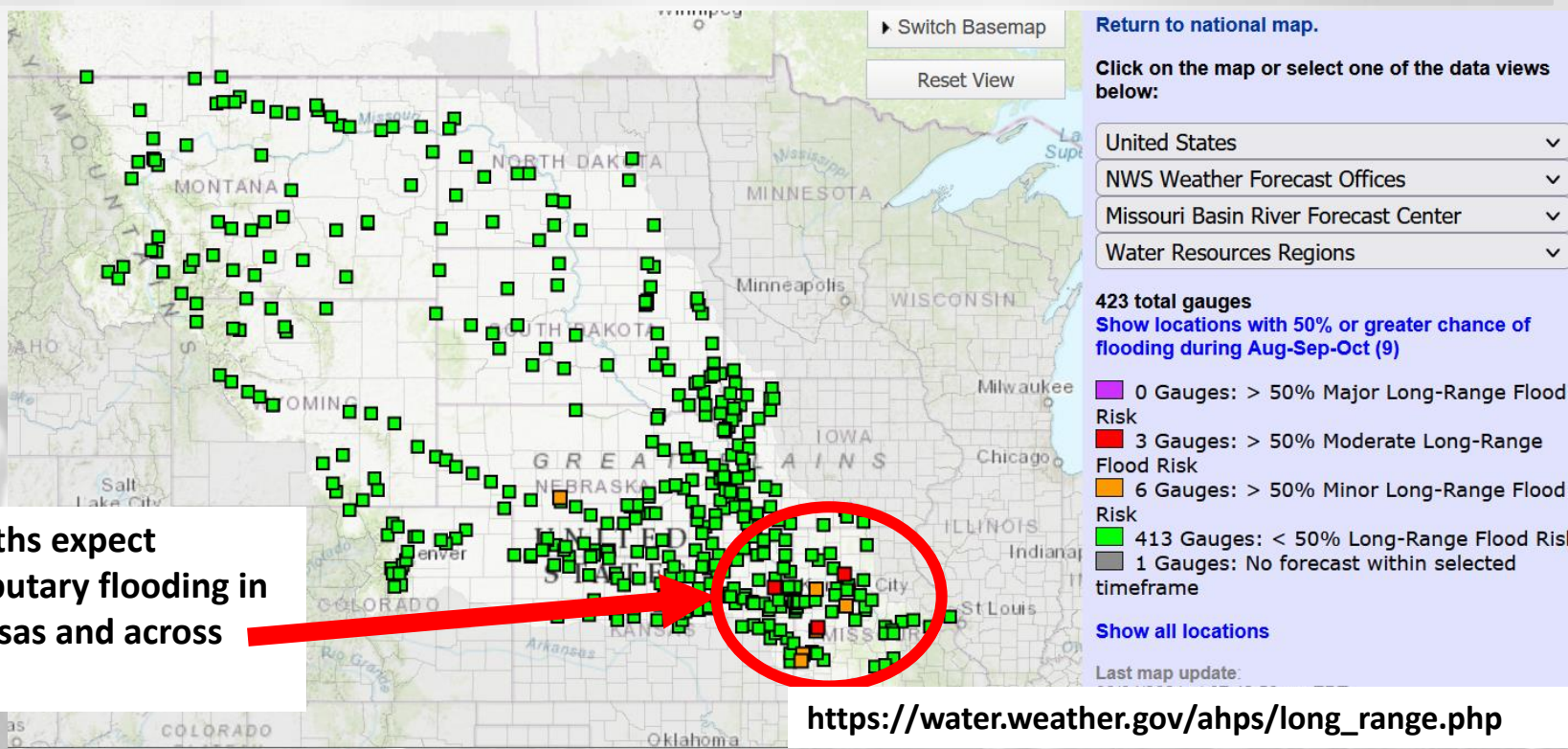
Explanation - Percentile classes						
Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	

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

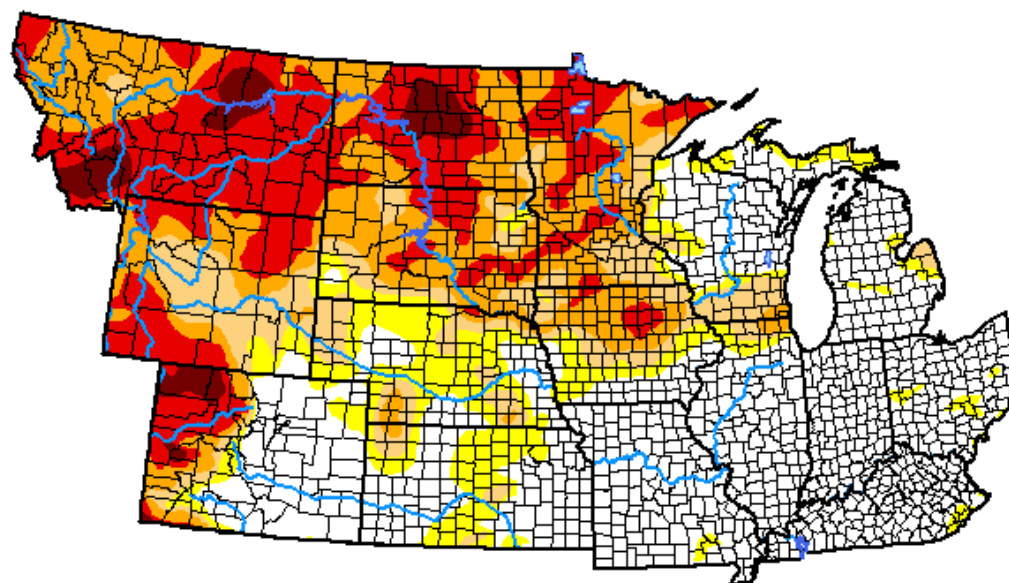
River Flood Outlook

AUGUST-SEPTEMBER-OCTOBER



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
Current	39.82	60.18	49.52	39.09	21.50	2.88
Last Week <i>07-27-2021</i>	40.75	59.25	49.65	36.48	17.49	2.76
3 Months Ago <i>05-04-2021</i>	33.42	66.58	44.03	21.34	11.82	1.48
Start of Calendar Year <i>12-29-2020</i>	30.52	69.48	46.07	24.23	12.18	2.52
Start of Water Year <i>09-29-2020</i>	29.60	70.40	37.34	17.96	7.13	0.24
One Year Ago <i>08-04-2020</i>	51.06	48.94	23.79	9.90	3.16	0.00

Intensity:

None	D2 Severe Drought
D0 Abnormally Dry	D3 Extreme Drought
D1 Moderate Drought	D4 Exceptional Drought

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



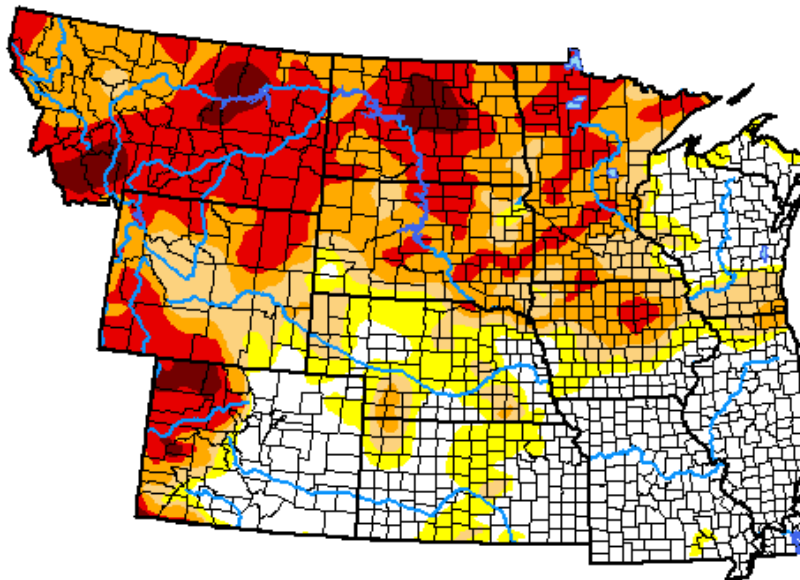
droughtmonitor.unl.edu

U.S. Drought Monitor NWS Central

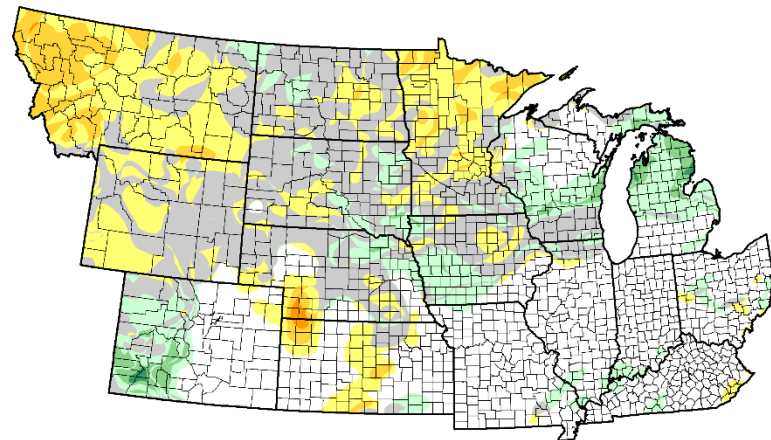
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U.S. Drought Monitor Class Change - NWS Central
4 Week



August 3, 2021
compared to
July 6, 2021

droughtmonitor.unl.edu



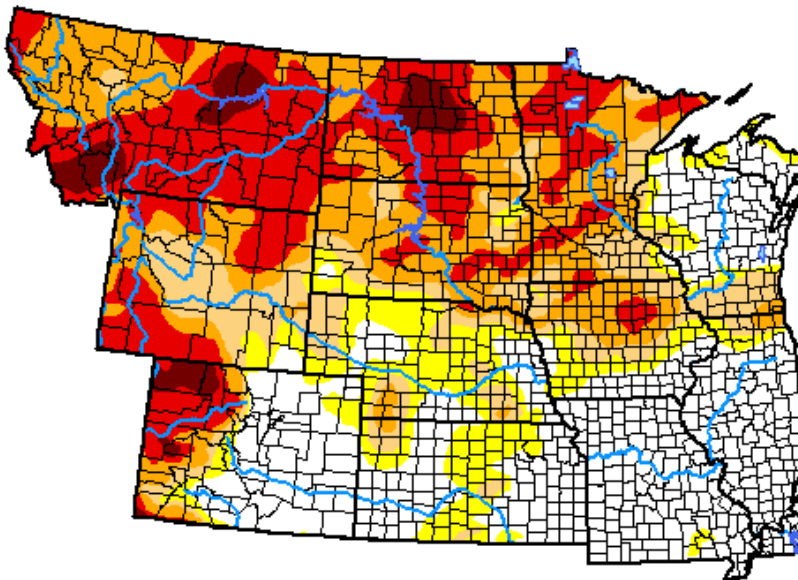
- 5 Class Degradation
- 4 Class Degradation
- 3 Class Degradation
- 2 Class Degradation
- 1 Class Degradation
- No Change
- 1 Class Improvement
- 2 Class Improvement
- 3 Class Improvement
- 4 Class Improvement
- 5 Class Improvement

U.S. Drought Monitor NWS Central

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

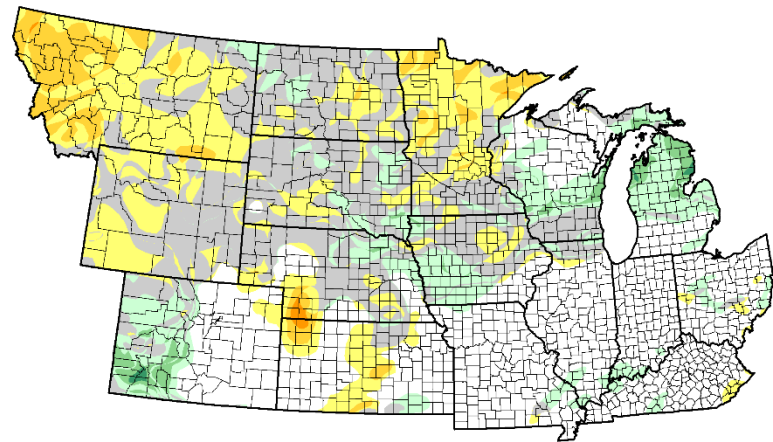
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Largest regional coverage since
spring 2013 (end of 2012 drought)

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



August 3, 2021
compared to
July 6, 2021

droughtmonitor.unl.edu



- 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

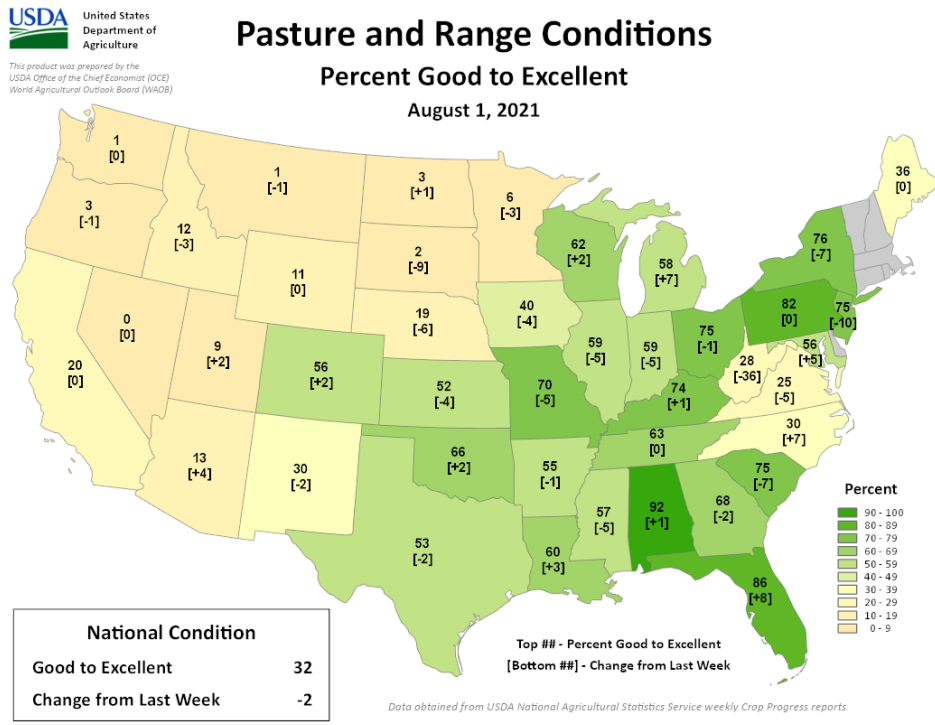
Leoti (fallow)



AGRICULTURE

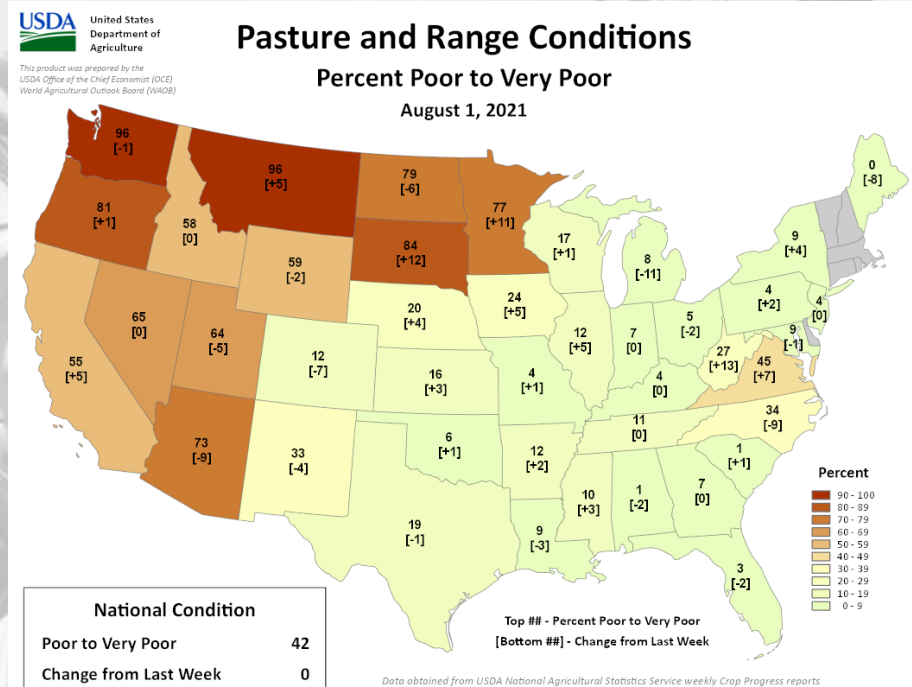
Photo:
Romulo Lollato – KSU

Pasture/Range Conditions (NASS)

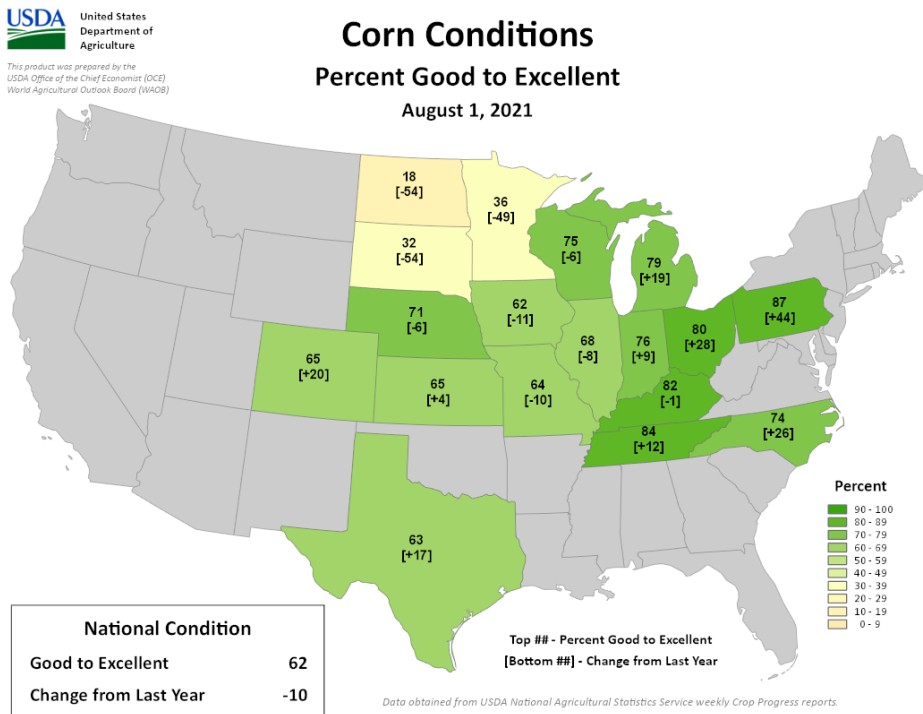


Pasture and range conditions worsened slightly again nationally. Several central US states worsening. Similar general pattern.

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

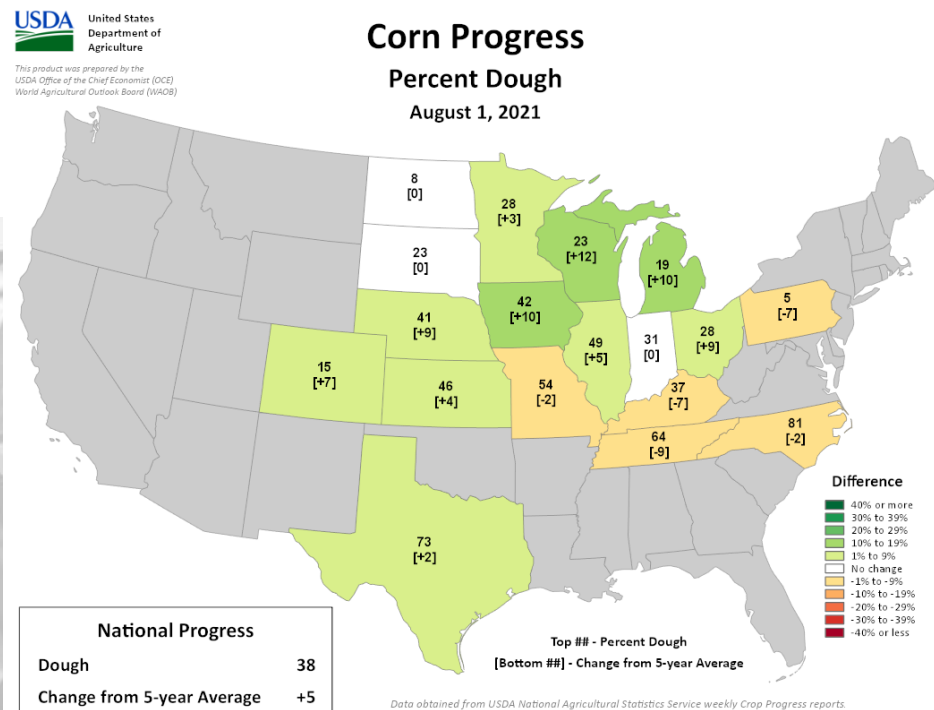


Corn Conditions (NASS)

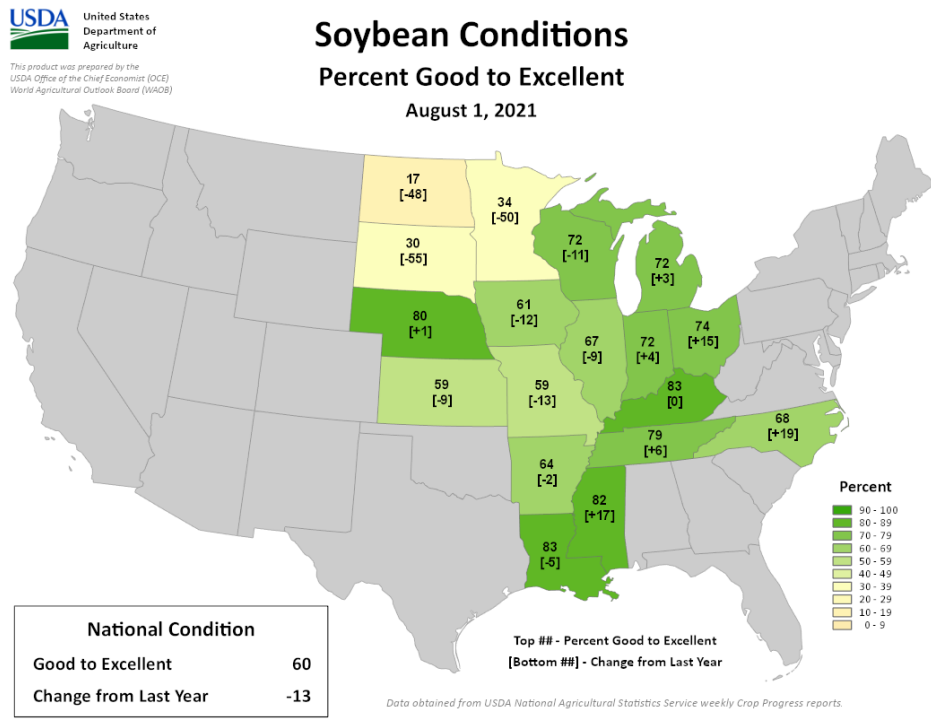


Crop conditions (corn) continues poor north/west. Progress ahead of average - dough in early stages nationally.

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

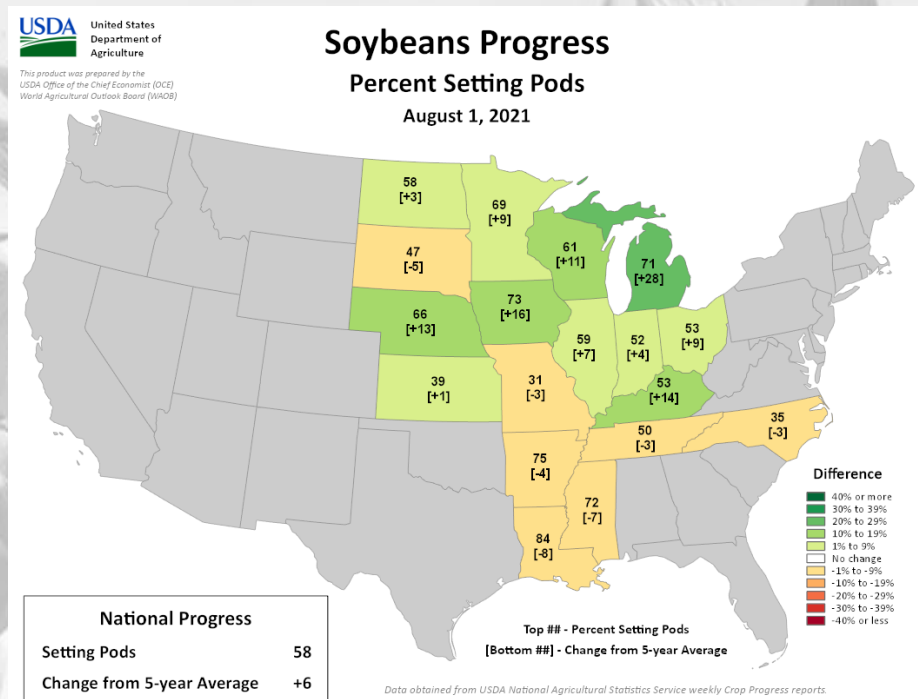


Soybean Conditions (NASS)



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

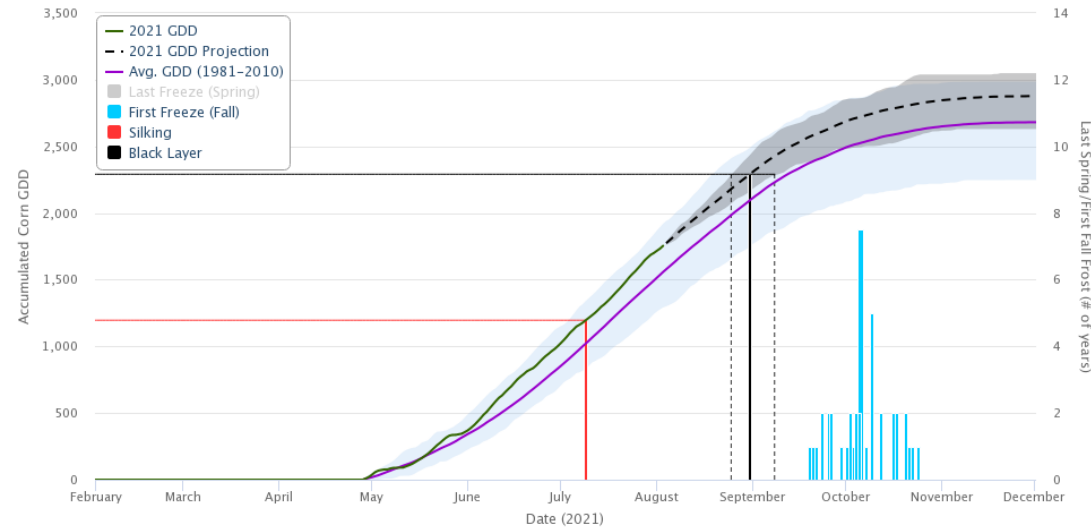
Soybean condition (NASS): Good-excellent - National 60% (-13%). Setting pods - National 58% (+6%).



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

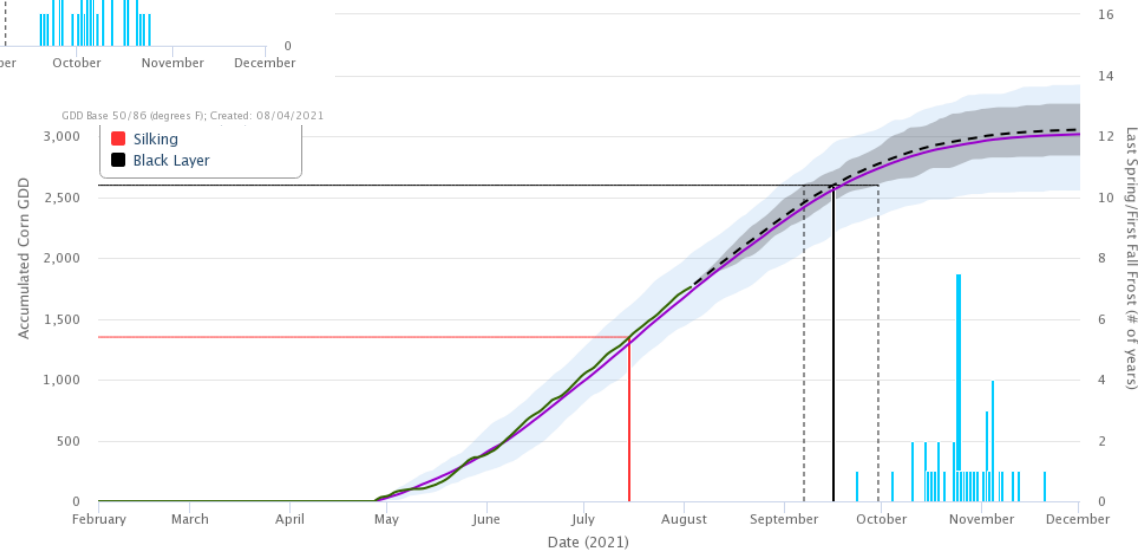
Corn Growing Degree Day Tool

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



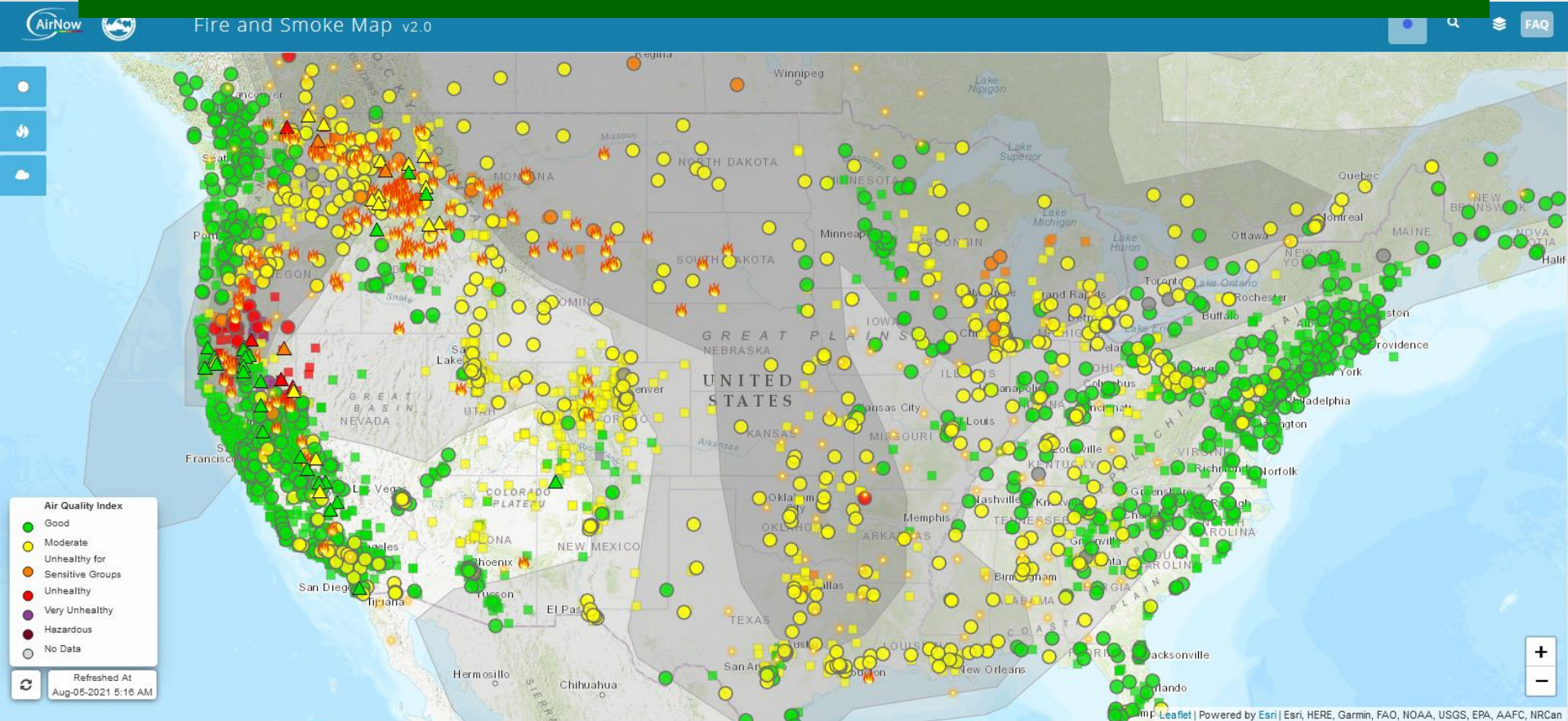
<https://hprcc.unl.edu/agroclimate/gdd/>
<https://mrcc.illinois.edu/U2U/gdd/>

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)

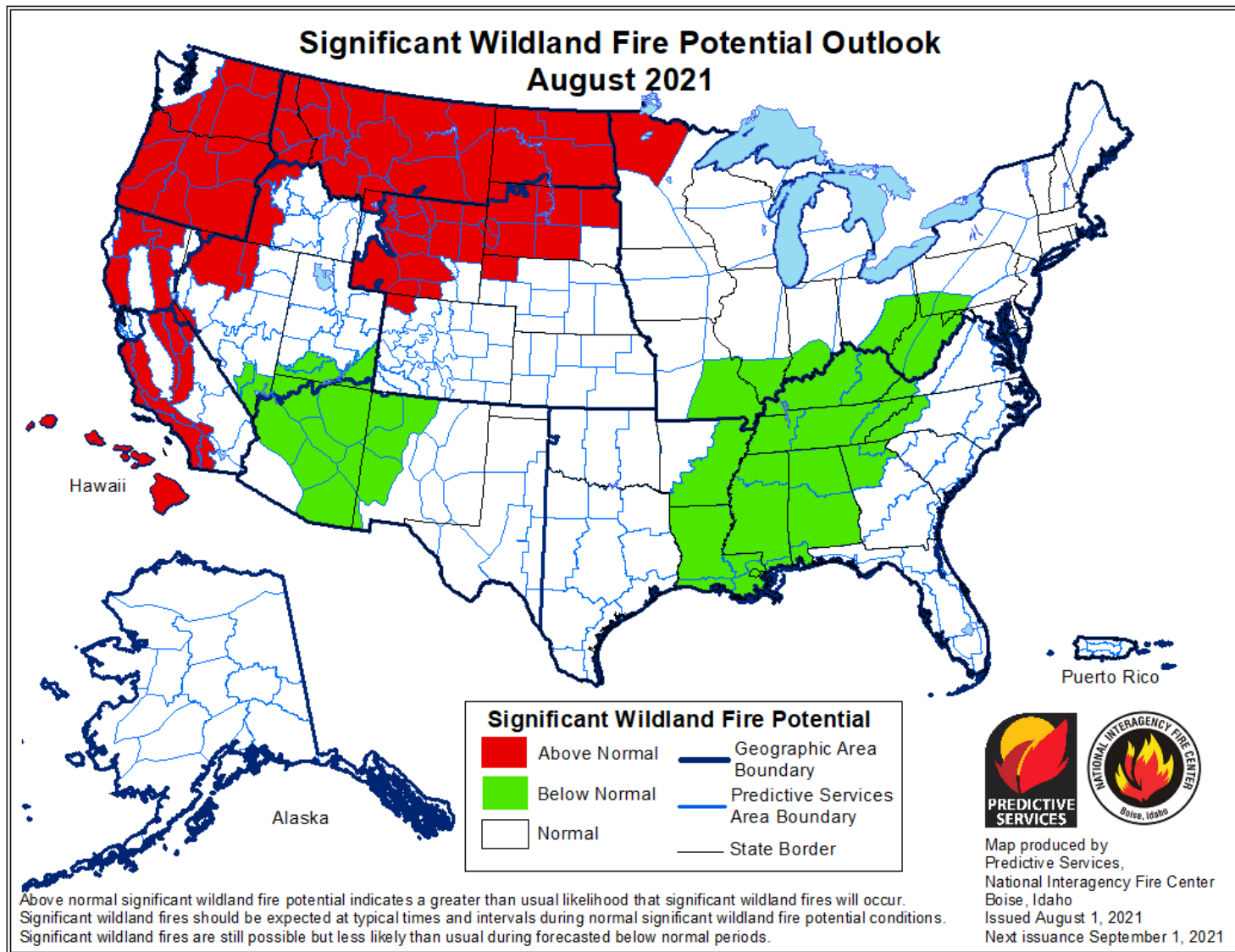


SMOKE

- 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)

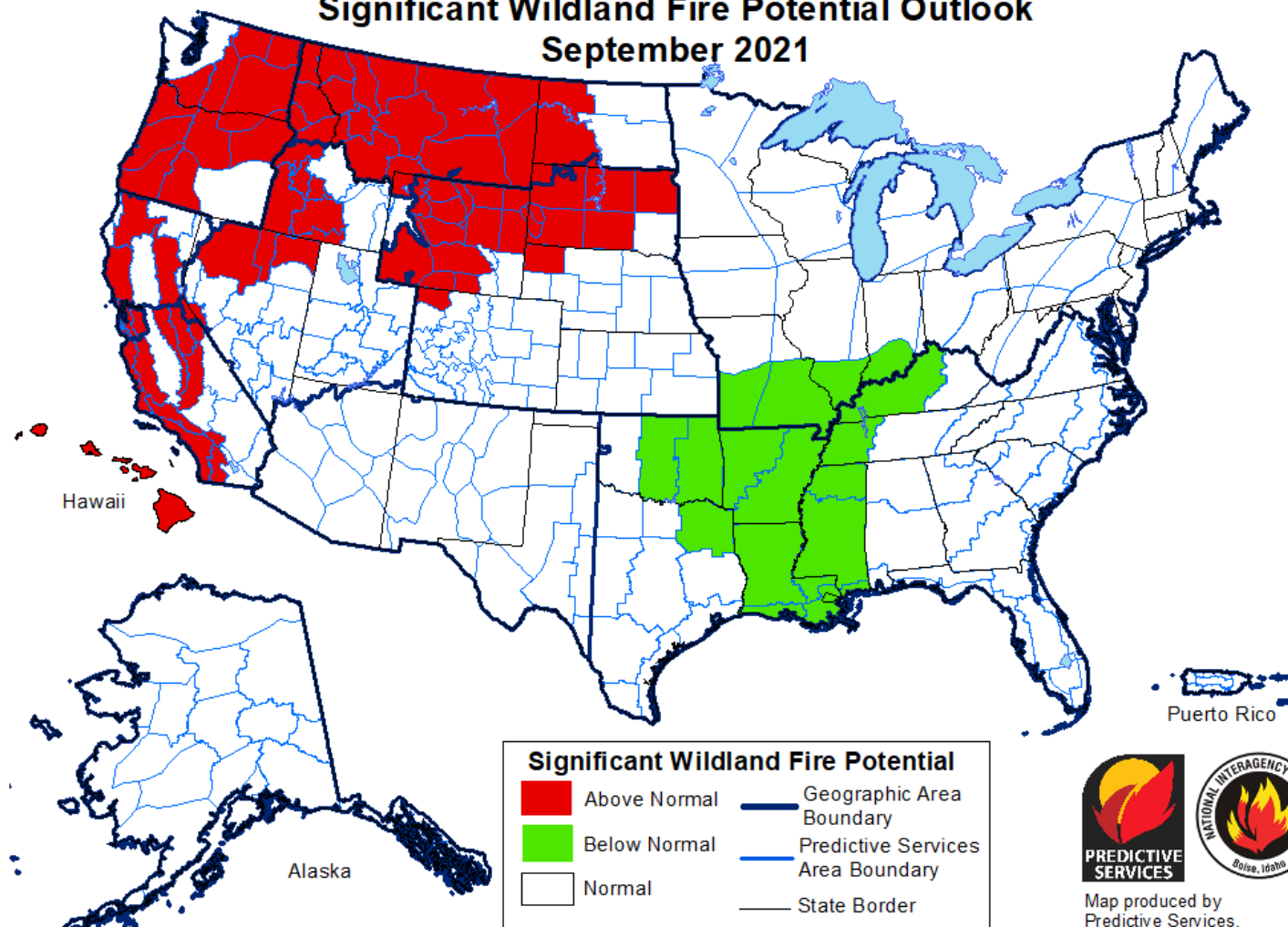


WILDFIRE POTENTIAL



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

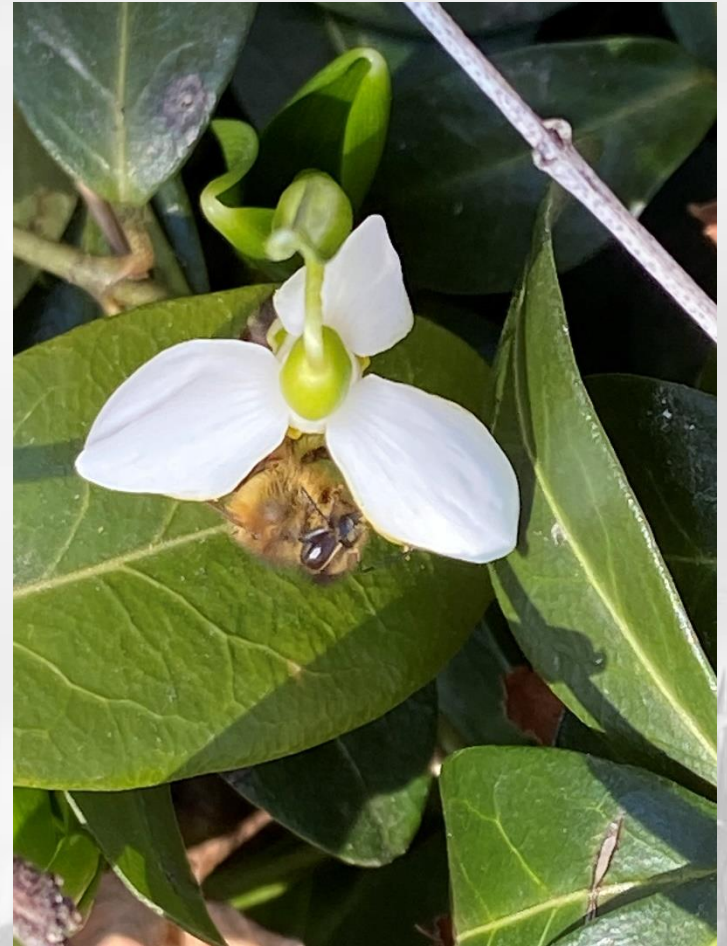


Photo: Ray Wolf
NWS Quad Cities

Climate Outlooks

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



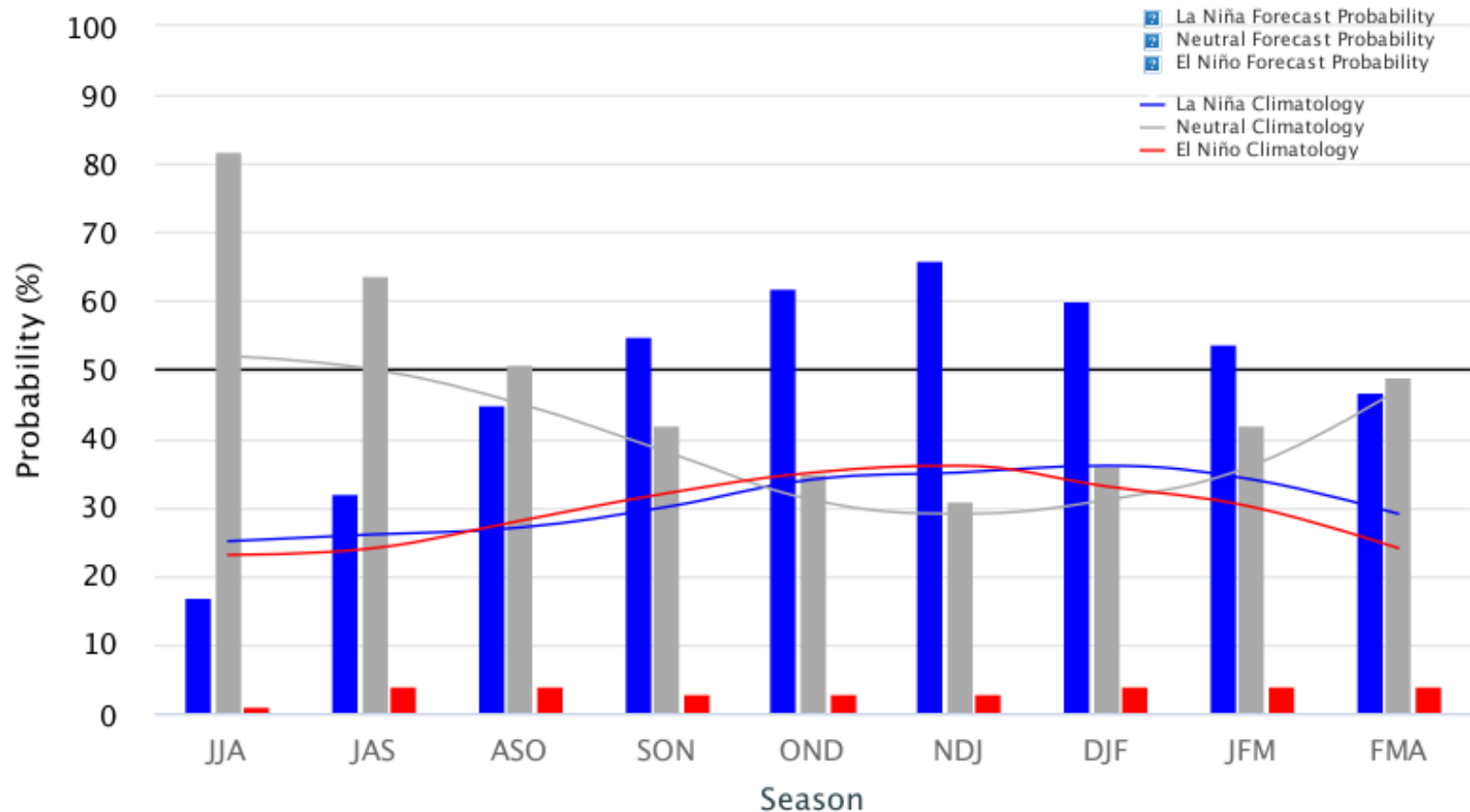
Photo:
Natalie Umphlett – UNL HPRCC
Lincoln, NE

ENSO Outlook Status

Early-July 2021 CPC/IRI Official Probabilistic ENSO Forecasts

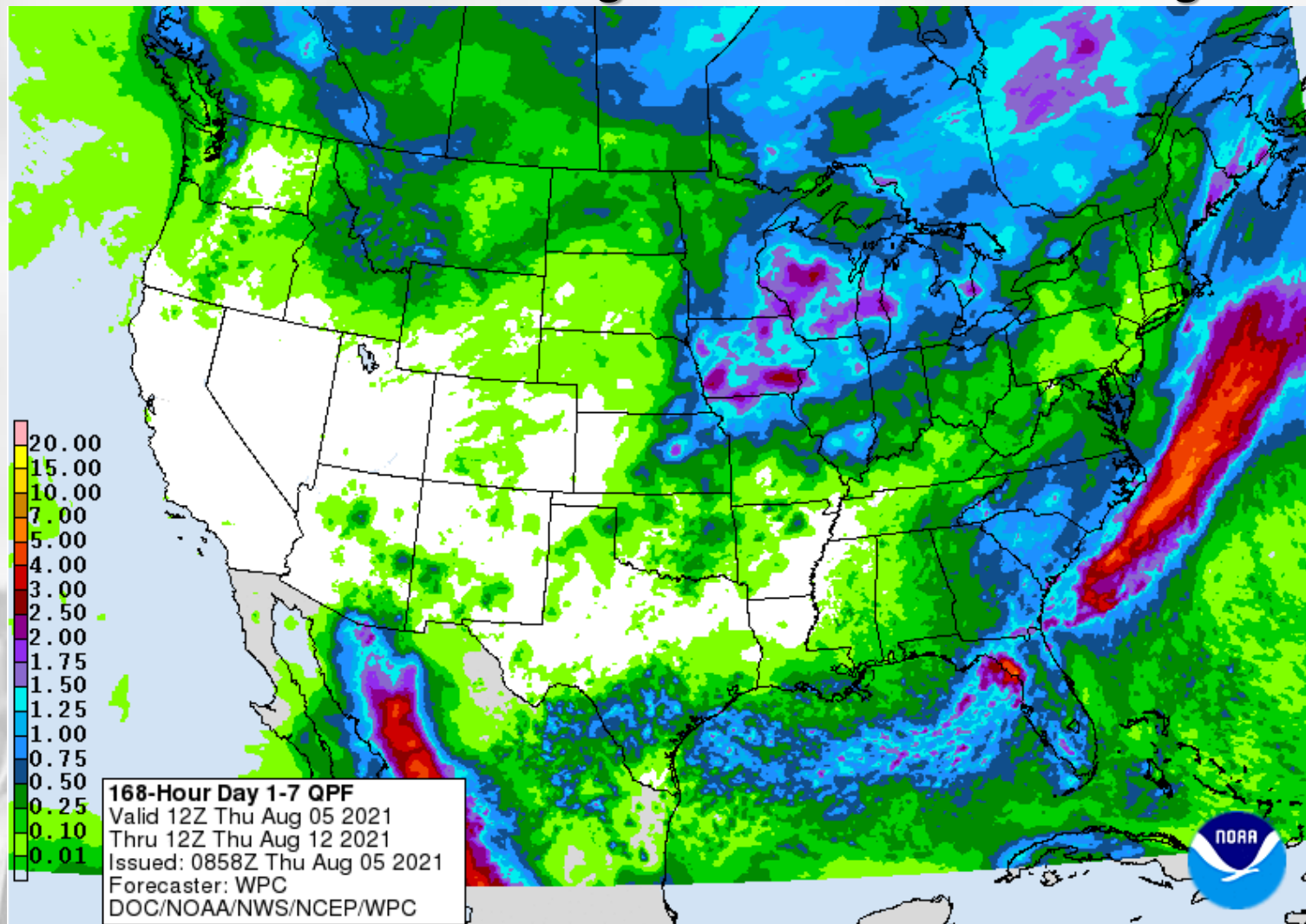
ENSO state based on NINO3.4 SST Anomaly

Neutral ENSO: -0.5°C to 0.5°C



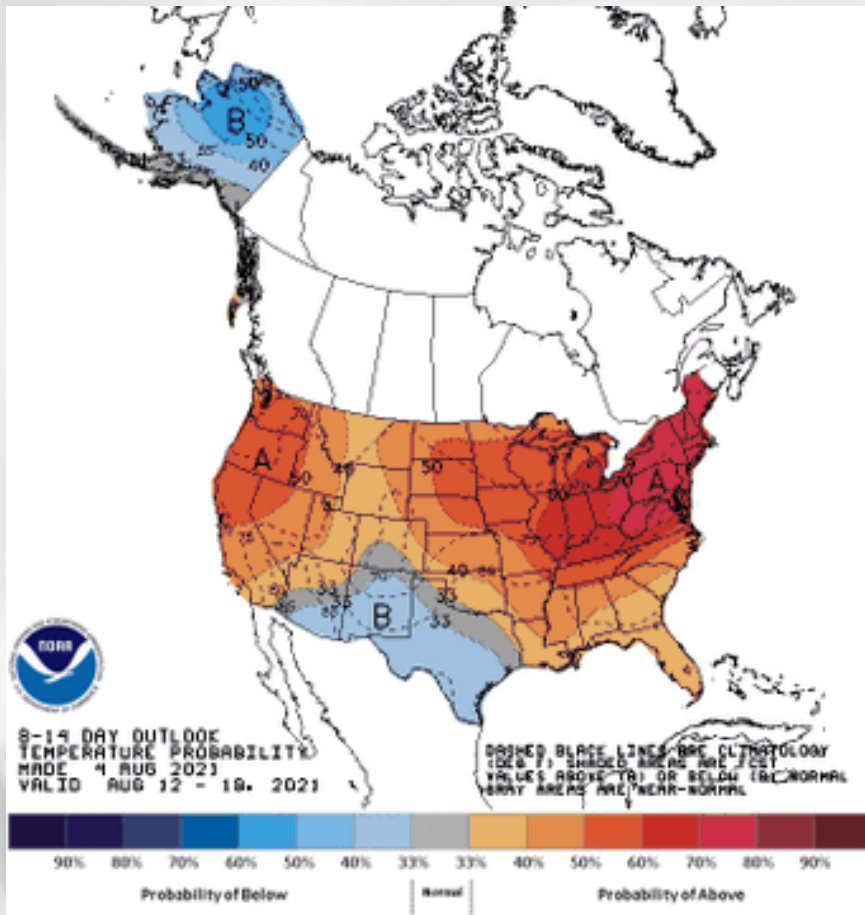
7-day Quantitative Precipitation Forecast

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

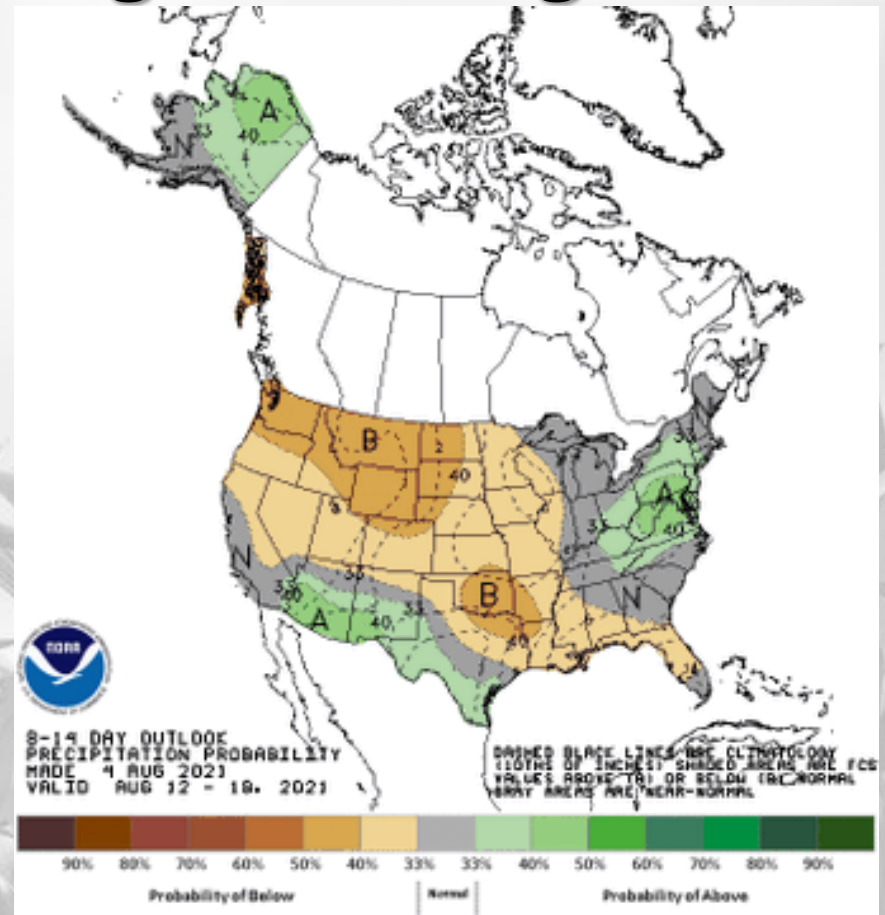


<http://www.wpc.ncep.noaa.gov/qpf/day1-7.shtml>

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



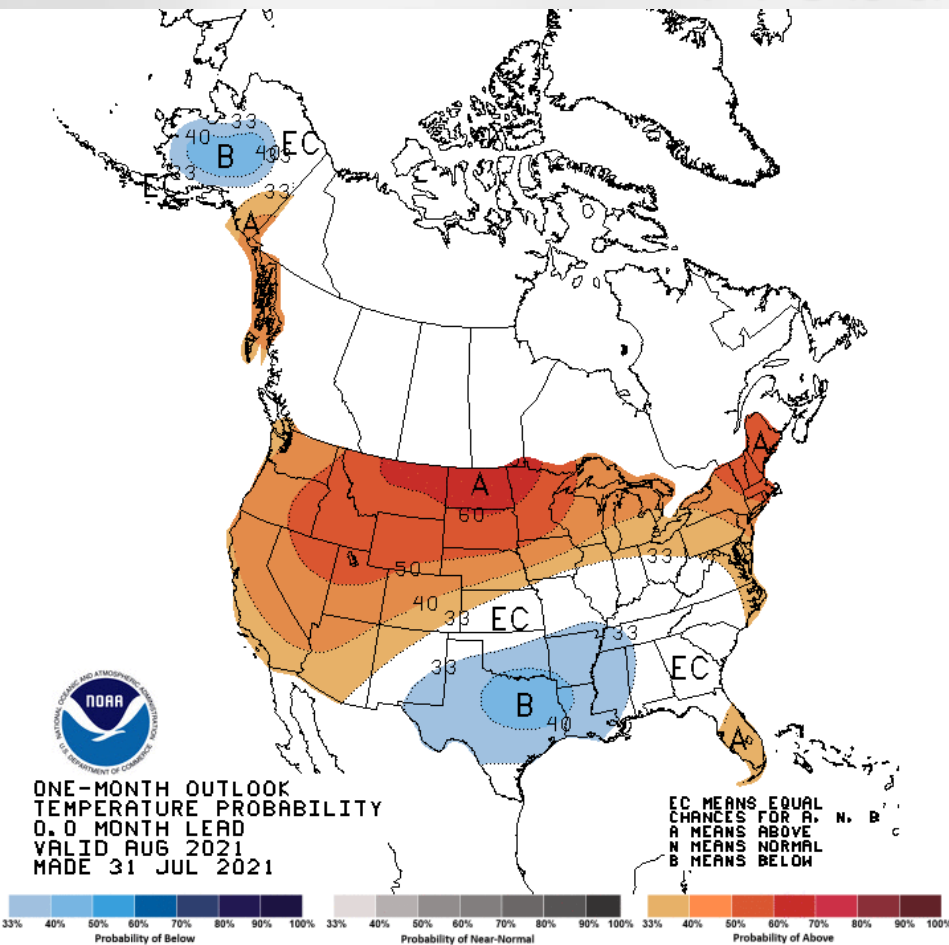
Temperature



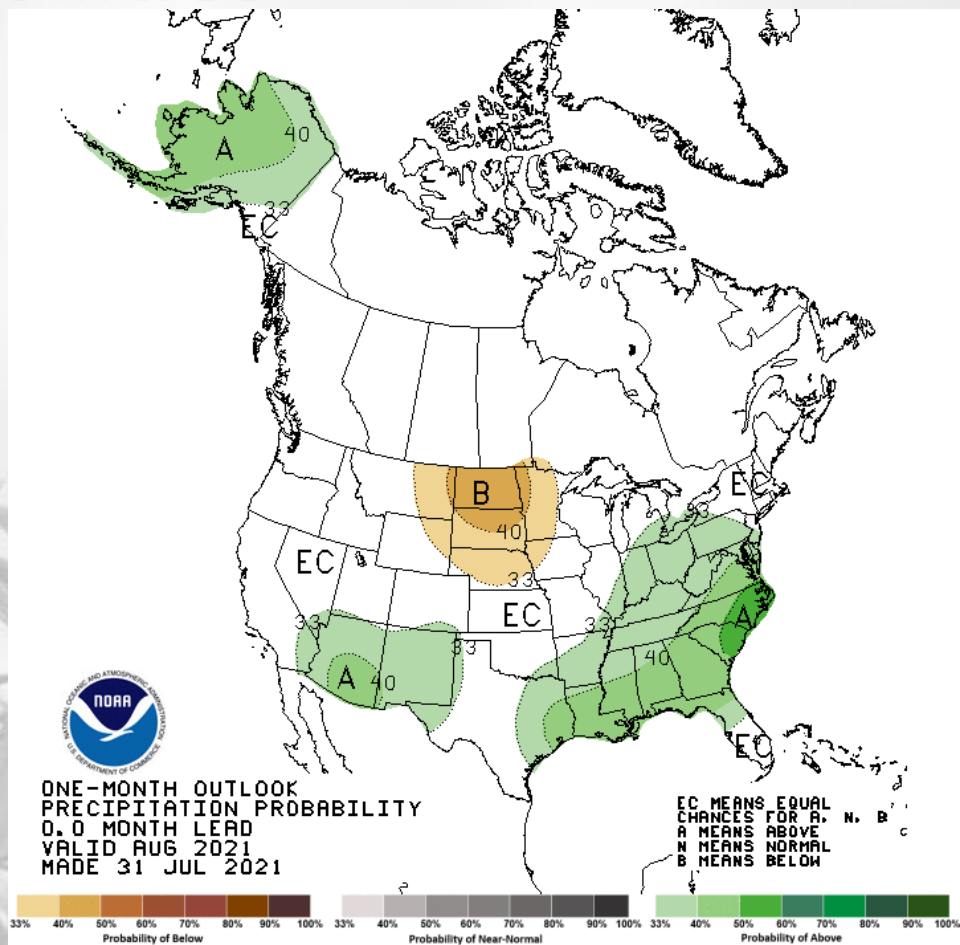
Precipitation

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

August Temperature and Precipitation Probabilities



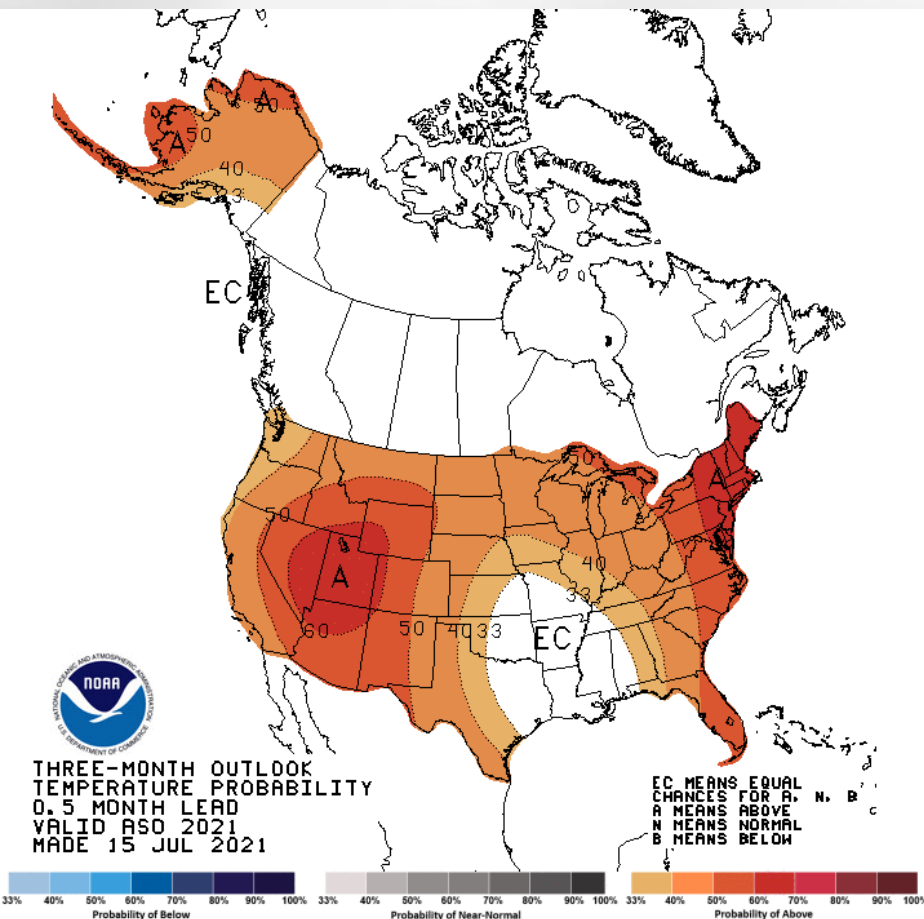
Temperature



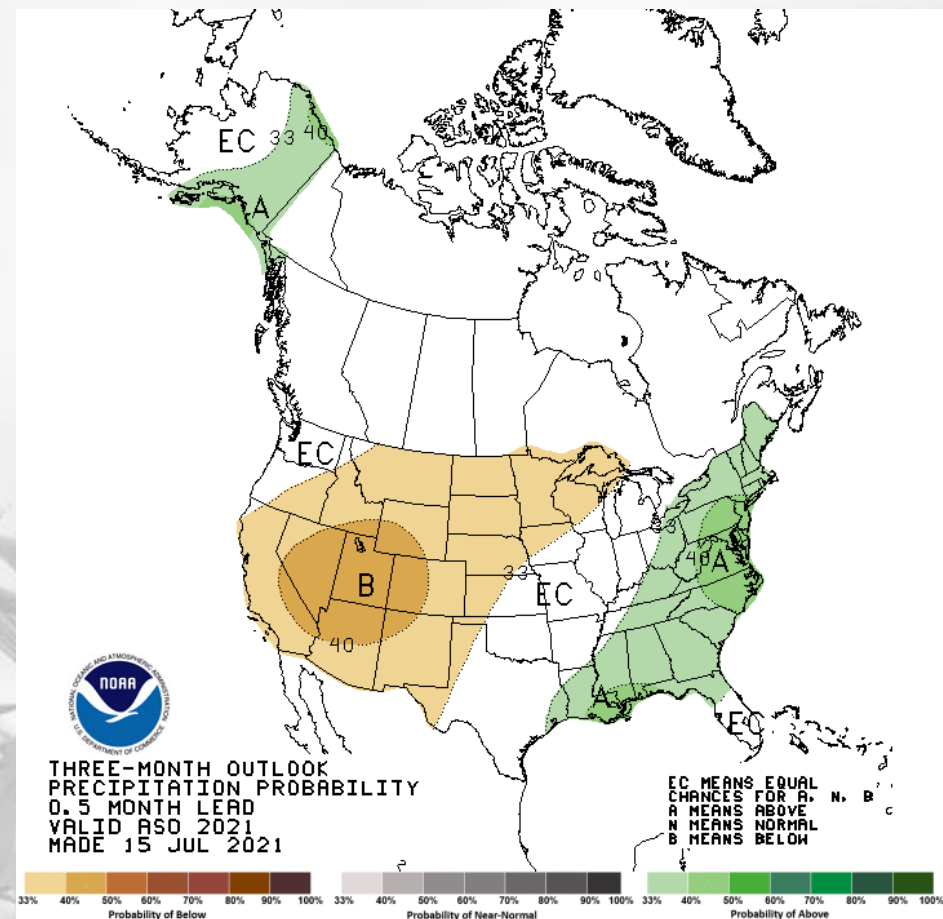
Precipitation

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

August-October Temperature and Precipitation Probabilities



Temperature



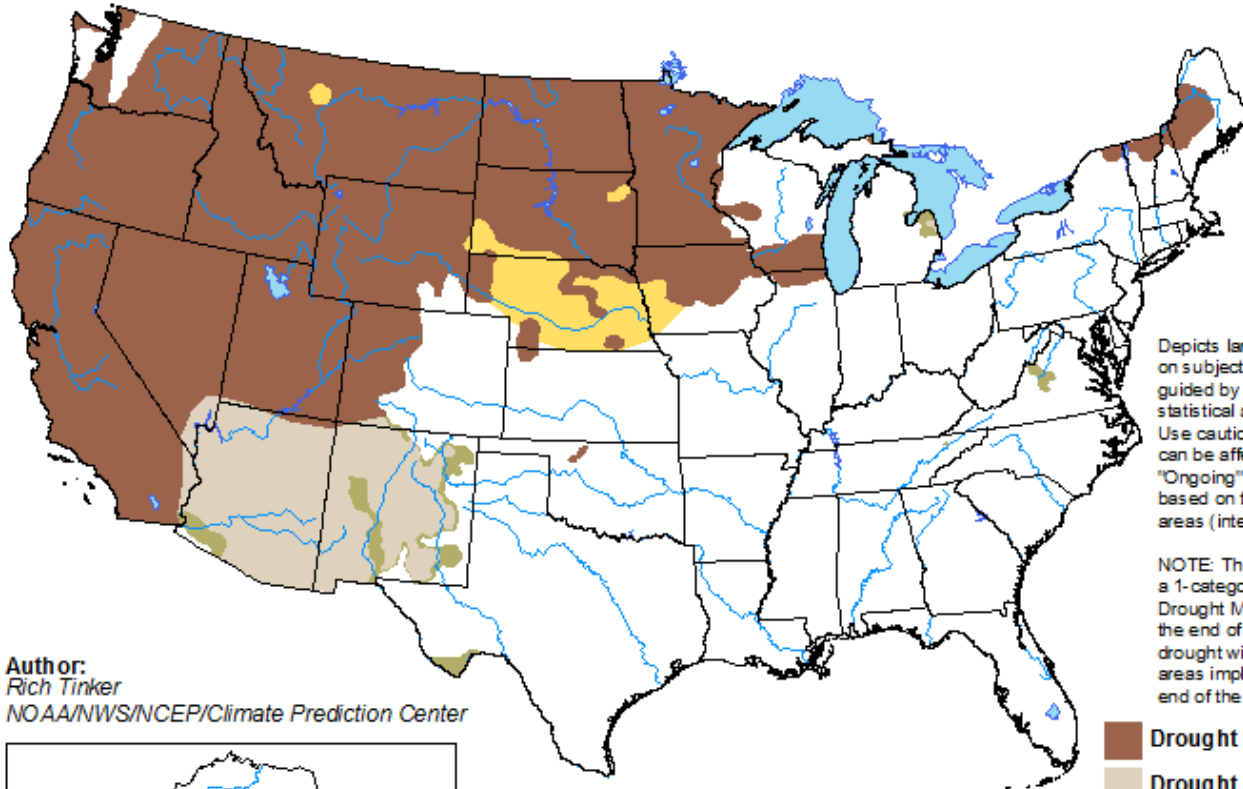
Precipitation

http://www.cpc.ncep.noaa.gov/products/predictions/long_range/seasonal.php?lead=2

Drought Outlook through 31 August

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

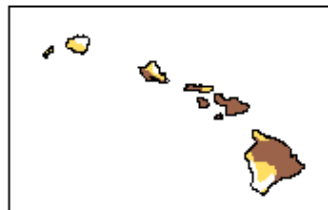
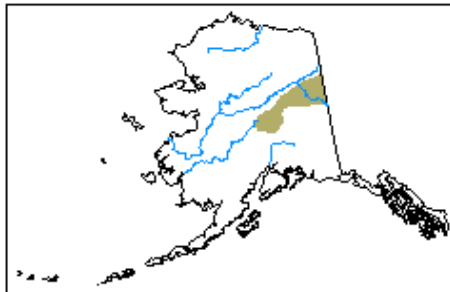
*Valid for August 2021
Released July 31, 2021*



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

Thank You and Questions?

- Questions:
 - **Climate:**
 - Dennis Todey: dennis.todey@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
 - Molly Woloszyn molly.woloszyn@noaa.gov, 217 244-7612
 - **Weather:**
 - crhroc@noaa.gov

For More Information



@dennistodey

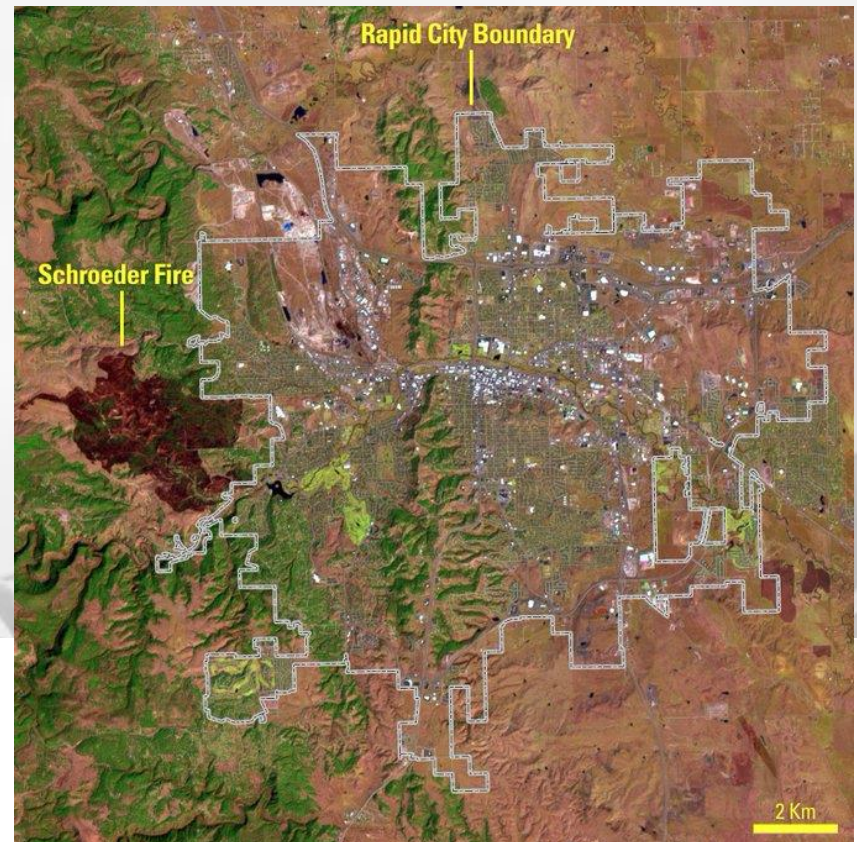


<https://www.climatehubs.usda.gov/hubs/midwest>

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515-294-2013

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

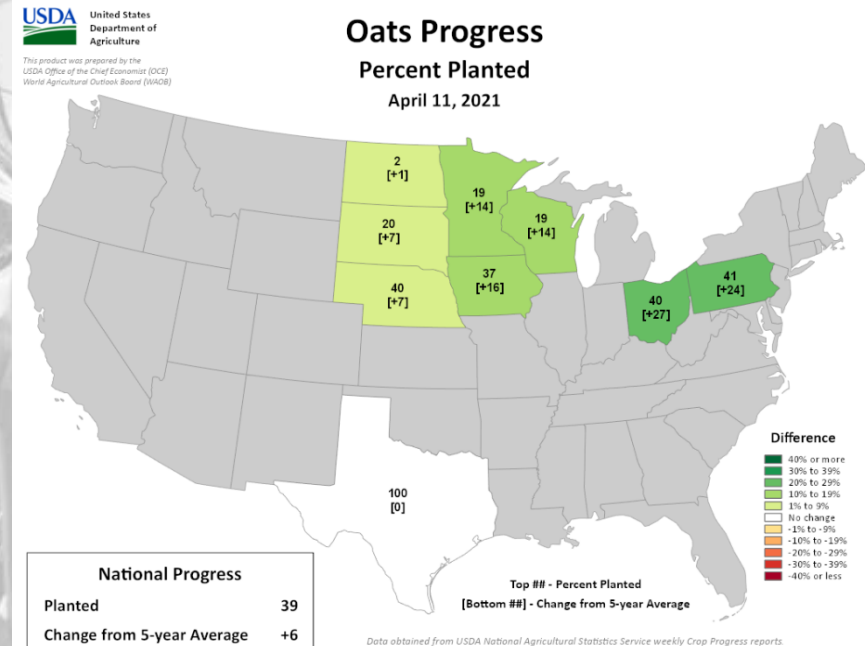
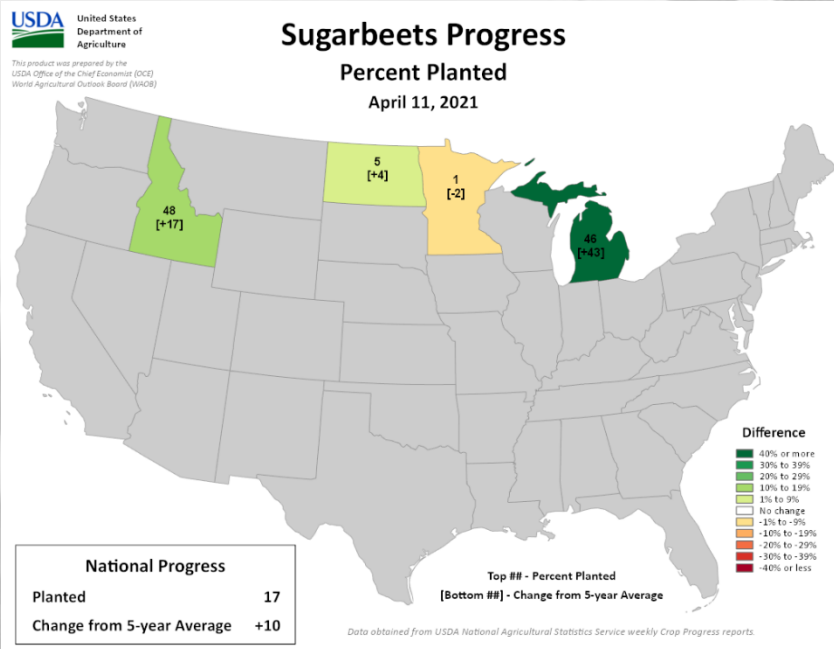
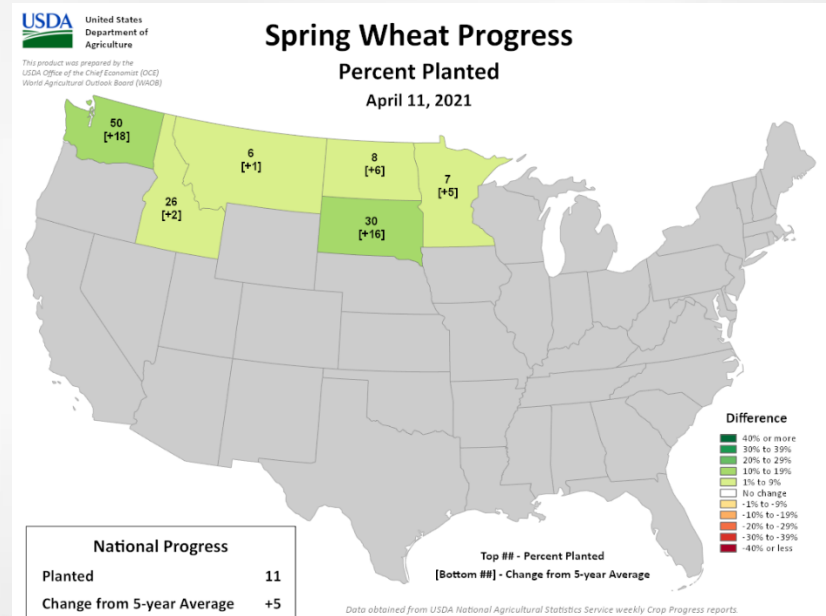
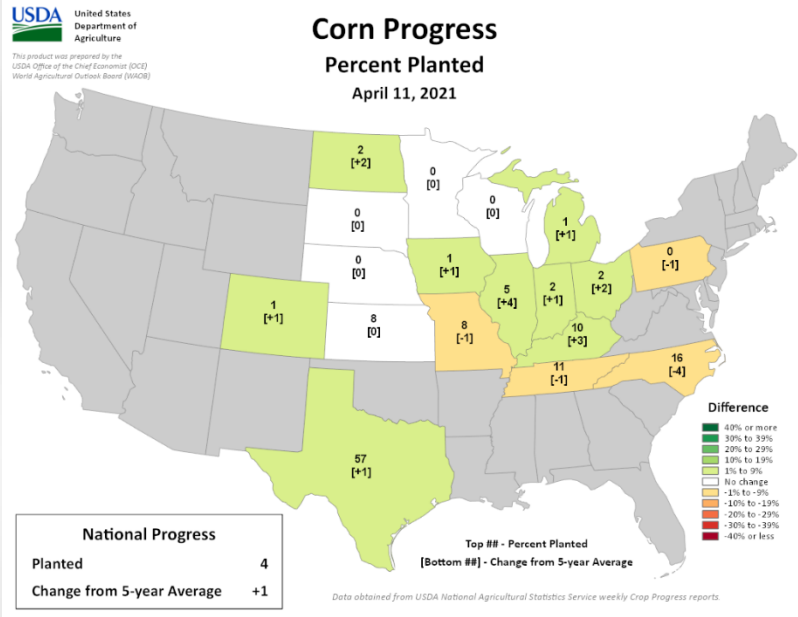
March Precip Details

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



Photo: Ray Wolf
NWS Quad Cities

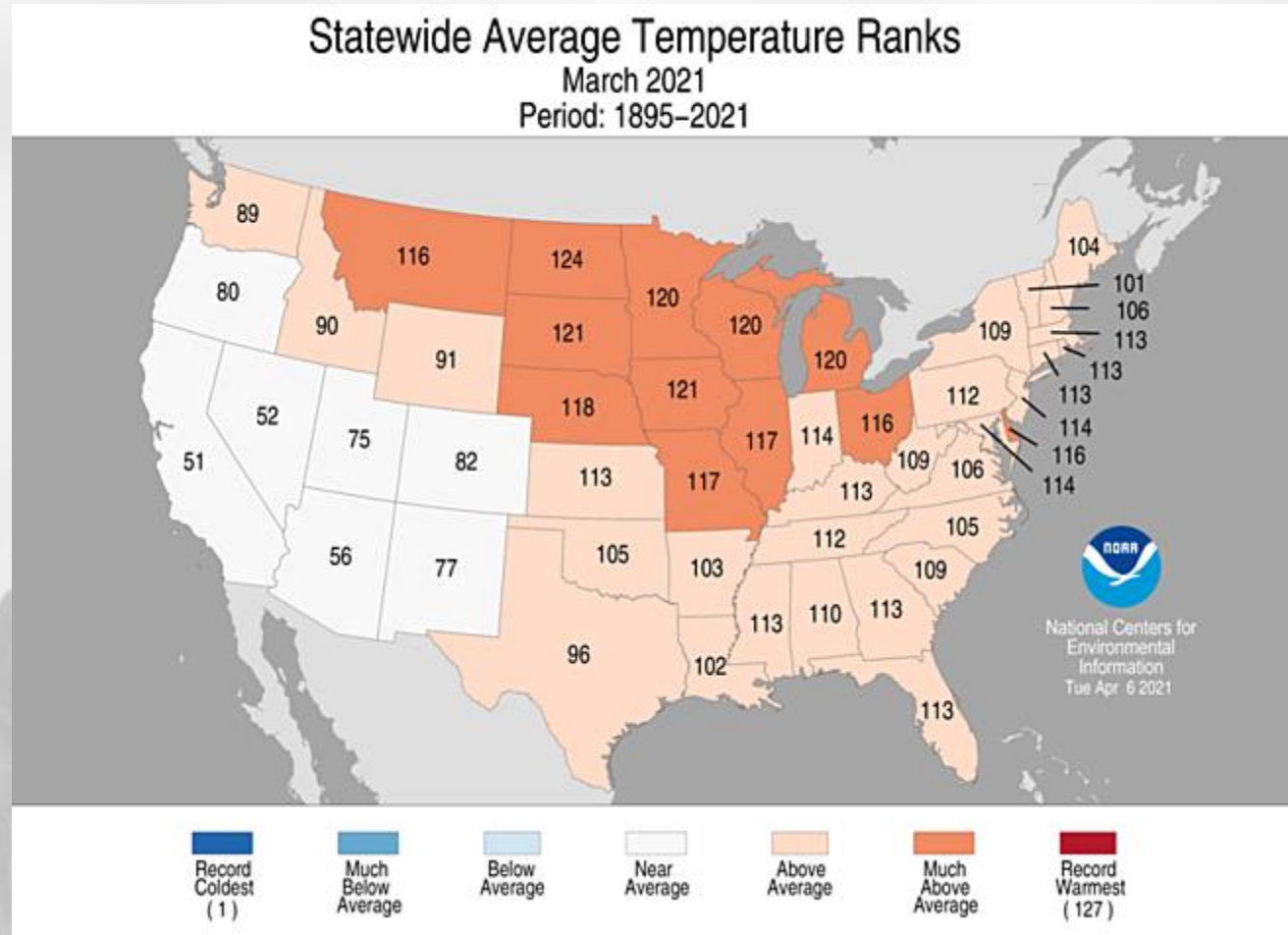
USDA NASS Crop Progress



March Temperature Recap

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

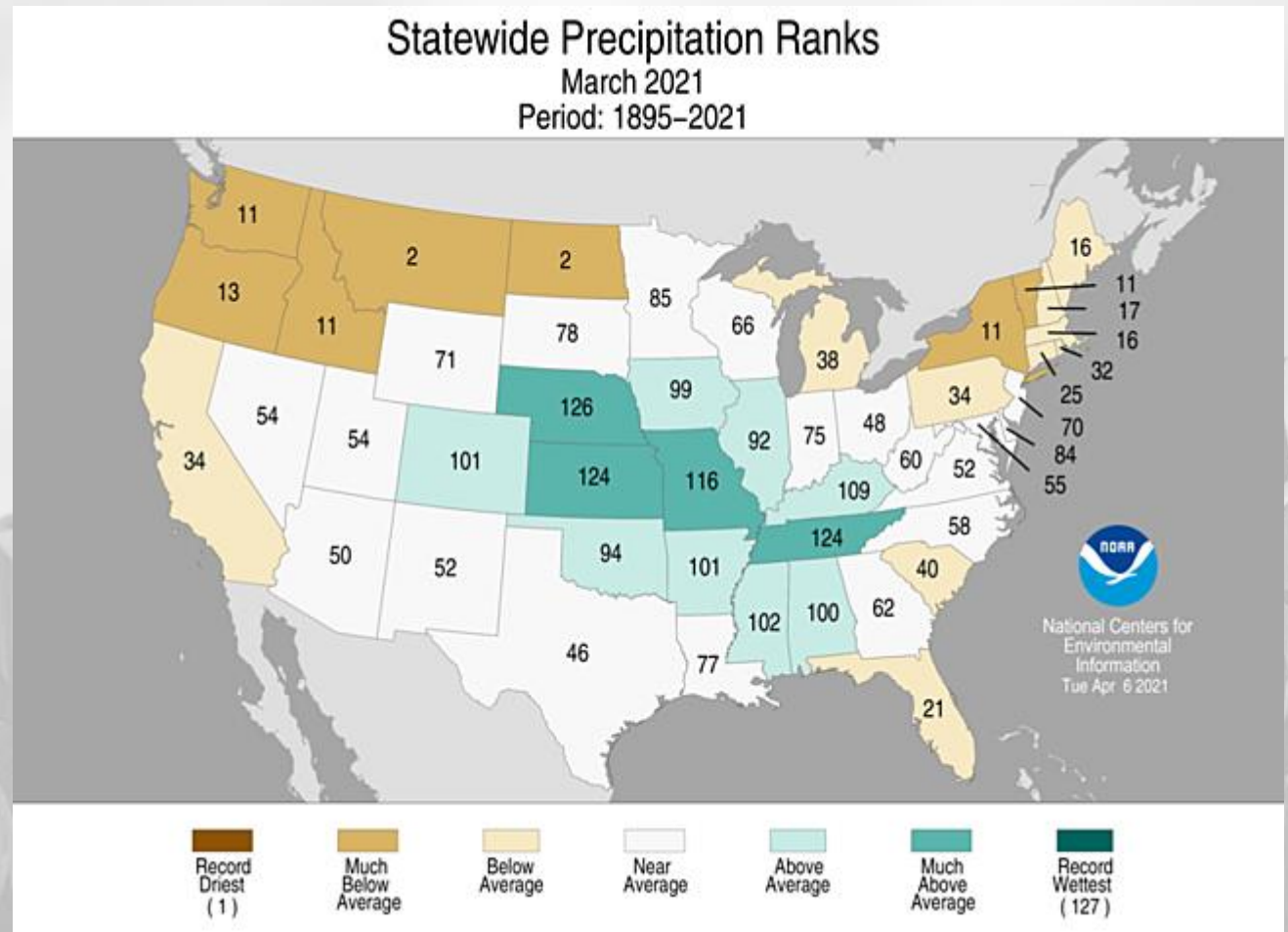
Top 10 warmest in most states in the region.



March Precipitation Recap

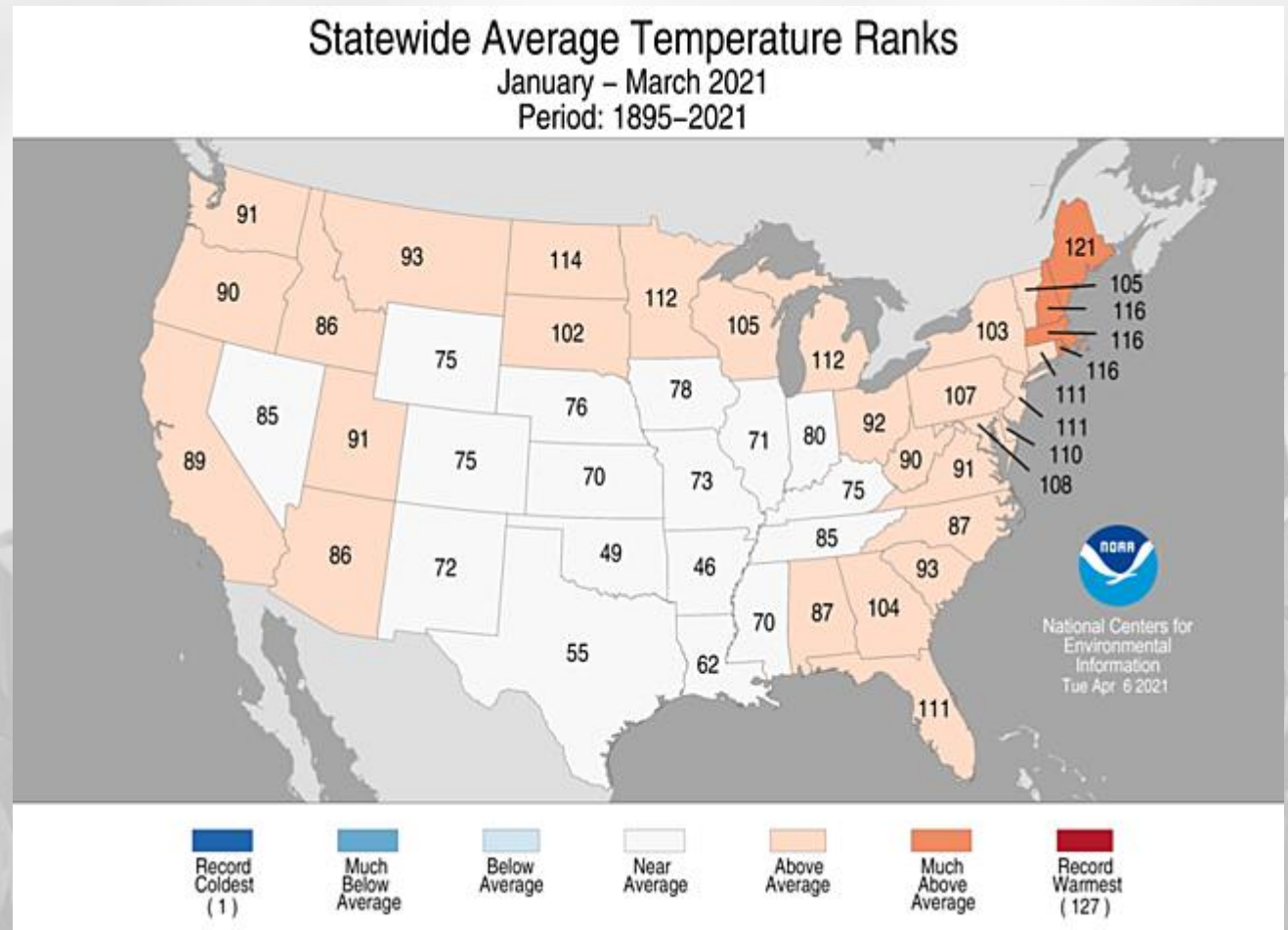
Strong contrast across the region in precipitation. Wet to the south and dry to the north.

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



January-March Temperature Recap

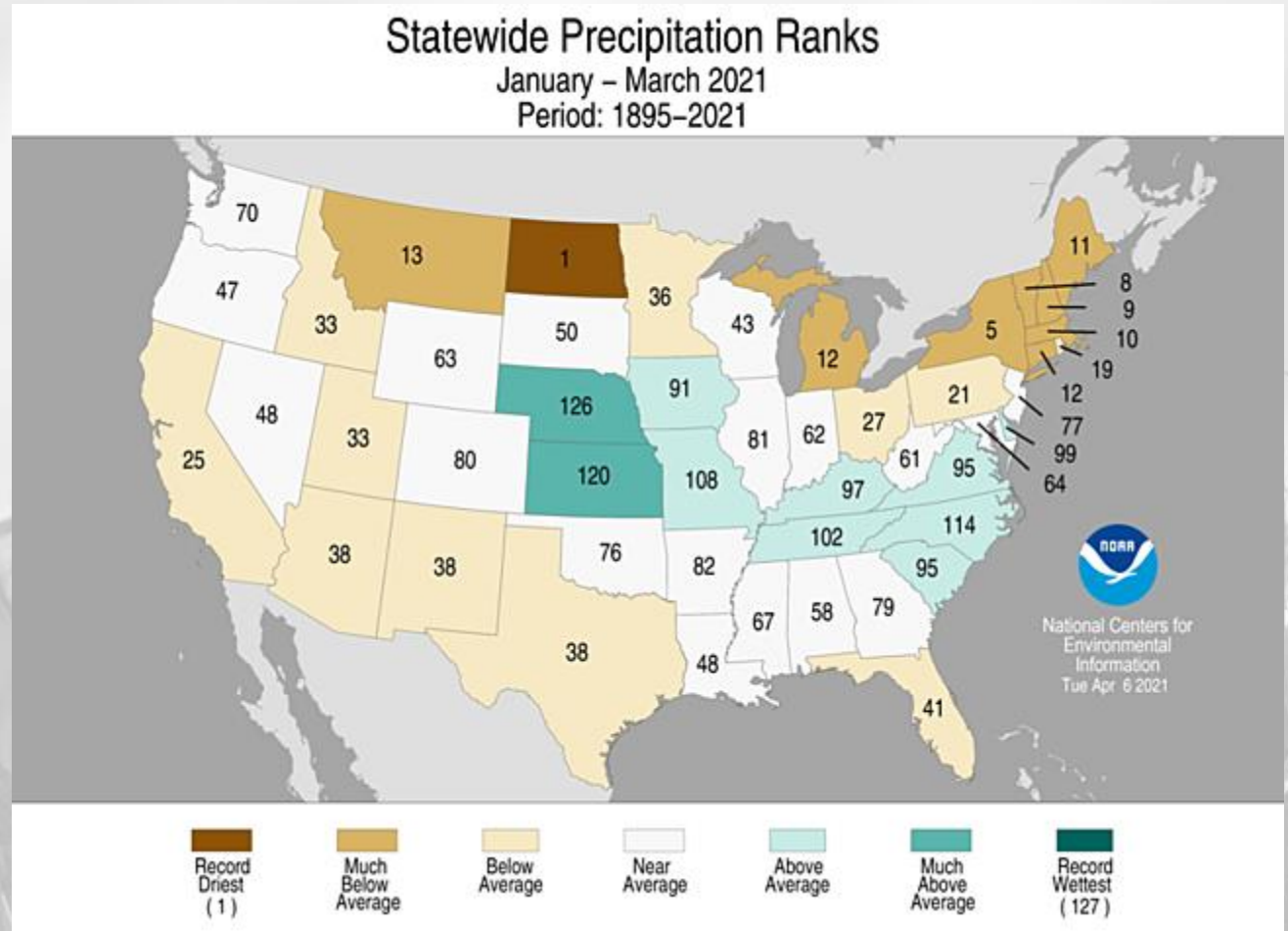
Cold February had a large impact across the south, while northern areas stayed relatively warm.



January-March Precipitation Recap

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

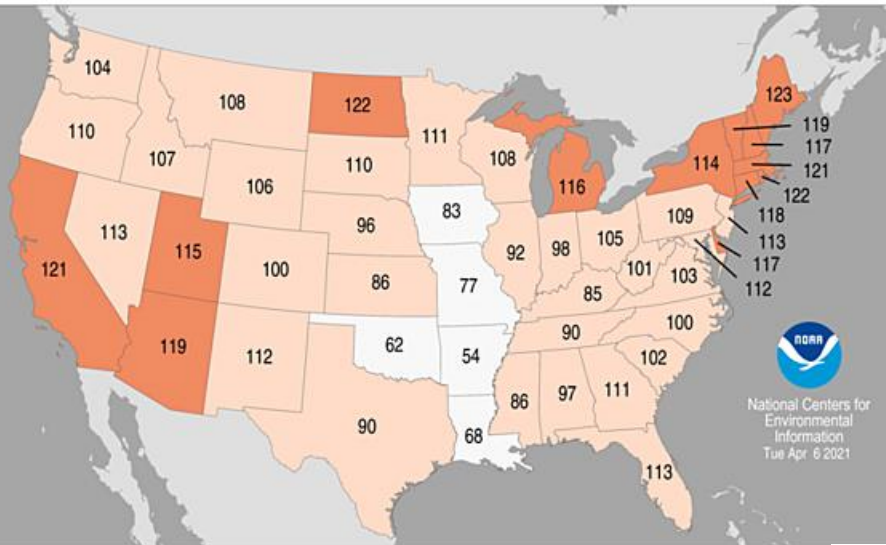
Second wettest on record for Nebraska, driest on record for North Dakota.



Statewide Maximum Temperature Ranks

October 2020 – March 2021

Period: 1895–2021

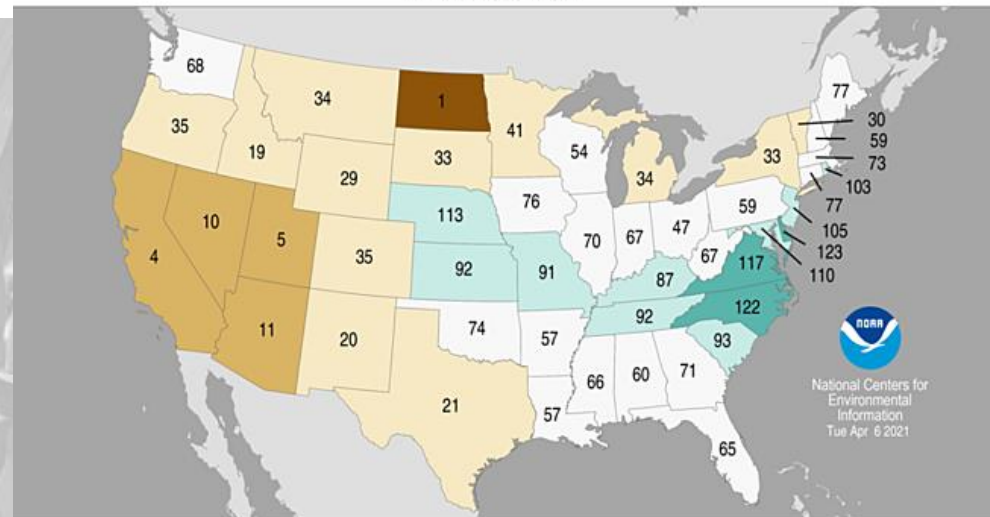


October–March

Statewide Precipitation Ranks

October 2020 – March 2021

Period: 1895–2021



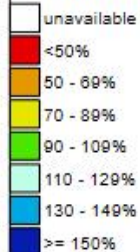
Generally warmer than average and dry across the north and west again.

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

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



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>

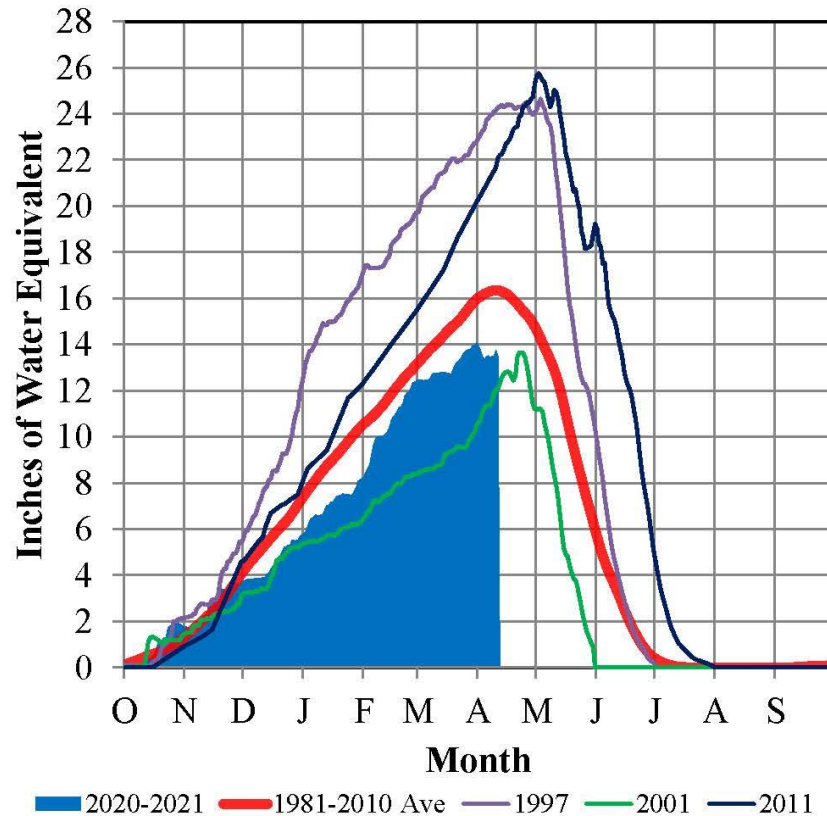
NRCS Snow Water Equivalent

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

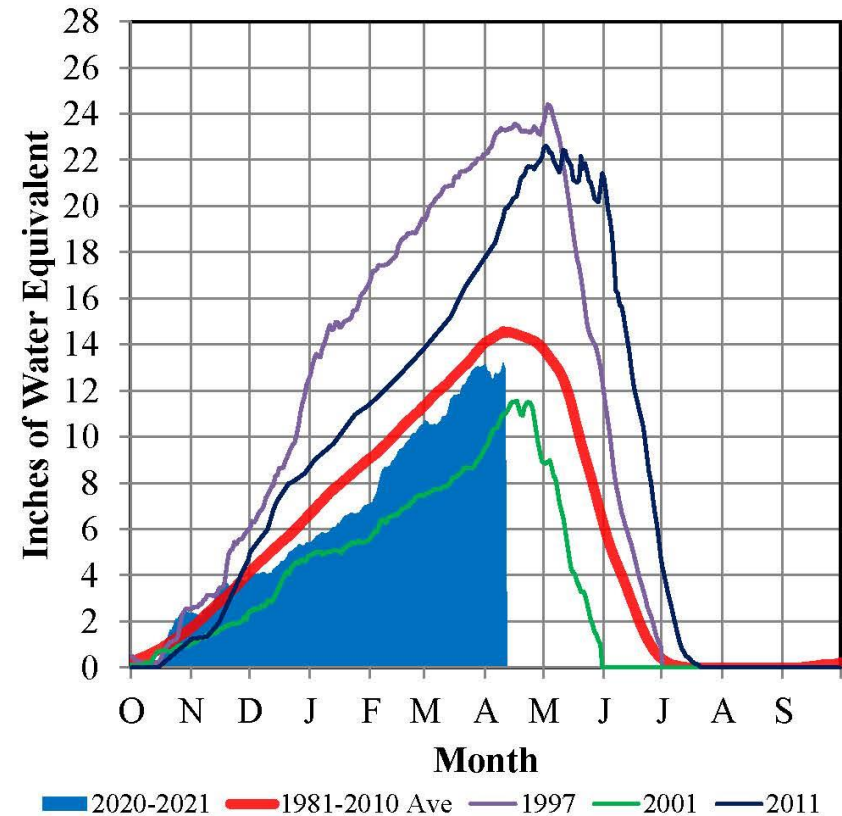
Missouri River Basin – Mountain Snowpack Water Content 2020-2021 with comparison plots from 1997*, 2001*, and 2011

11-Apr-2021

Total above Fort Peck



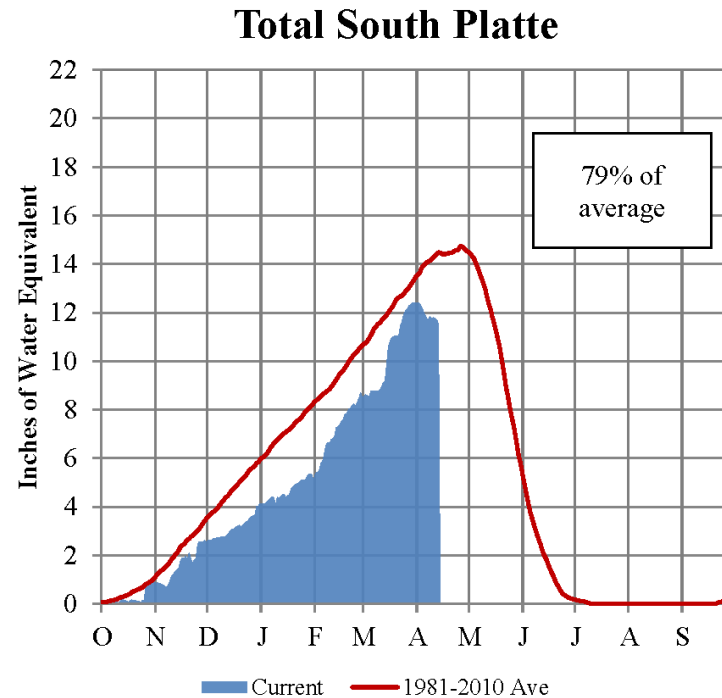
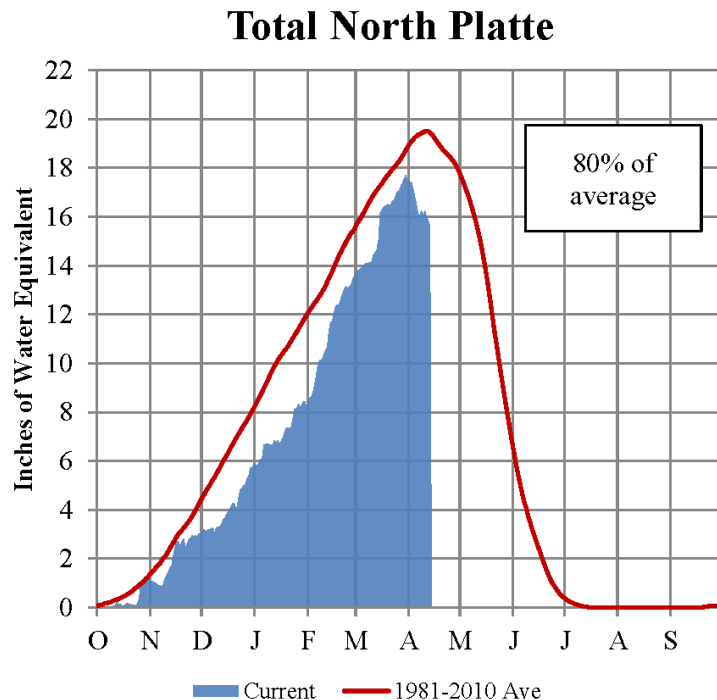
Total Fort Peck to Garrison



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



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

GREAT LAKES SURFACE ENVIRONMENTAL ANALYSIS (GLSEA)



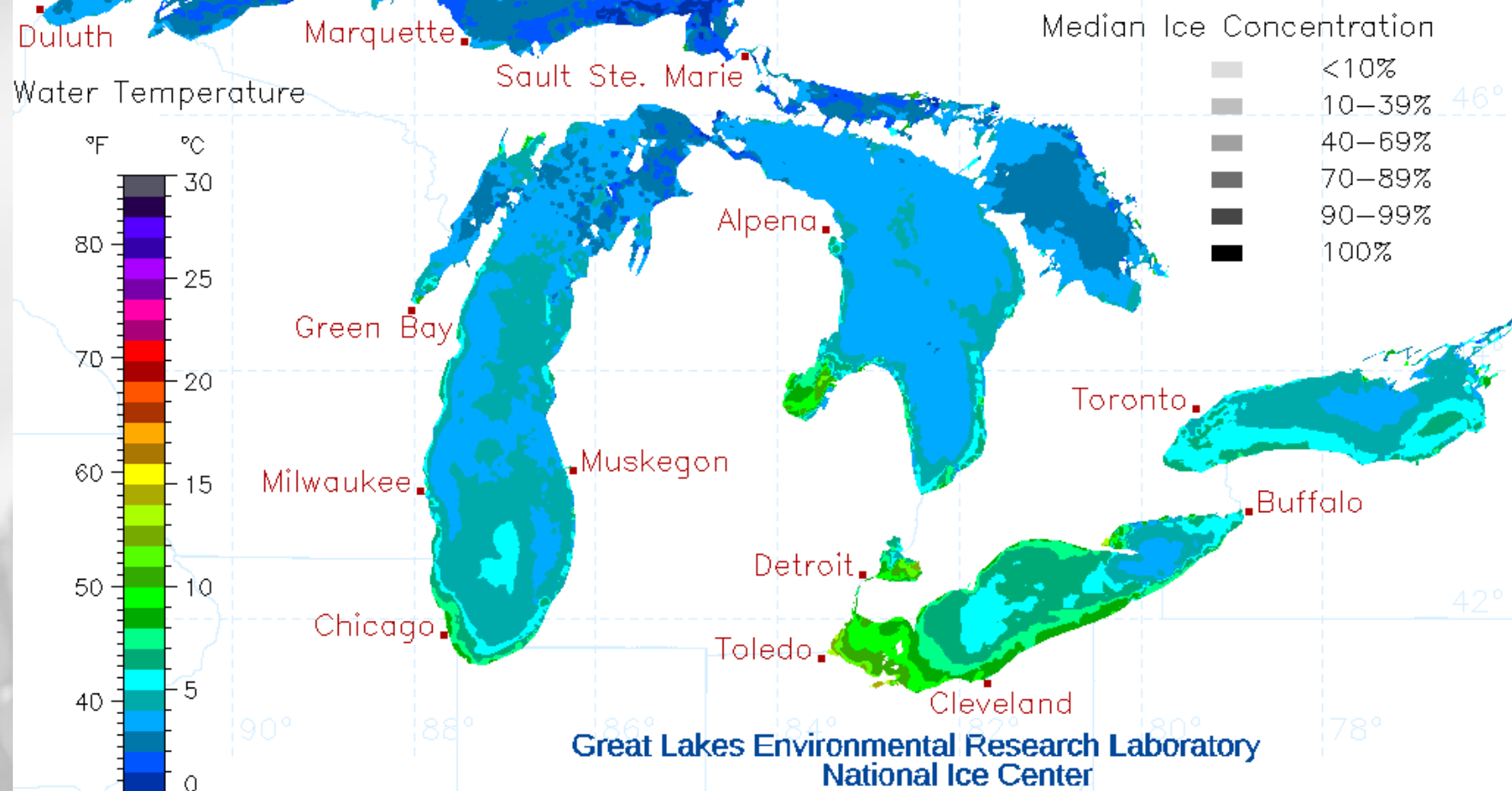
Analysis Date: JD 104 04/14/2021

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%

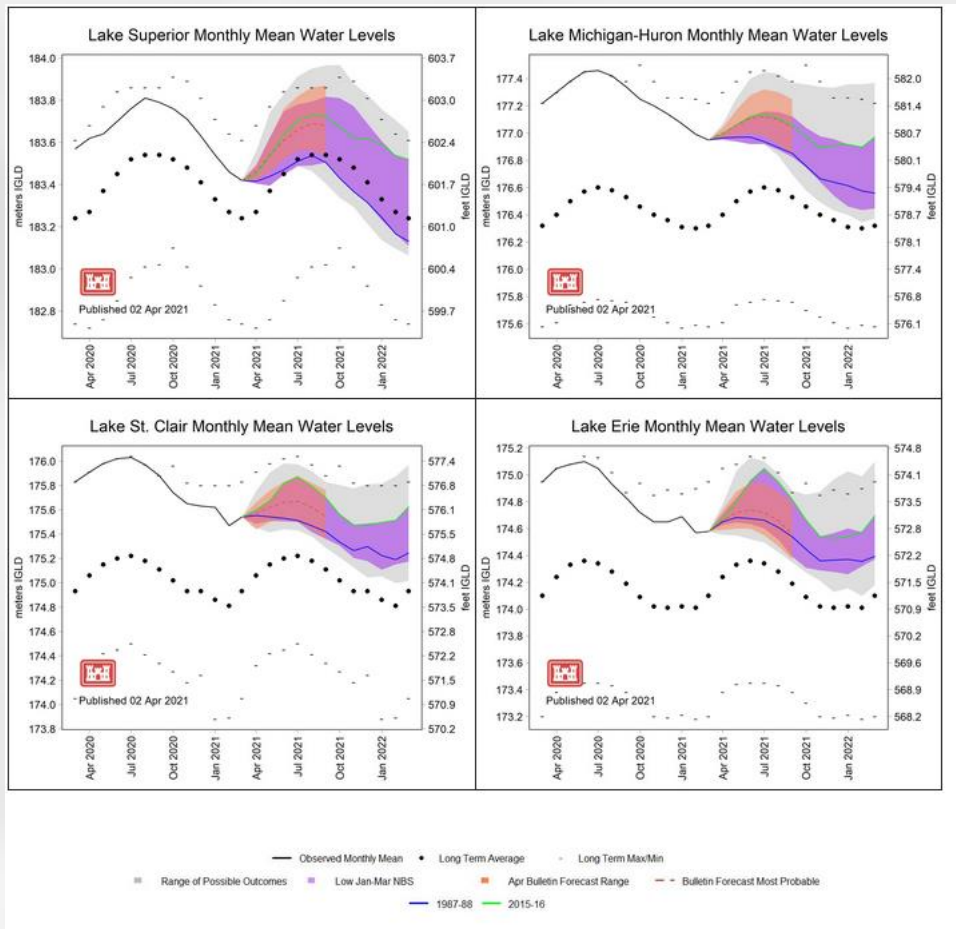


Cloud Free - Superior: 0.2 %, Michigan: 1.8 %, Huron: 37.7 %, Erie: 60.4 %, Ontario: 41.6 %, St Clair: 21.6 %

https://coastwatch.glerl.noaa.gov/glsea/cur/glsea_cur.png

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

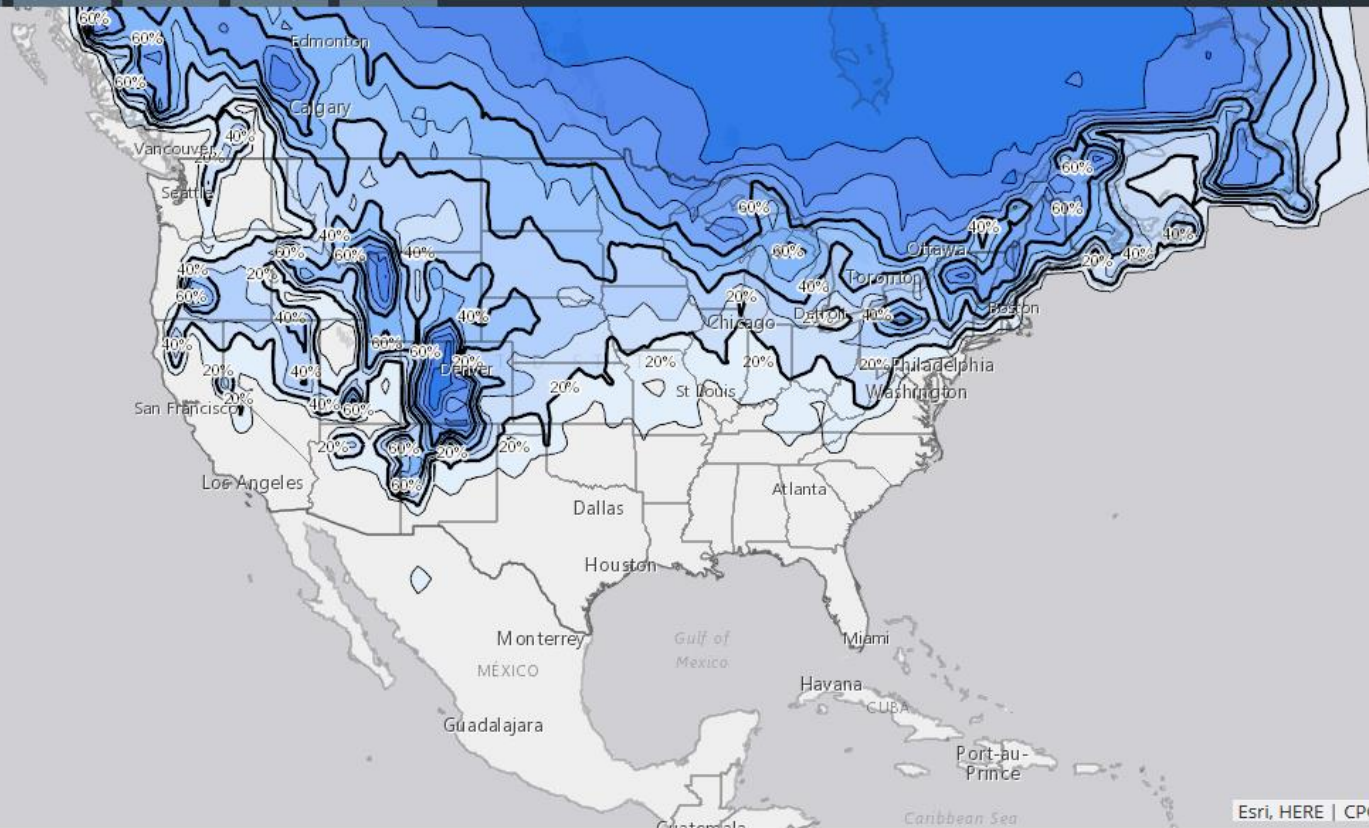
Valid:

(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



Esri, HERE | CPC | Esri, HERE

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Other Crop Impacts

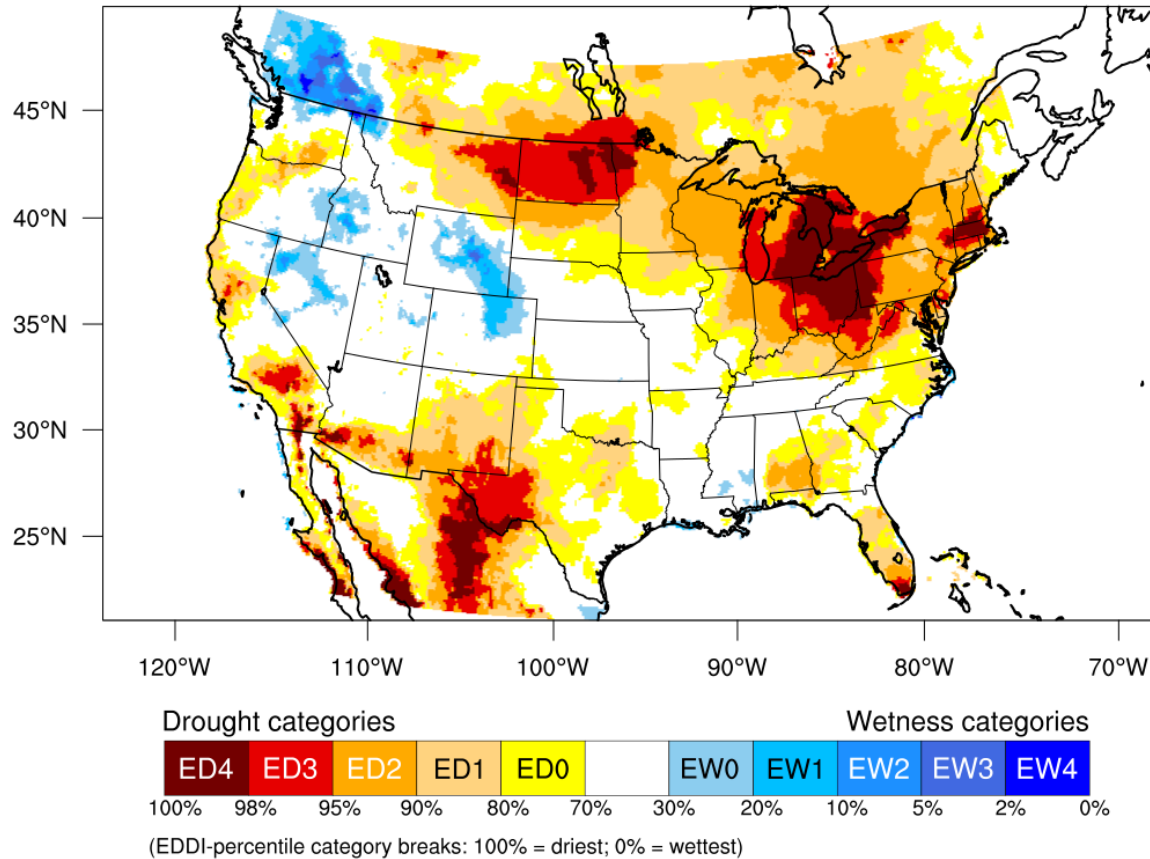


Frozen soybeans IL Chelsea Harbach, Director of the U of I Northwestern Illinois Ag R&D Center

- 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