North Central U.S. Climate & Drought Outlook
May 19, 2022

Photo Courtesy of Elizabeth Hawkins – OSU Extension

Aaron B. Wilson
wilson.1010@osu.edu | 614-292-7930
State Climate Office of Ohio (SCOO)
OSU Extension & Byrd Polar and Climate Research Center

NIDIS | NDMC National Drought Mitigation Center, University of Nebraska | AASC American Association of State Climatologists | NOAA National Oceanic and Atmospheric Administration, U.S. Department of Commerce | Regional Climate Centers | USDA 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 16 (1 PM CDT) Beth Hall – Indiana State Climatologist

Access to Future Climate Webinars and Information

http://www.drought.gov/drought/content/regional-programs/regional-drought-webinars
https://mrcc.purdue.edu/multimedia/webinars.jsp
http://www.hprcc.unl.edu/webinars.php

Open for questions at the end (Enter them along the way)

Agenda

Recent Climate Conditions

Recent Events

Impacts: Hydrological, Snow/Water, Agricultural, Fire

Outlooks: Short-term, June, and Summer Updates; La Niña still?

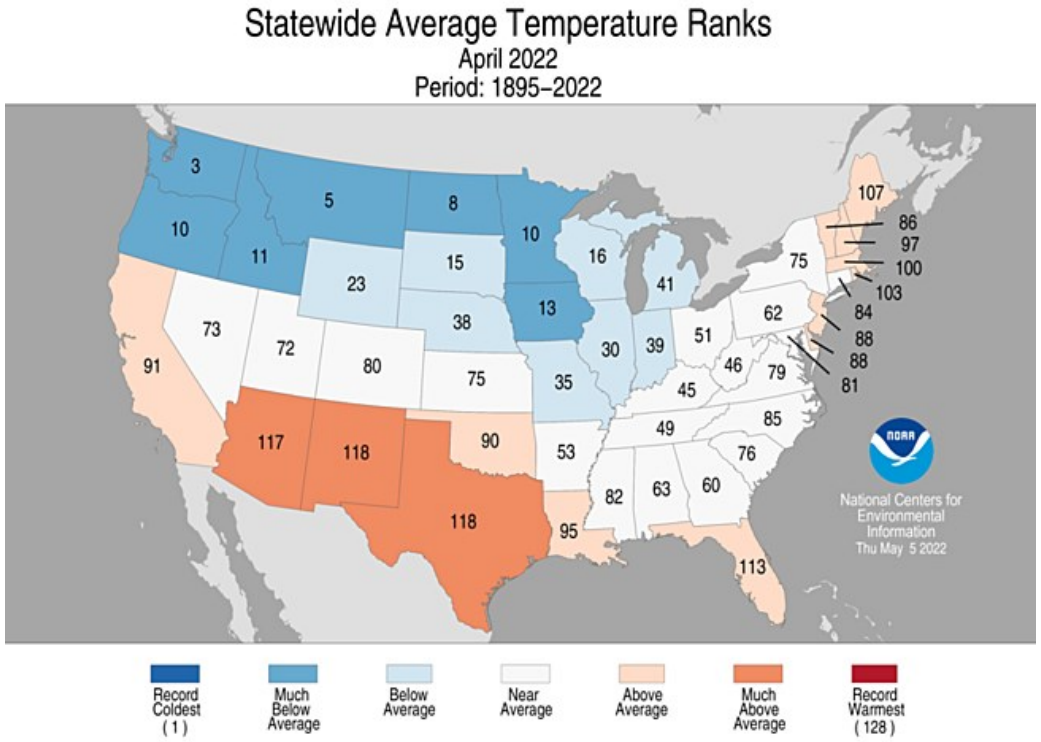
RECENT CLIMATE CONDITIONS

Photo Courtesy of Laura Edwards – SD SC; Cheyenne River/Hwy 34 & 73, on Cheyenne Reservation, near the community of Bridger; In D3 Drought. Photo taken May 11

April Temperature Recap

- Near to Much Below Average (South to North) across the region
- Top 10 coldest April's on Record for Montana, North Dakota, and Minnesota
- Function of both daytime highs and overnight lows
- Kansas – Above average daytime highs and Below average lows = DRY

Recent Climate Conditions

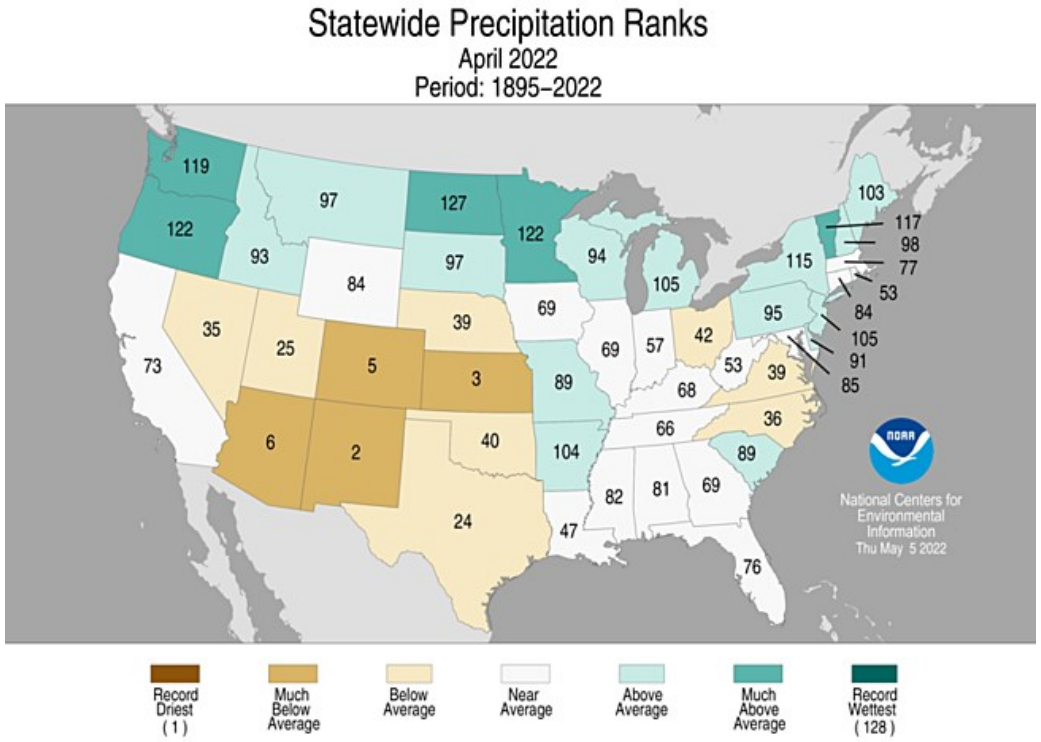


Source: http://www.ncdc.noaa.gov/temp-and-precip/us-maps/

April Precipitation Recap

- A mixed bag of conditions
- 2nd wettest on record for North Dakota; 7th wettest for Minnesota
- Dry in Kansas (3rd), Colorado (5th), Nebraska, and Ohio

Recent Climate Conditions

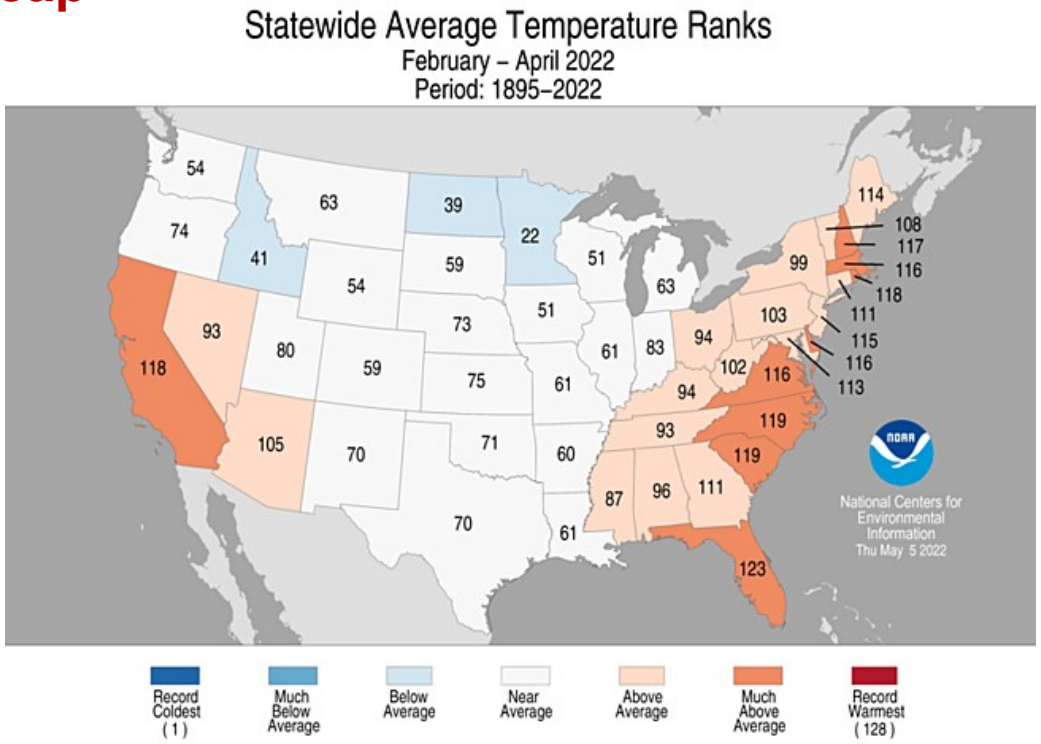


Source: http://www.ncdc.noaa.gov/temp-and-precip/us-maps/

Recent Climate Conditions

February – April Temperature Recap

- Below average across the far north
- Average for much of the North Central Region
- Above Average east

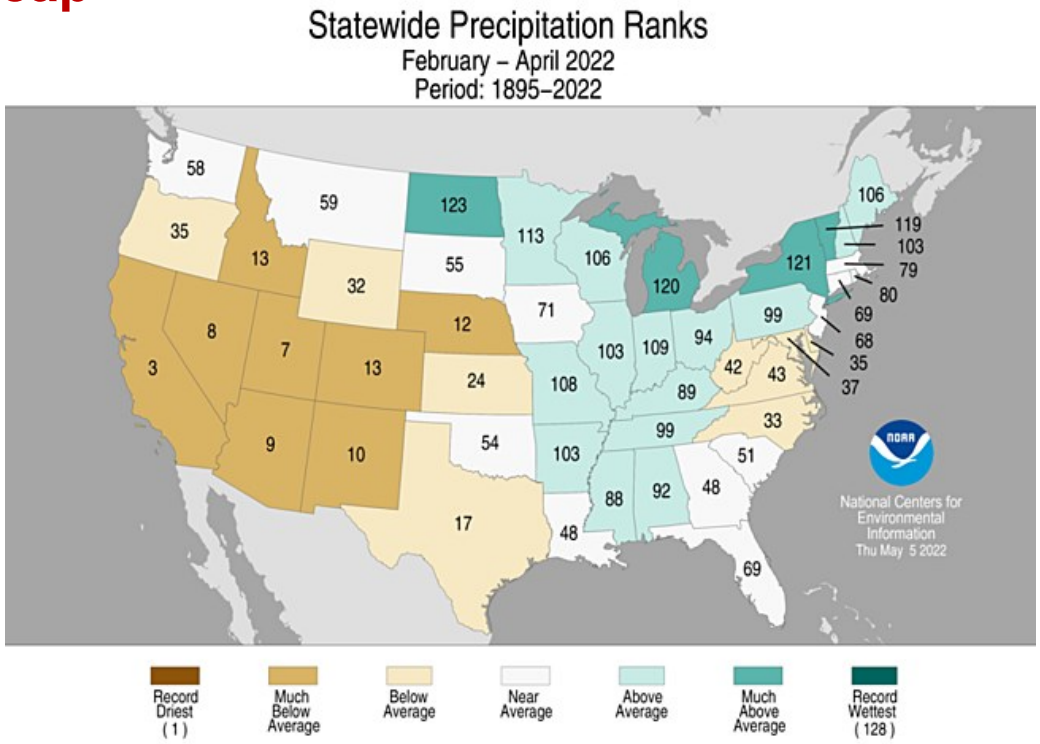


Source: http://www.ncdc.noaa.gov/temp-and-precip/us-maps/

Recent Climate Conditions

February – April Precipitation Recap

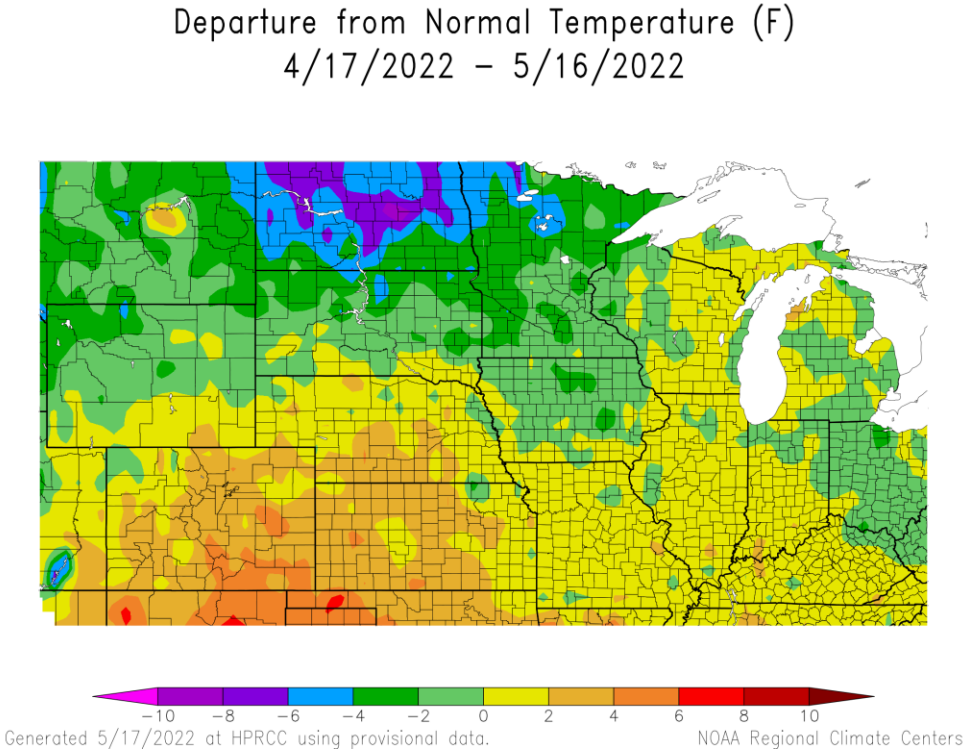
- Very dry conditions across the Central Plains
- Counties in NW KS, SW NE, and much of NE CO had their driest April on record
- Wetter than average across the northern and eastern states
- ND-6th wettest; MI-9th wettest



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

Recent Climate Conditions

Last 30 Days: Temperature



- Cooler than average across the north and far east
- Slightly warmer than average Central Plains to Lower Ohio and parts of the Great Lakes

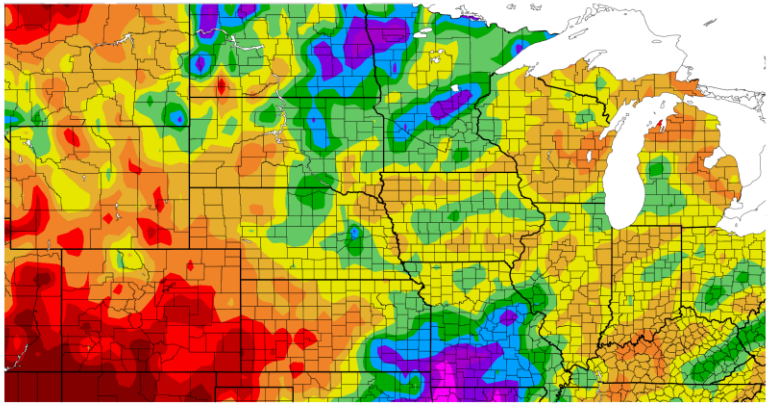
Source: https://hprcc.unl.edu/maps.php?map=ACISClimateMaps

Recent Climate Conditions
Last 30 Days: Precipitation

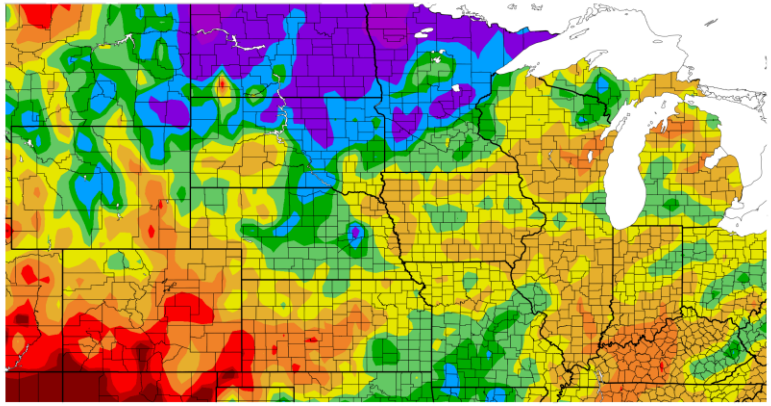
- Heavier rainfall across Upper Midwest (well above average), SE KS and MO
- Generally, less than 3” across Great Lakes, Parts of IA to Ohio, and western Plains

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

Precipitation (in)
4/17/2022 – 5/16/2022



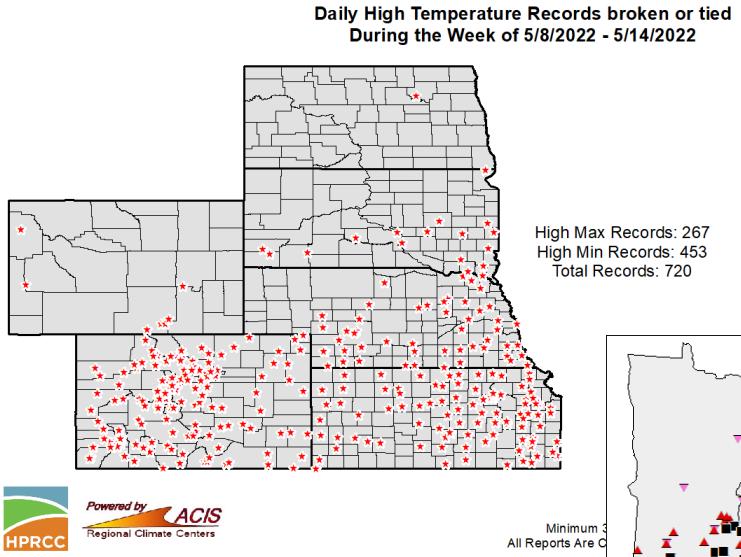
Percent of Normal Precipitation (%)
4/17/2022 – 5/16/2022

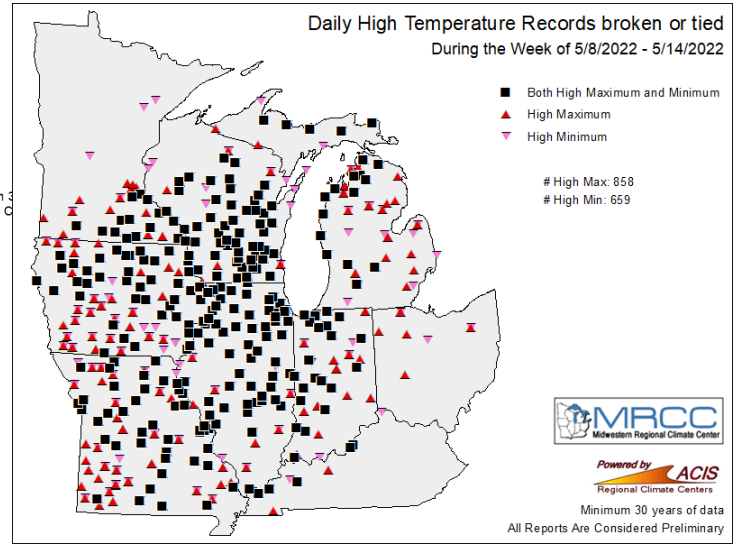


Issues & Events

Photo Courtesy of Pete Boulay Minnesota SCO; Thunderstorm damage on the UM Campus. Photo taken May 11

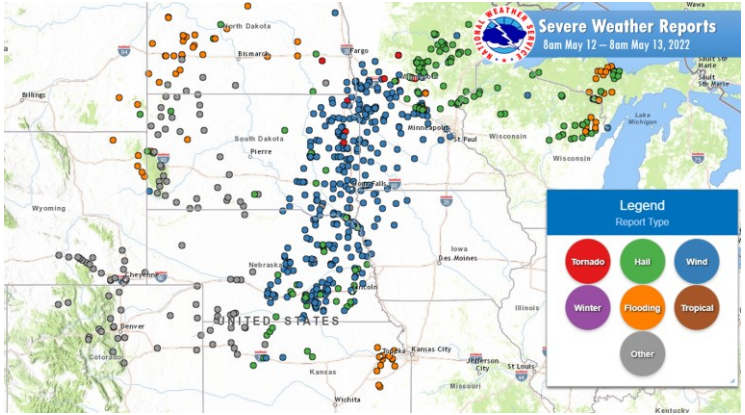
Extreme Heat (05/08-05/14)





- Chicago set an all-time May record for 3-day average minimum temperature (72.3°F), which knocked off the previous record set in 1911
- Three deaths reported in Chicago from heat and poor utility management

May 12th Severe Weather



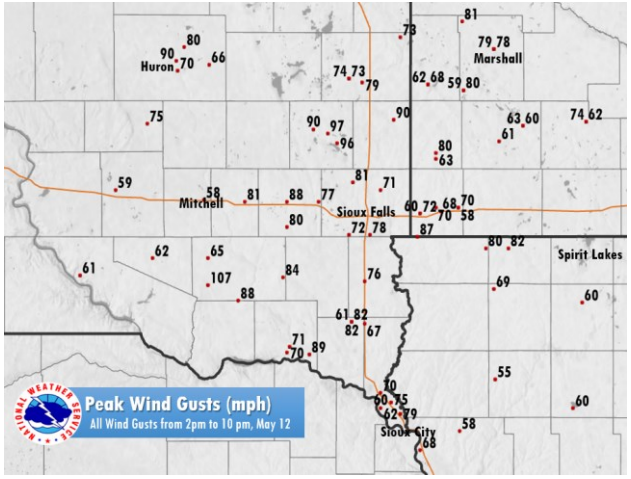
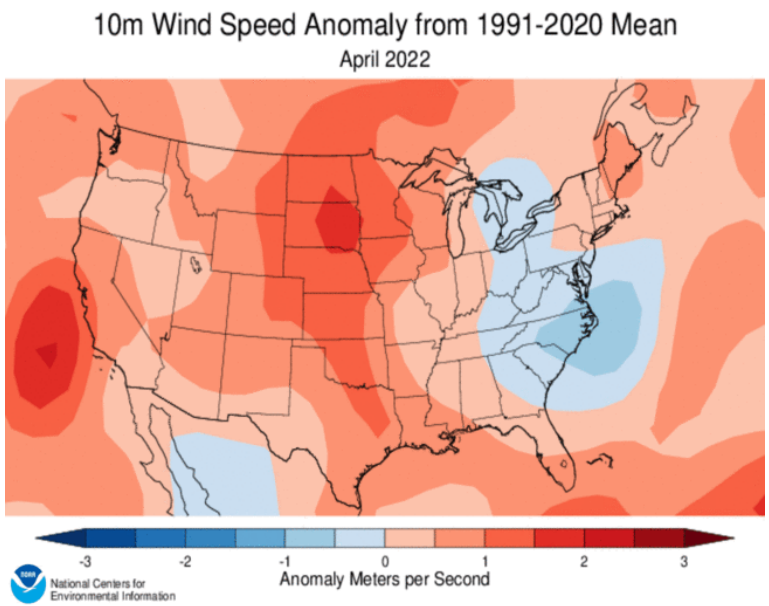


Photo Courtesy of NWS-Sioux Falls, SD, source: Ryan Reiser – View of storm from Boyden, IA

Wind and Other Issues



1 m/sec = ~2.2 mph
2 mph anomalies for a month are on the high side.
Don't have good wind climatologies

- Winds continues to blow!
- Numerous states have conducted wind speed analyses (CO, KS, SD) – showing some of the windiest conditions on record for April (persistent and well above average)
- Several dust storms across the region; Southern CO basin with dust on snow
- May 12th event – also 2nd highest number of single day hurricane strength wind reports (55)
- Another blizzard across the Dakotas and Montana, 18" in Niobe ND combined with 60mph

Ophir Pass on May 8. Photos courtesy of Omar Behery. Center for Snow and Avalanche Studies

https://www.ncdc.noaa.gov/societal-impacts/wind/maps/202204

http://www.codos.org/codosupdates/may102022

HYDROLOGIC IMPACTS

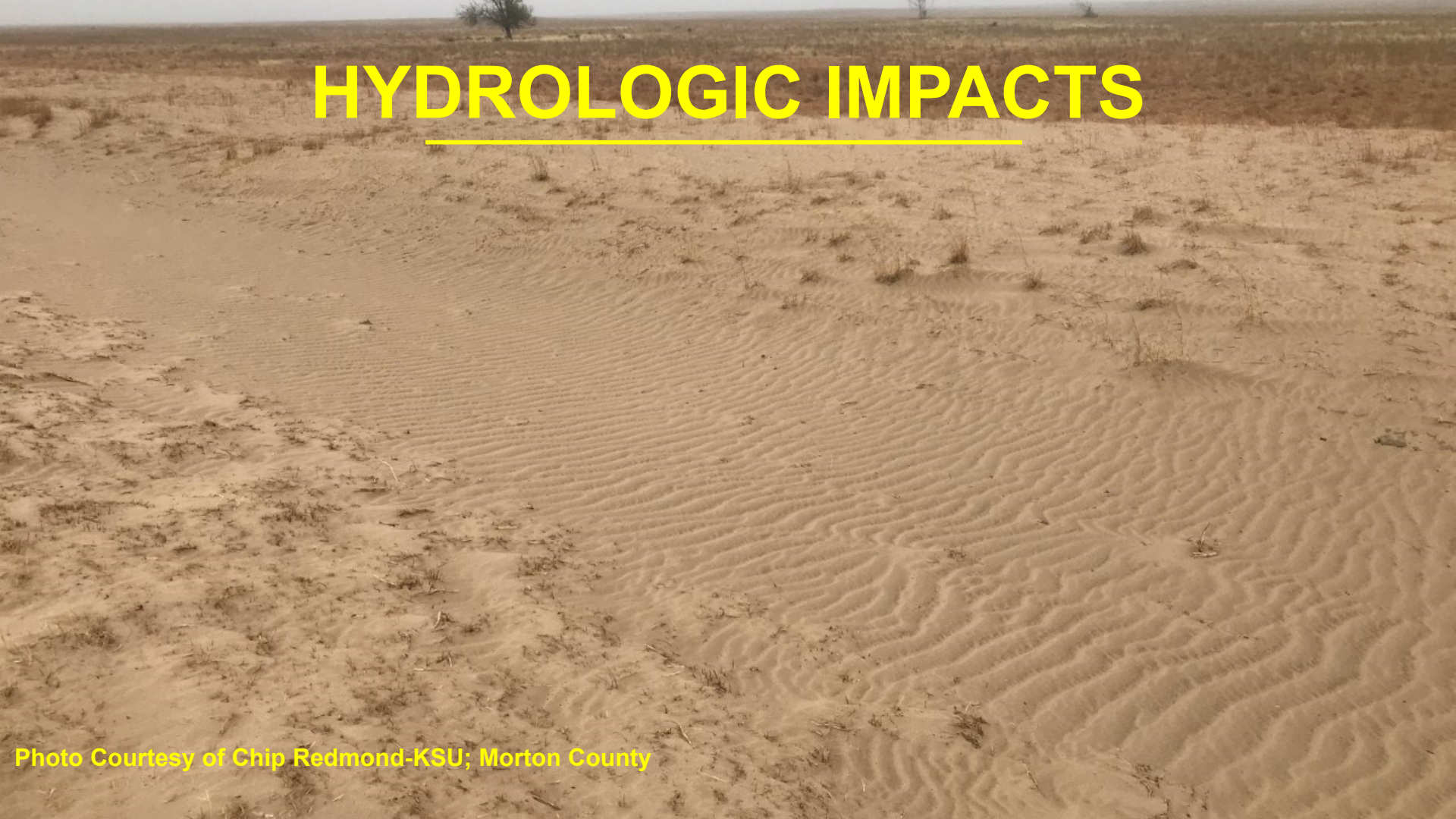
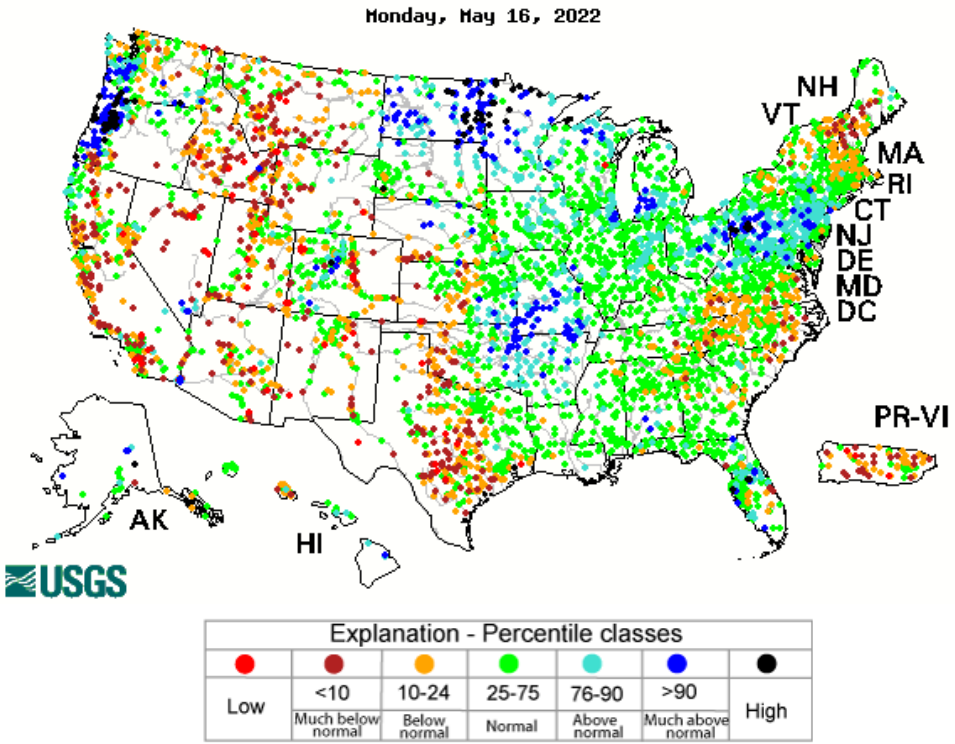


Photo Courtesy of Chip Redmond-KSU; Morton County

Hydrology

28-Day Stream Flows

- High end flows across parts of SE KS/Southern MO; Eastern Corn Belt; Red River of the North and Northern MN
- Low end flows across western NE, KS, and eastern CO – extending up into Wyoming and Montana



https://waterwatch.usgs.gov/index.php?id=pa28d

Water Issues

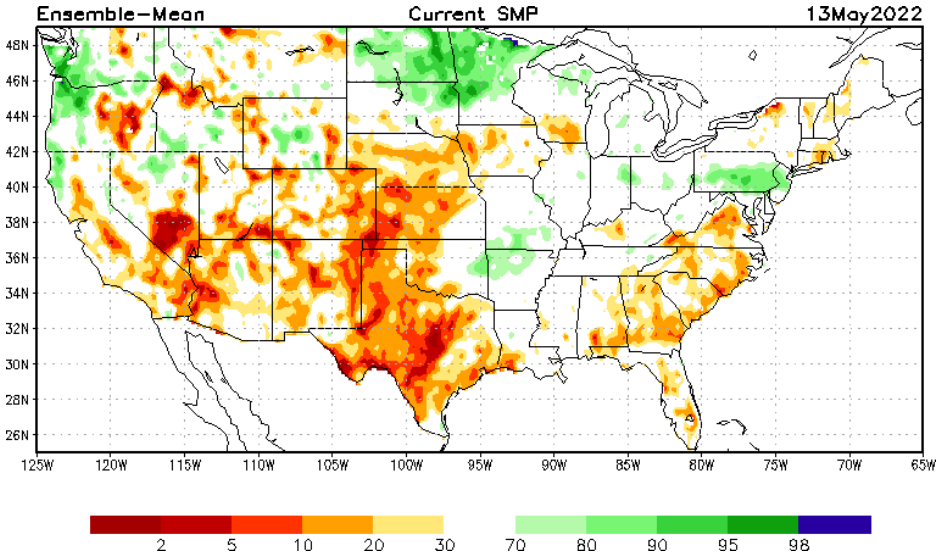
- **Red River Flooding:** Heavy late season snowmelt, frequent heavy rainfall; ND Governor sent National Guard to shore up Bourbanis Dam in Pembina
- **MN/Ontario Border:** International Falls - record precipitation to date with 100 years of record (https://www.weather.gov/dlh/RainyRiverBasin)
- **James River:** Ongoing flooding along the middle reach (Columbia to Huron SD)
- **Lower Missouri:** Flooding along the smaller tributaries

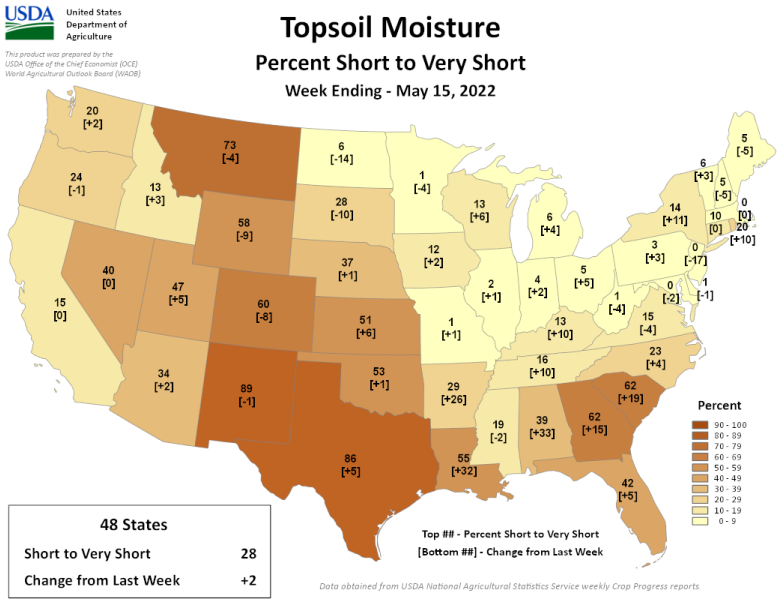
Large areas of Minnesota and North Dakota along the Red River are flooded. The temporary lakes are creating small-scale weather systems. Matt James/Oslo, Minn./Facebook

North shore of Rainy Lake near Fort Frances, Ontario (across from International Falls, MN). Photo credit to Mary Ellen Kennedy. Lake of the Woods, Rainy Lake, Namakan Lake, and all of those lakes up in that vicinity are top 2 or record high lake levels.

Hydrology

Soil Moisture



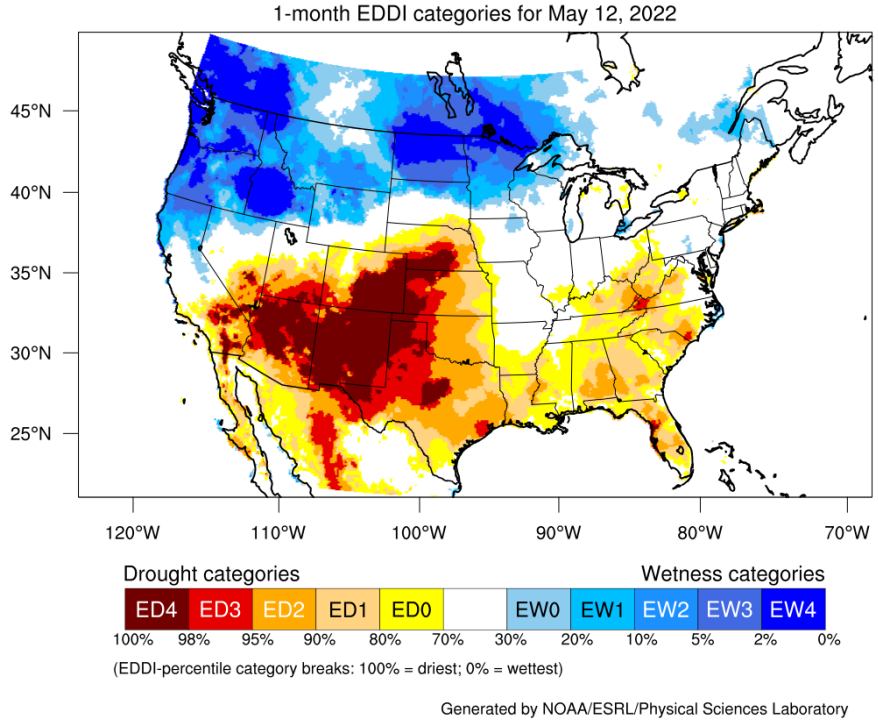


- Improving soil moisture conditions across Dakotas and Minnesota
- Additional drying across KS, NE, IA, and WI; less so across the east

http://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml#
USDA-NASS data – map courtesy Brad Rippey USDA-OCE

Hydrology

Evaporative Demand Drought Index



- "Thirst of the atmosphere" or precursor for water stress
- Limited demand across the North
- Extreme demand across Central Plains
- Growing demand across Ohio Valley in response to warming temperatures

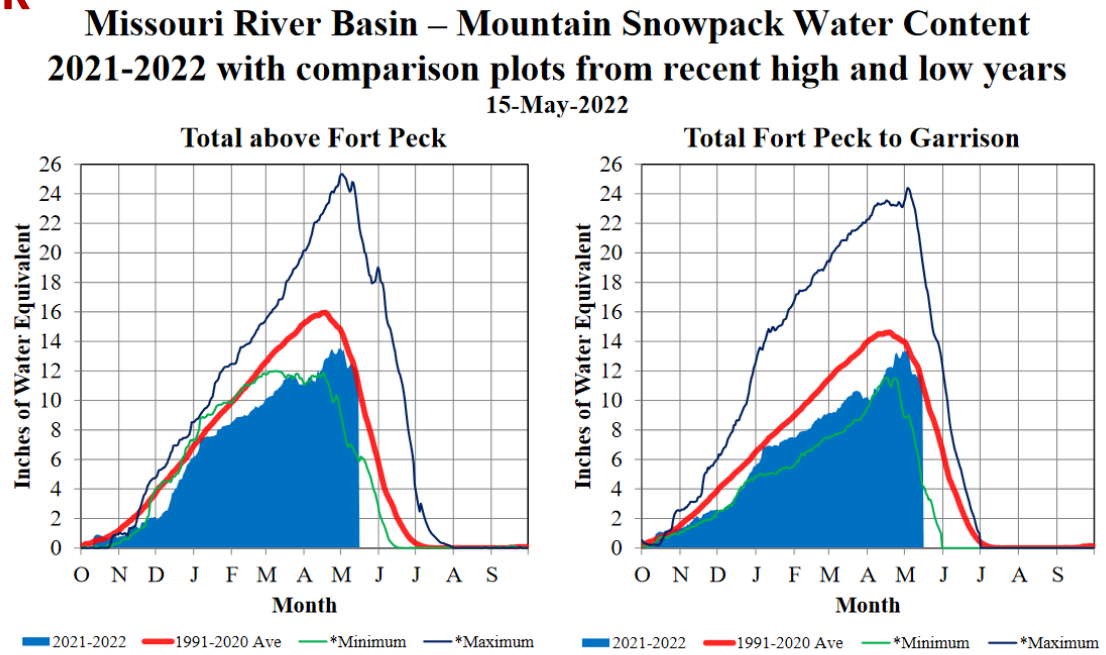
Source: https://www.esrl.noaa.gov/psd/eddi/

Hydrology

Missouri River Snowpack

- Upper Missouri is having a slower melt off with more cold conditions and snow expected this weekend
- Above Fort Peck – reached peak on April 29th at 13.5" SWE and 85% of the normal peak
- Fort Peck to Garrison – reached peak on May 3rd at 13.4" SWE and 92% of normal peak

https://www.nwd-mr.usace.army.mil/rcc/reports/snow.pdf



On May 15, 2022 the mountain Snow Water Equivalent (SWE) in the "Total above Fort Peck" reach is 11.5" and 85% of the annual peak remains. The mountain SWE in the "Fort Peck to Garrison" reach is 11.4" and 85% of the annual peak remains. The normal peak for both reaches occurs near April 17. The "Total above Fort Peck" reach peaked on April 29 at 13.5" SWE and 85% of the normal peak. The "Fort Peck to Garrison" reach peaked on May 3 at 13.4" SWE and 92% of the normal peak.

*Minimum peak SWE between 1991-2020 occurred in 2015 above Fort Peck, and in 2001 between Fort Peck and Garrison.
Maximum peak SWE between 1991-2020 occurred in 2011 above Fort Peck, and in 1997 between Fort Peck and Garrison.

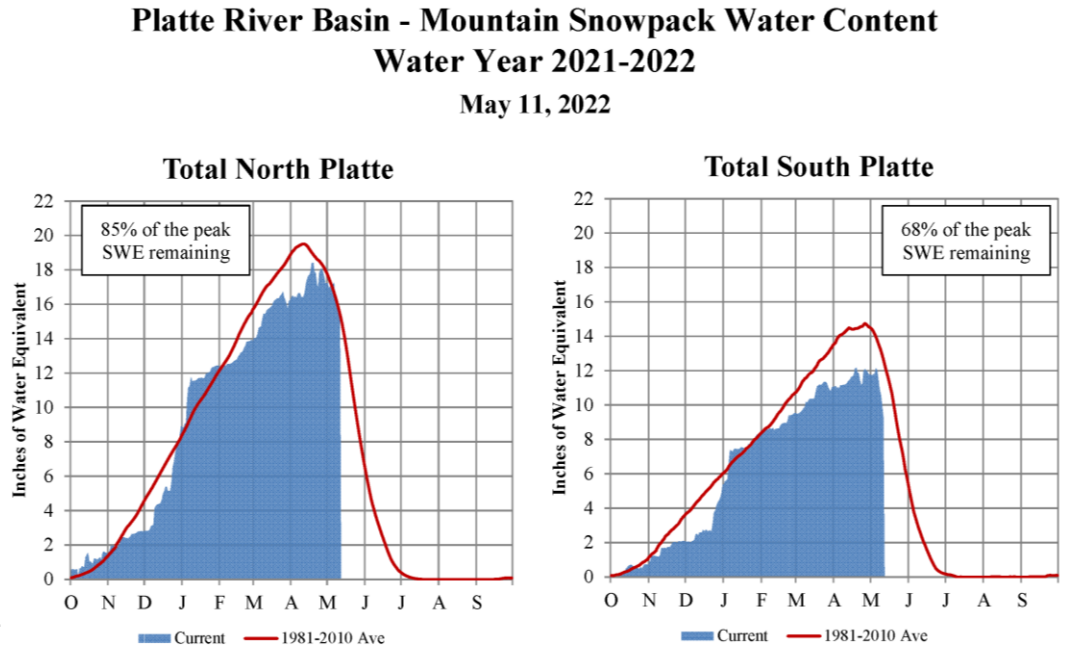
Provisional data. Subject to revision.

Hydrology

Platte River Snowpack

- North Platte– reached peak at 18.4” SWE and 85% remaining
- South Platte - reached peak at 12.2” SWE and 68% of normal peak remains

https://www.nwd-mr.usace.army.mil/rcc/reports/platte_snow.png

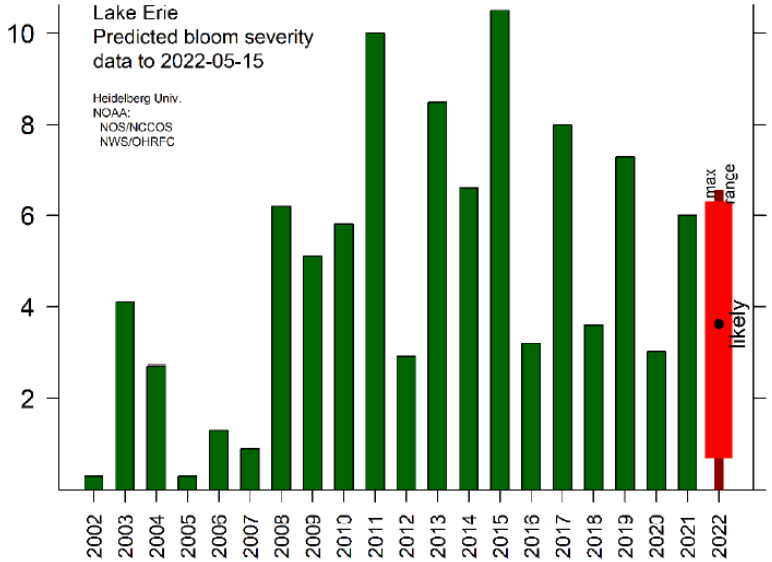


The North and South Platte River Basin mountain snowpacks normally peak near April 15 and the end of April, respectively. As of May 11, 2022, the mountain snowpack SWE in the "Total North Platte" reach peaked at 18.4" and currently has 85% of the peak SWE remaining. The mountain snowpack SWE in the "Total South Platte" reach peaked at 12.2" and currently has 68% of the peak SWE remaining.

Source: USDA, Natural Resource Conservation Service

Provisional Data. Subject to Revision

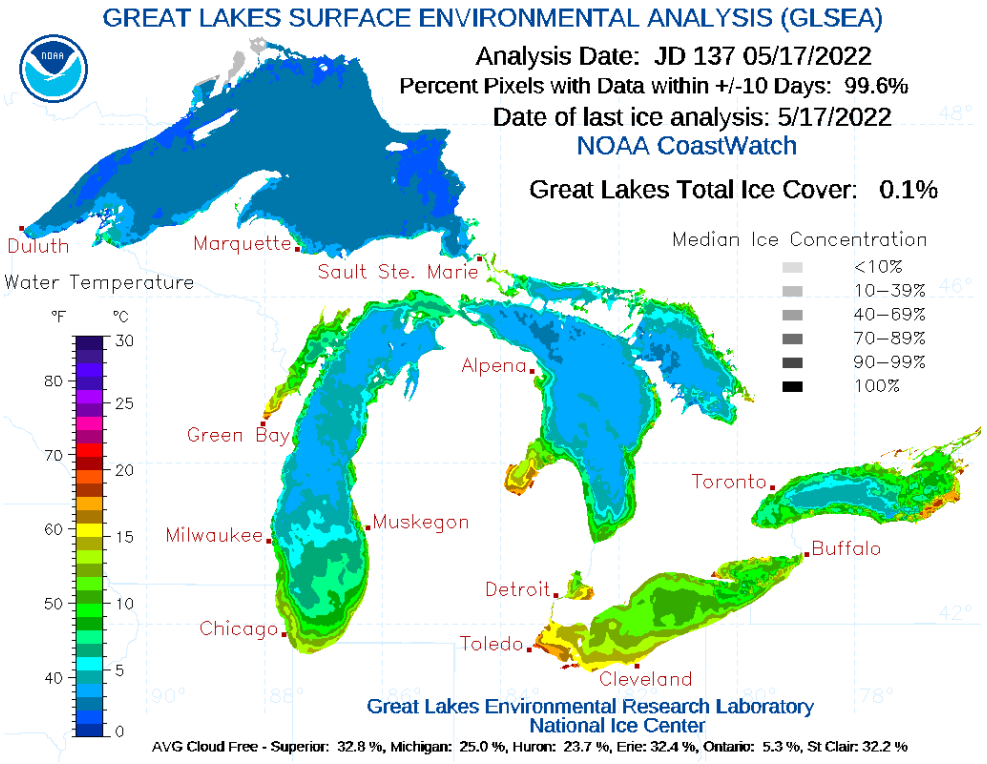
Great Lakes



- Less severe than 2021 (<6)
- April dryness kept forecast down; wetter conditions May – July may bump forecast up a bit

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

Hydrology

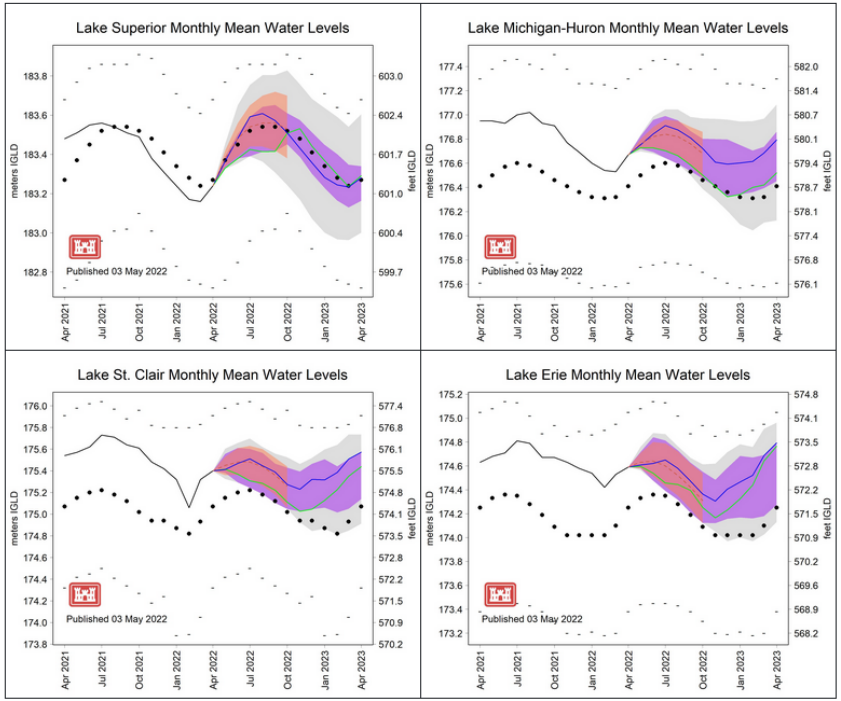


https://coastwatch.glerl.noaa.gov/glsea/cur/glsea_cur.png

Hydrology

Great Lakes

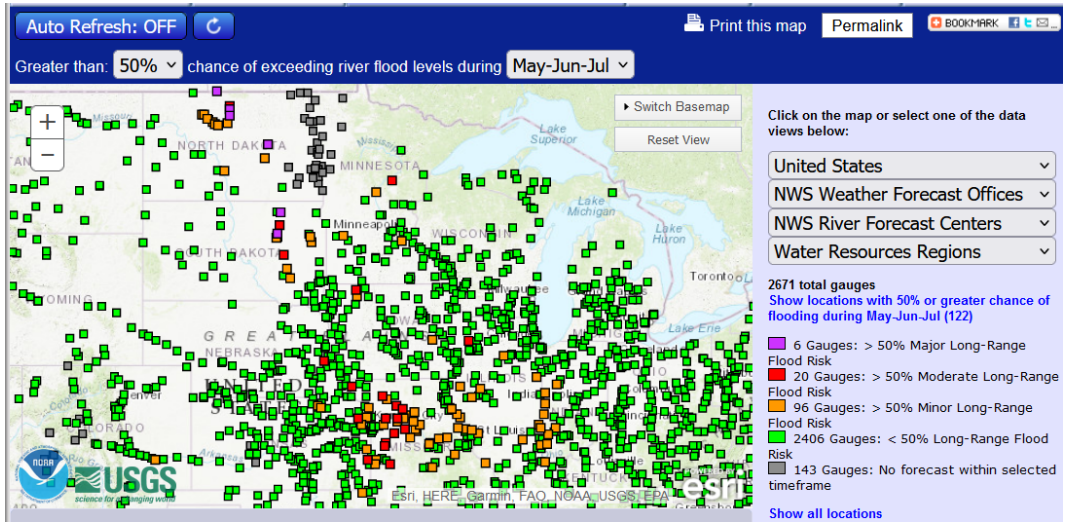
- **Rising after seasonal lows; still down from overall maximum levels**
- **Still above long-term averages across Lower Great Lakes**
- **Superior has recovered to near average levels**



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

Hydrology

River Forecasts (May-Jul)

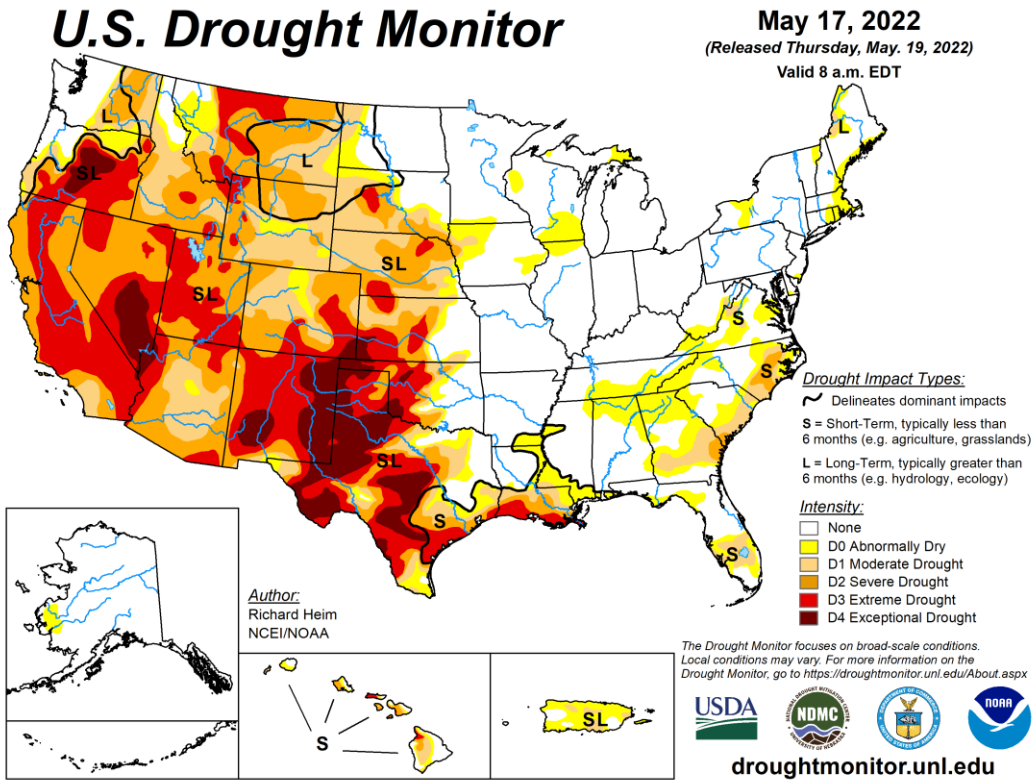


https://water.weather.gov/ahps/

- **NWS May-September water supply forecasts Missouri:** Below average runoff volumes (Near-average flow for North Platte); No flooding from mountain snowmelt is expected.
- **James River:** Flooding through July as water moves through system – very slow system
- **Lower basin tributaries:** Episodic flooding (eastern KS and MO)
- **Ohio River:** Return to normal flows after wet spring. Scattered minor flooding possible

Hydrology

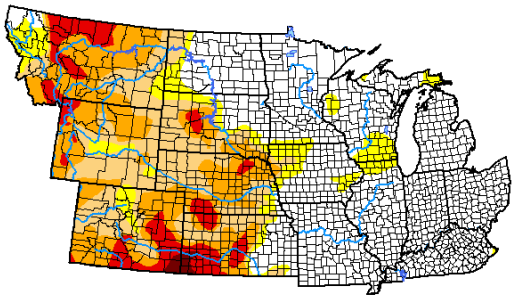
U.S. Drought Monitor



U.S. Drought Monitor

Hydrology

U.S. Drought Monitor
NWS Central



May 17, 2022
(Released Thursday, May. 19, 2022)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

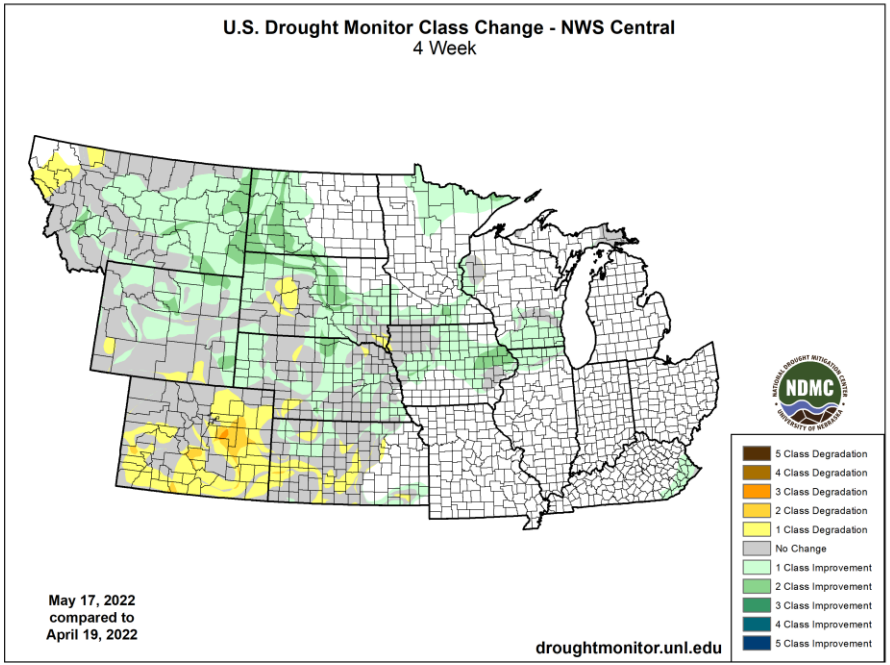
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	48.83	51.17	42.62	25.71	7.64	0.53
Last Week 05-10-2022	47.93	52.07	44.01	26.42	5.36	0.25
3 Months Ago 02-15-2022	27.11	72.89	54.84	28.60	8.68	0.72
Start of Calendar Year 01-04-2022	33.94	66.06	46.53	27.27	10.67	1.77
Start of Water Year 09-28-2021	31.08	68.92	50.85	37.30	18.35	3.17
One Year Ago 05-18-2021	40.78	59.22	39.28	19.29	11.37	2.50

Intensity:
- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme 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 Heim
NCEI/NOAA

droughtmonitor.unl.edu

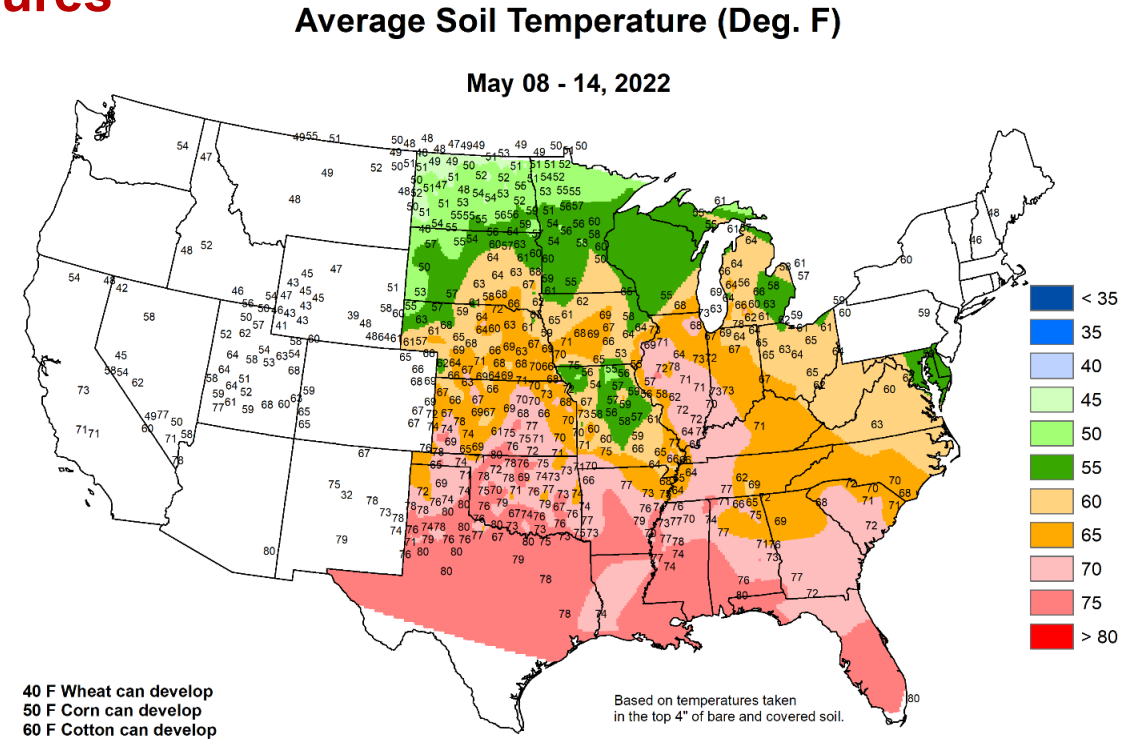


AGRICULTURAL IMPACTS

Photo Courtesy of NDMC Condition Monitor Observer Reports: Elbert County, Colorado - “Neighbor’s failed crop and pasture land blowing dirt. Approximately 50’ X 2640’ of my pasture is now buried because of his blowing dirt.”

Agriculture

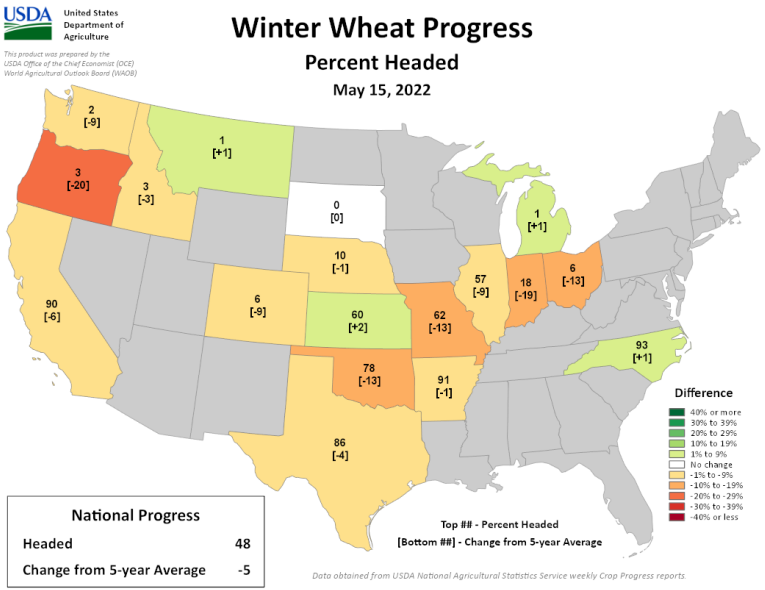
Soil Temperatures



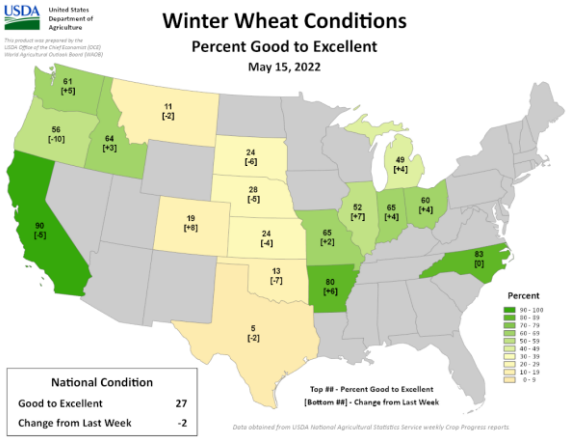
Data provided by the Climate Prediction Center, High Plains Regional Climate Center, Nebraska Mesonet at Univ of Nebraska, CoAgMet at Colorado State Univ, Kansas Mesonet at Kansas State Univ, North Dakota Agricultural Weather Network at North Dakota State Univ, Wyoming State Climate Office at the Univ of Wyoming, Illinois State Water Survey, Iowa State University, Oklahoma Mesonet, Purdue University, University of Missouri, Illinois State Water Survey, Michigan Automated Weather Network, West Texas Mesonet, South Dakota State Univ. Mesonet, Ohio Agricultural Research and Development Center, Univ. of Missouri and USDA/NRCS.

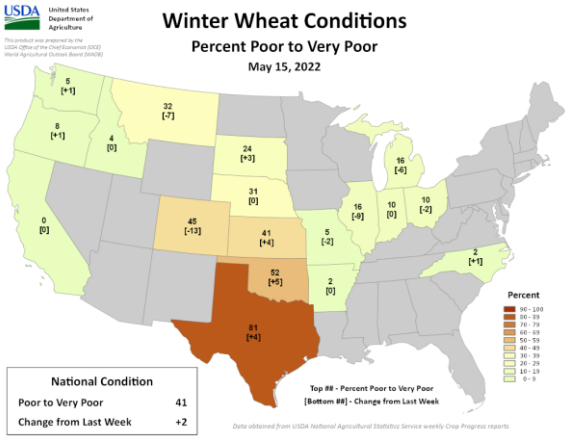
USDA United States Department of Agriculture

USDA NASS Crop Progress: Winter Wheat



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



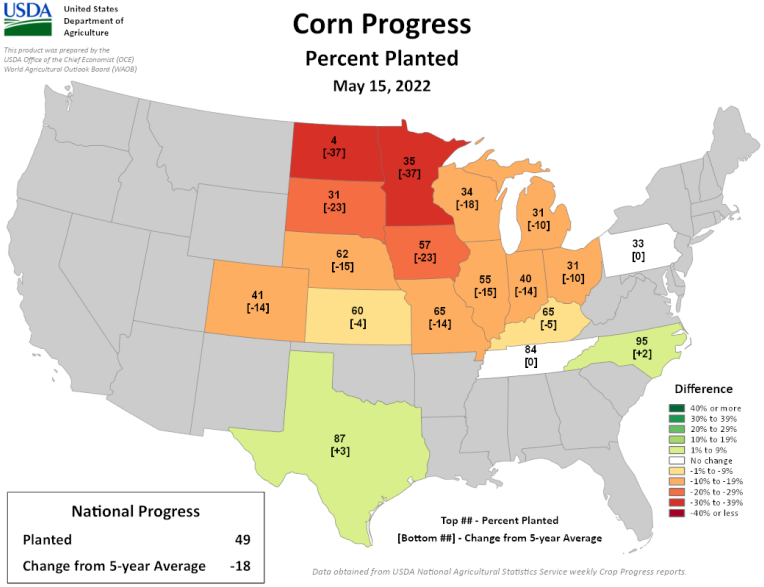


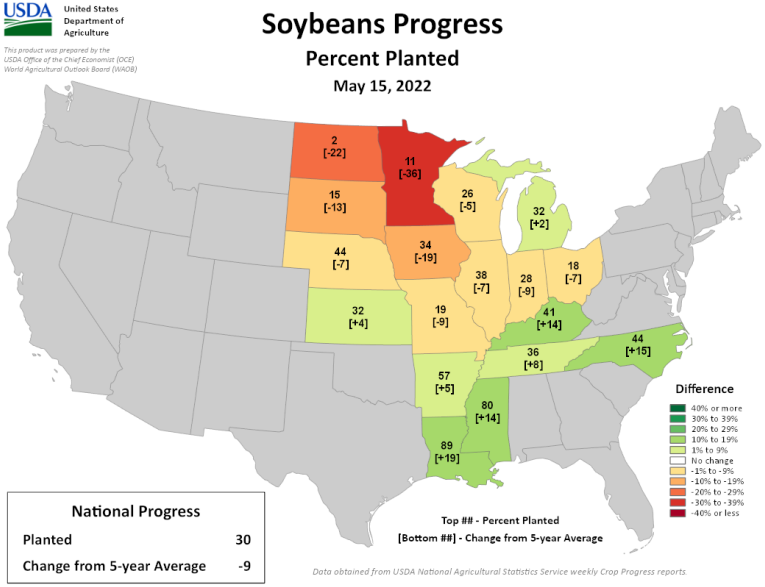
Agriculture

- Progress lags the 5-year average (-5%)
- Improving across the east
- Dryness hampering the west

Agriculture

USDA NASS Crop Progress: Corn/Soy



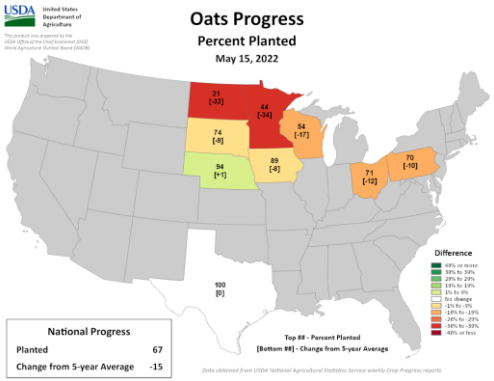


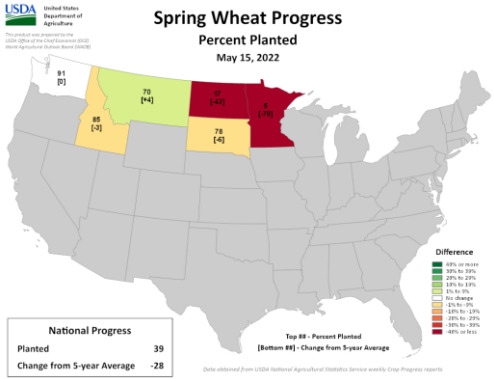
Thanks to Brad Rippey – USDA OCE Washington D.C.

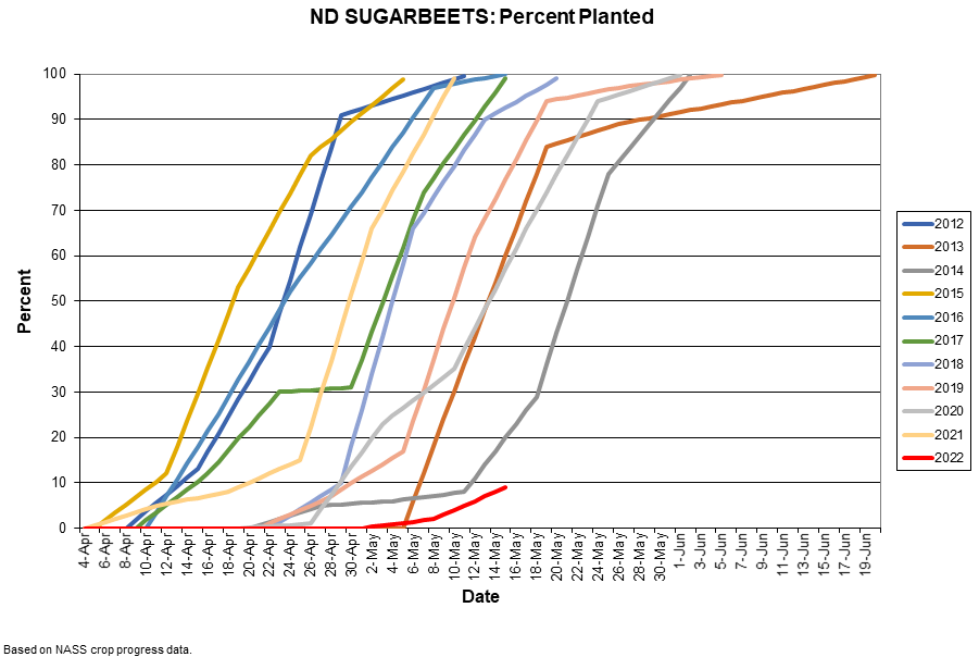
- Corn and soybeans are well behind 5-year average (18% and 9%)
- Wet conditions hampering planting across the Upper Midwest; cool damp April to blame in the east; Dry conditions in the west

Agriculture

USDA NASS Crop Progress: Others







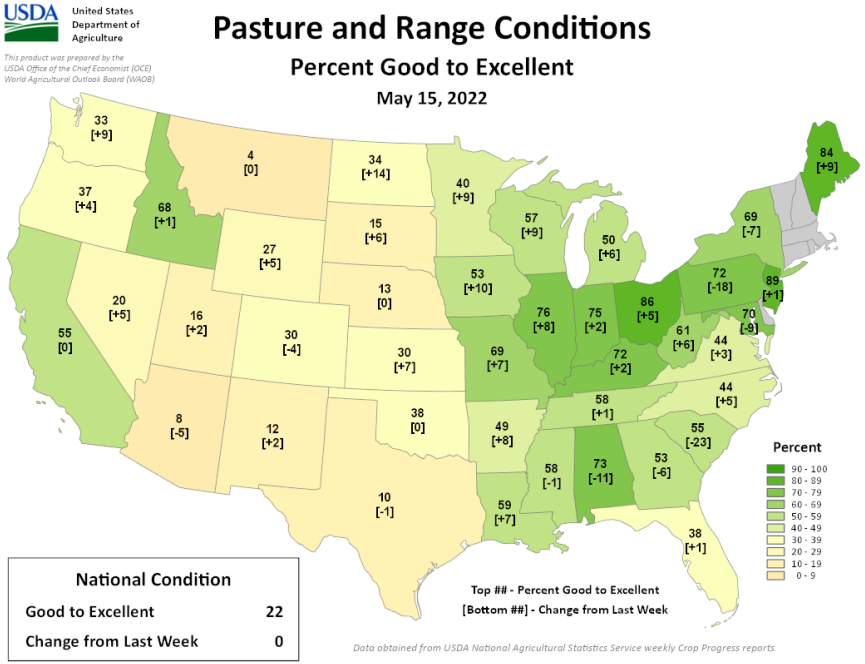
Based on NASS crop progress data.

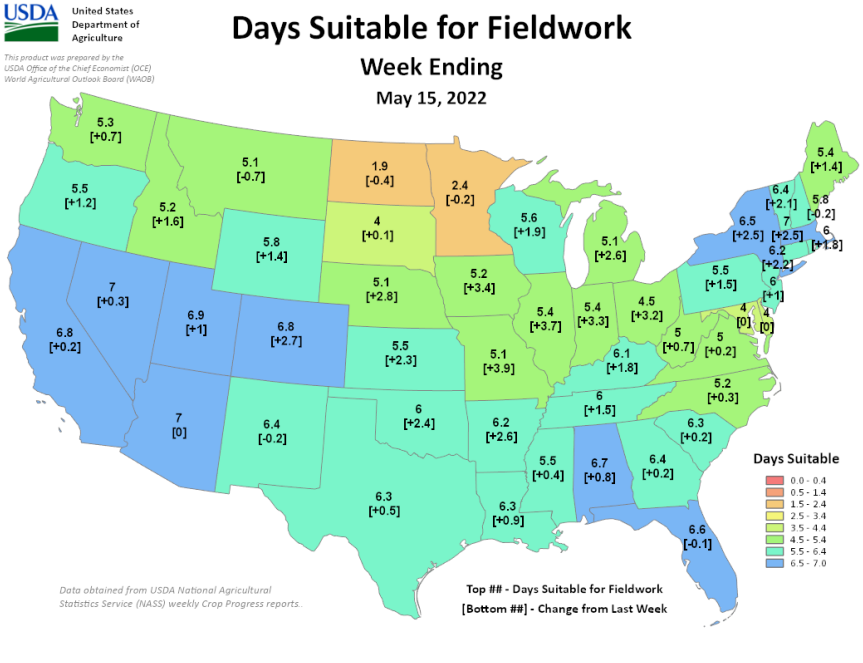
ND and MN sugarbeet planting progress over the last 10 years, with other slow years being 2014 (dark gray), 2013 (brown), 2019 (light brown), and 2020 (light gray).

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

Agriculture

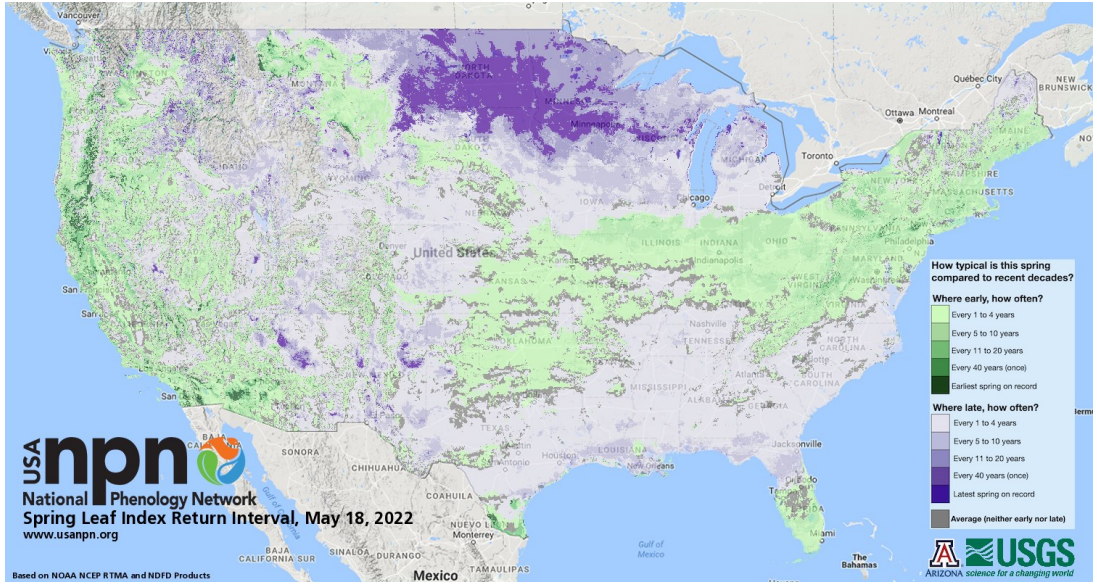
Pastures and Days Suitable





Late Spring Onset Across the North

Agriculture

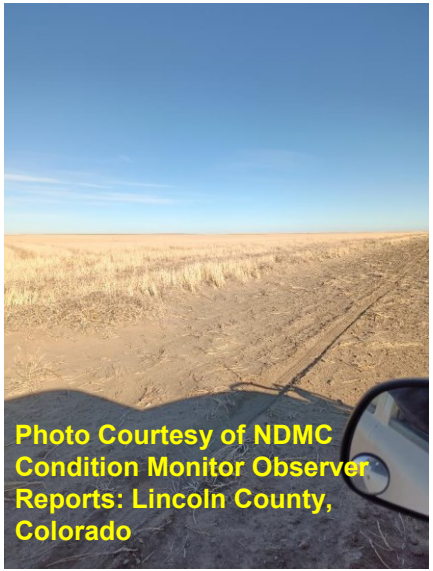


- Latest arrival of spring conditions across Dakotas, MN, and WI (dark purple)
- Contributing to the large planting delays and lack of warming in soils
- Some concern for near-freezing temperatures in the short-term

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

Other Impacts

- Rapid transition from cool April to record heat across Eastern Corn Belt brought on crusting concerns
- Discussion on cattle being sold across Kansas and Colorado
- Earlier season cold/dampness hindered bees foraging – warmer conditions have helped (IN)



Wildfire

Photo Courtesy of Nebraska State Patrol (https://twitter.com/NEStatePatrol): Highway 6 west of Cambridge on April 22nd.

Nebraska State Patrol via AP

Wildfire

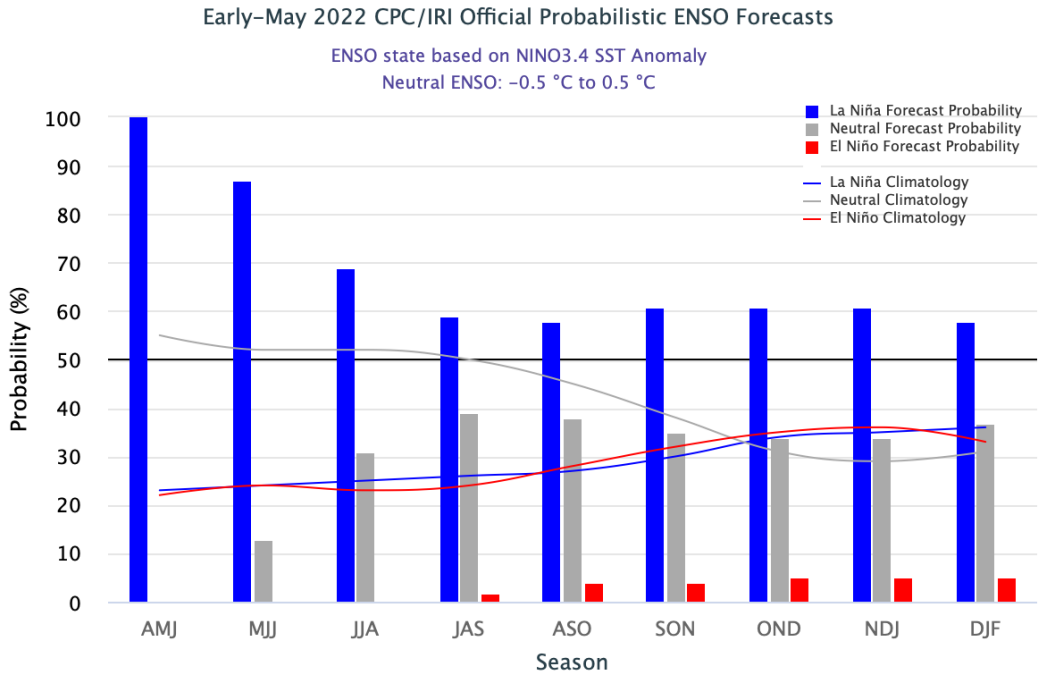
- SW Nebraska (Road 702, Cambridge, Elsie, Perkins, Dundy, Scotts Bluff, Cheyenne and Duele, Purdum fire in Blaine, Cherry, Brown, and Thomas Counties), Rising City, and Macy (northeast)
- Multiple evacuations, 10s of 1000s of acres burned
- Killed retired fire chief and injured 15 firefighters near Cambridge
- One wildfire this week in far southwest Kansas
- Record number of Red Flag Warning – NWS Boulder

Nebraska Army and Air National Guard firefighters near Hayes Center, Neb., April 24, 2022. From Nebraska Emergency Management Agency.

Outlooks

Photo Courtesy of Pete Boulay Minnesota SCO

ENSO Status and Projection



Outlooks

- Sea surface temperatures in the central and eastern Pacific have decreased (La Niña has strengthened)
- Coldest April in records going back 72 years
- La Niña conditions likely continues into the summer and may persist into fall
- Dry/Hot southern to central plains into western IA/MO...southern SD

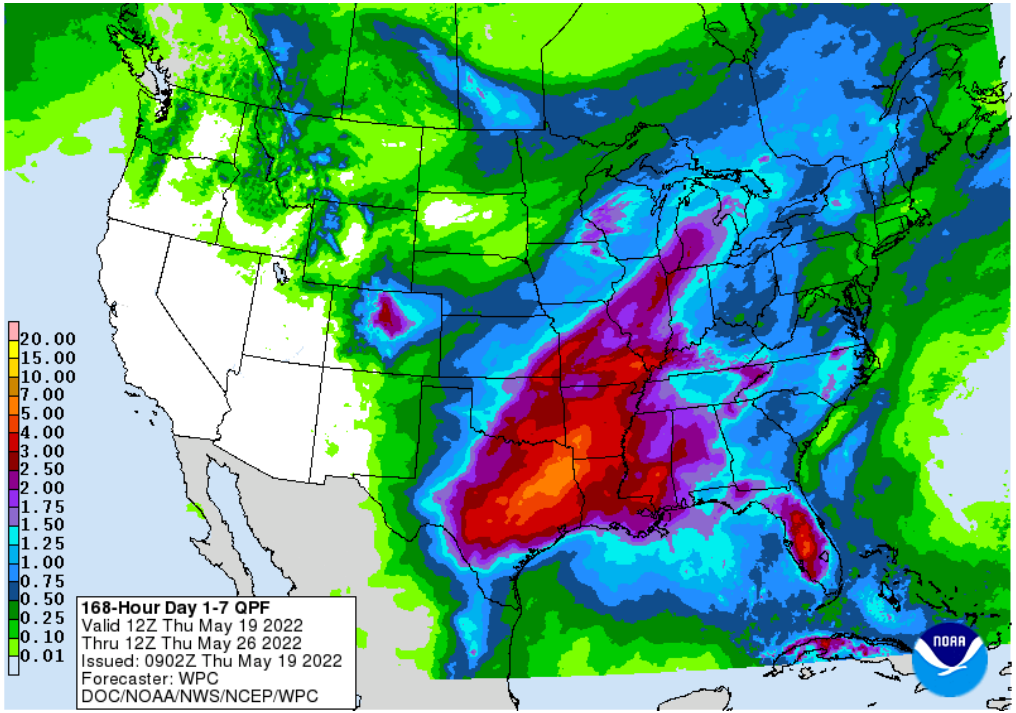
Source: https://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/enso.shtml#discussion

Outlooks

7-Day Quantitative Precipitation Forecast

Valid Thu May 19 – Thu May 26

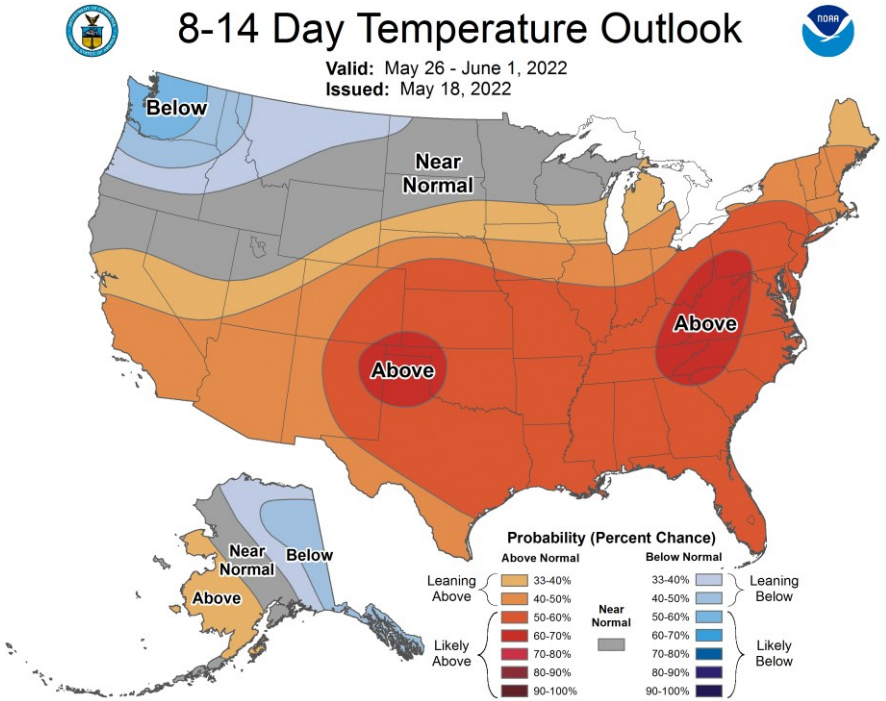
- Gulf of Mexico moisture streaming ahead of multiple fronts moving through the region
- Snow in the Colorado Rockies; Plenty of rainfall across Lower Missouri and Ohio River basin
- Some rainfall across the Northern Plains and Upper Midwest

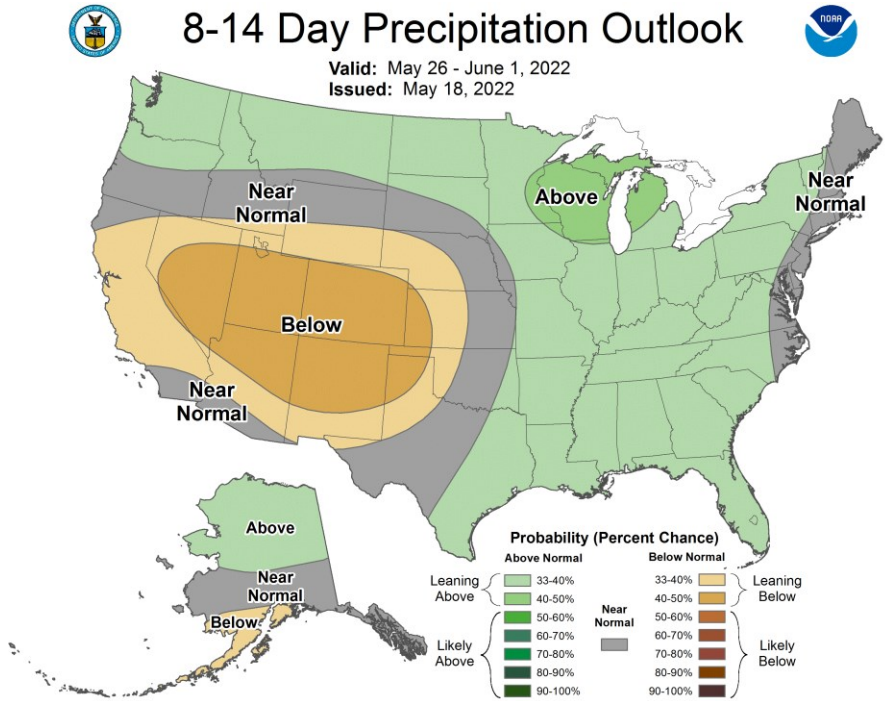


Source: https://www.wpc.ncep.noaa.gov/#

8-14 Day Temperature/Precipitation Probabilities

Outlooks
May 26 – June 1

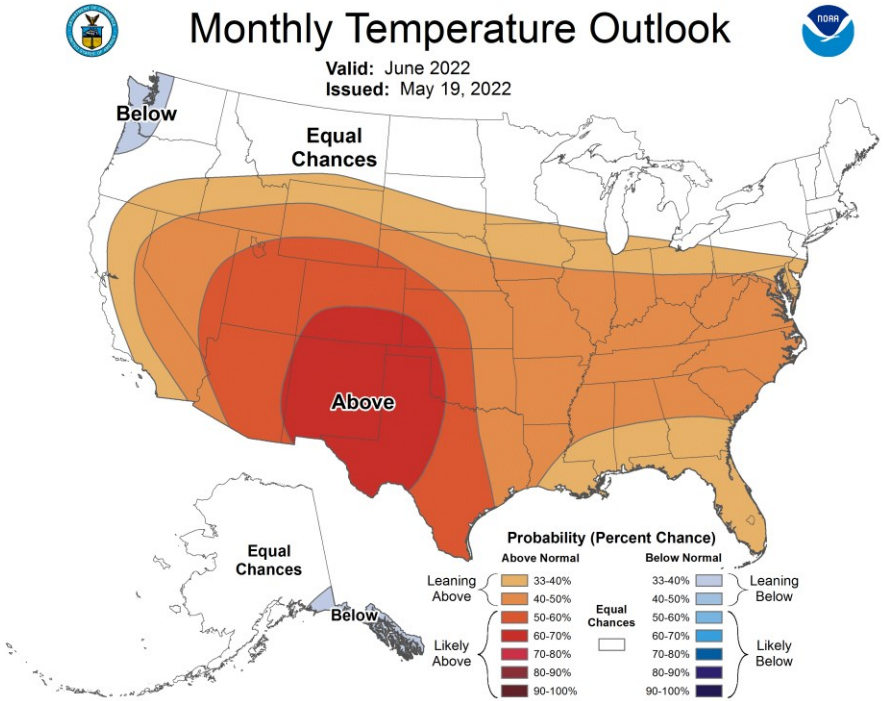


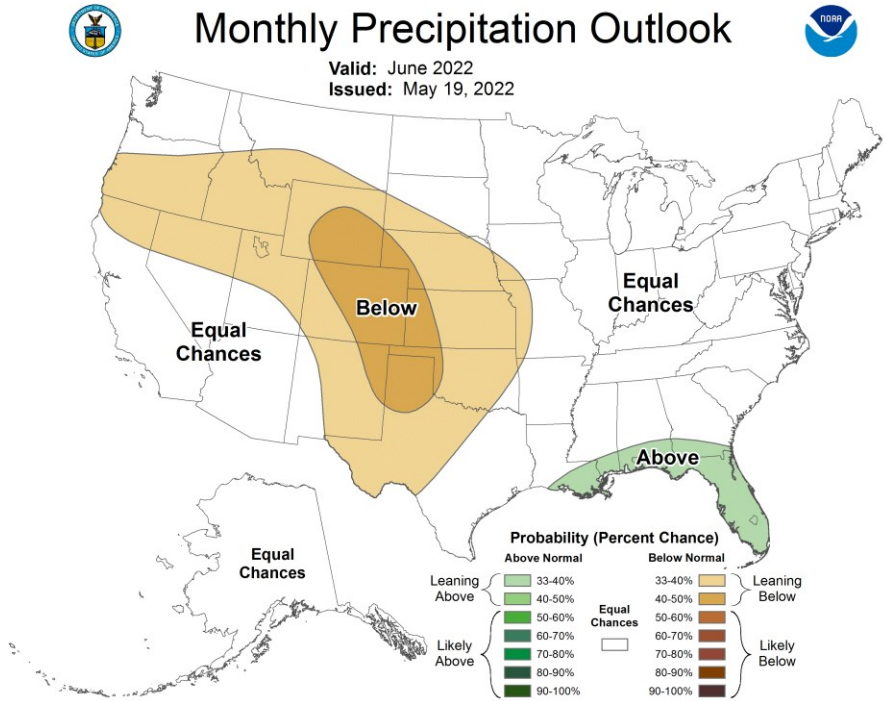


Source: http://www.cpc.ncep.noaa.gov/products/predictions/814day/index.php

Outlooks

June Temperature/Precipitation Probabilities

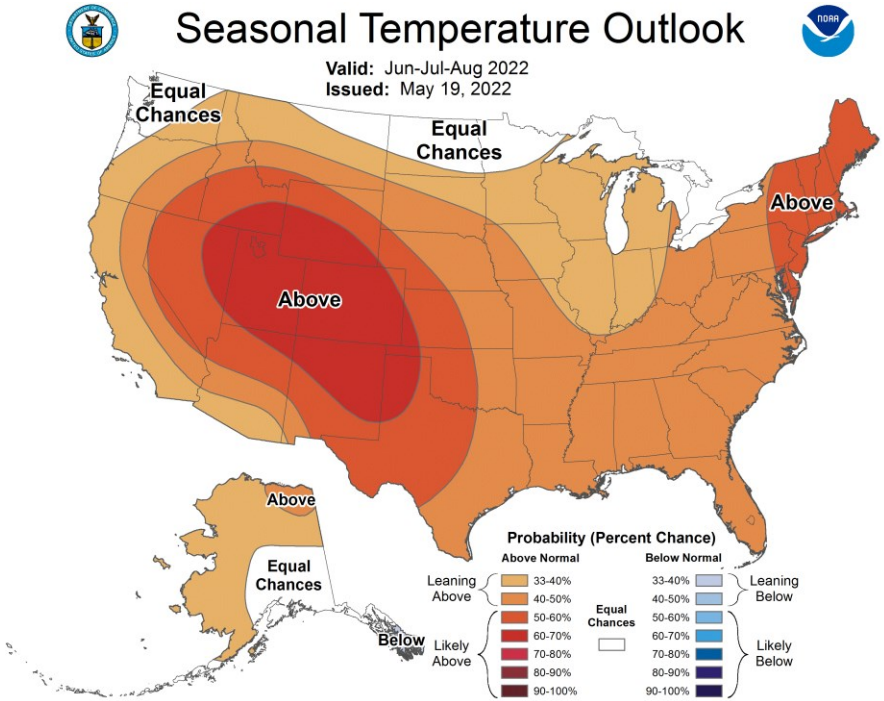


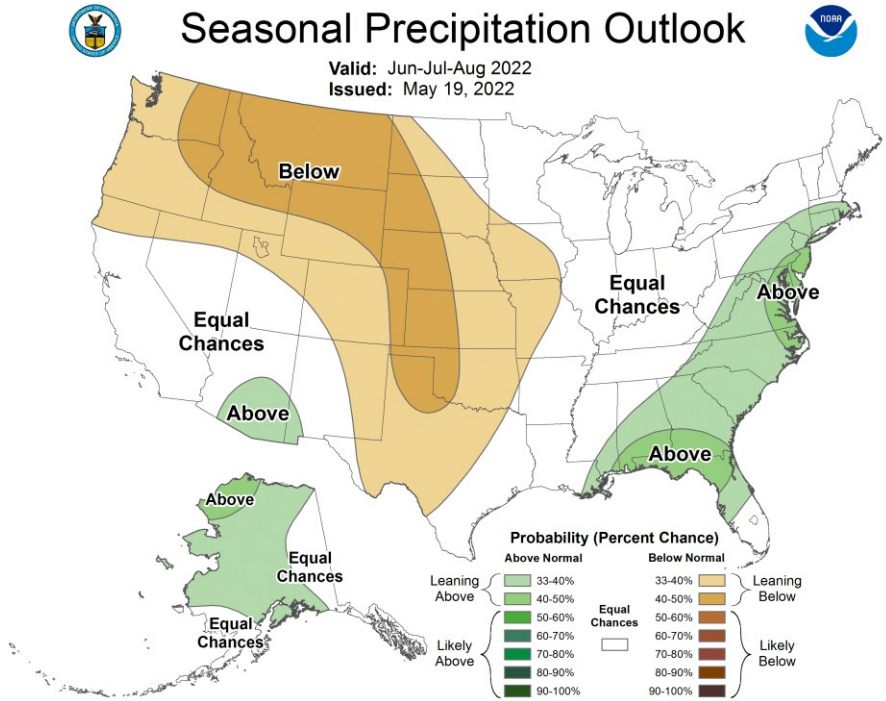


https://www.cpc.ncep.noaa.gov/products/predictions/814day/

Outlooks

June - August Temperature/Precipitation Probabilities

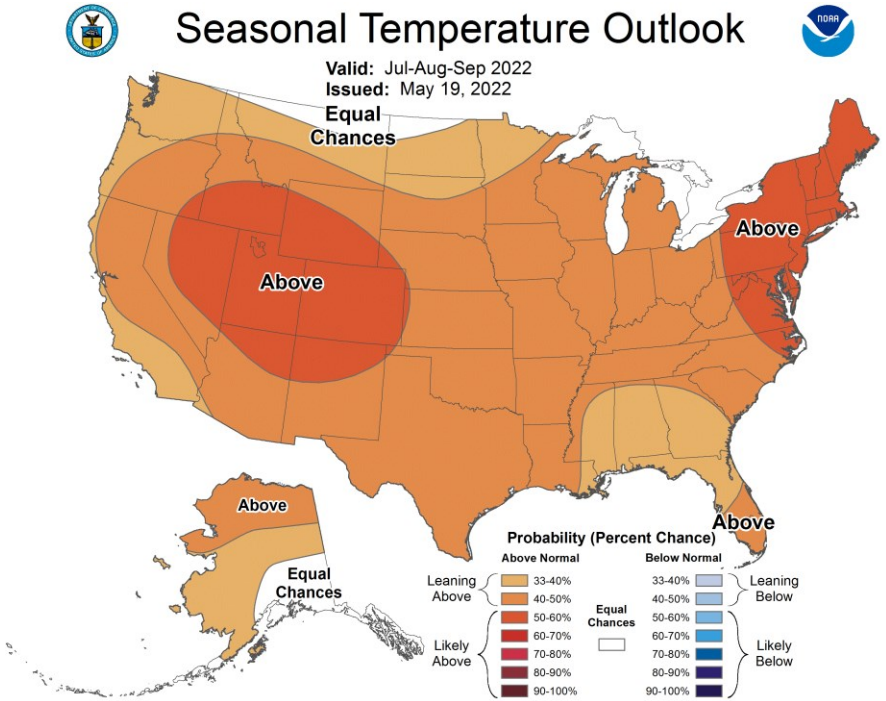


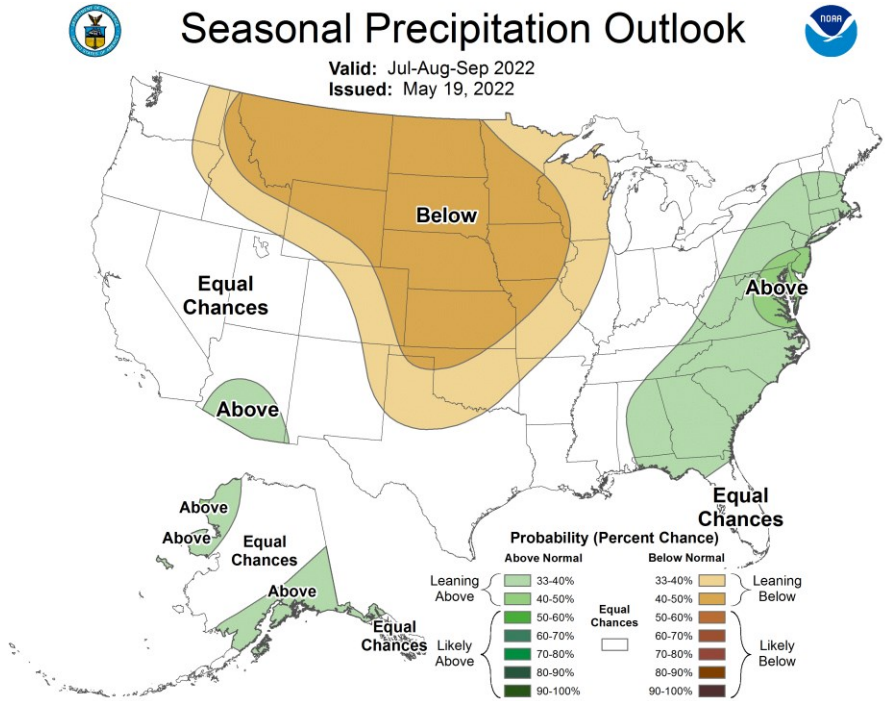


https://www.cpc.ncep.noaa.gov/products/predictions/long_range/

Outlooks

July - September Temperature/Precipitation Probabilities



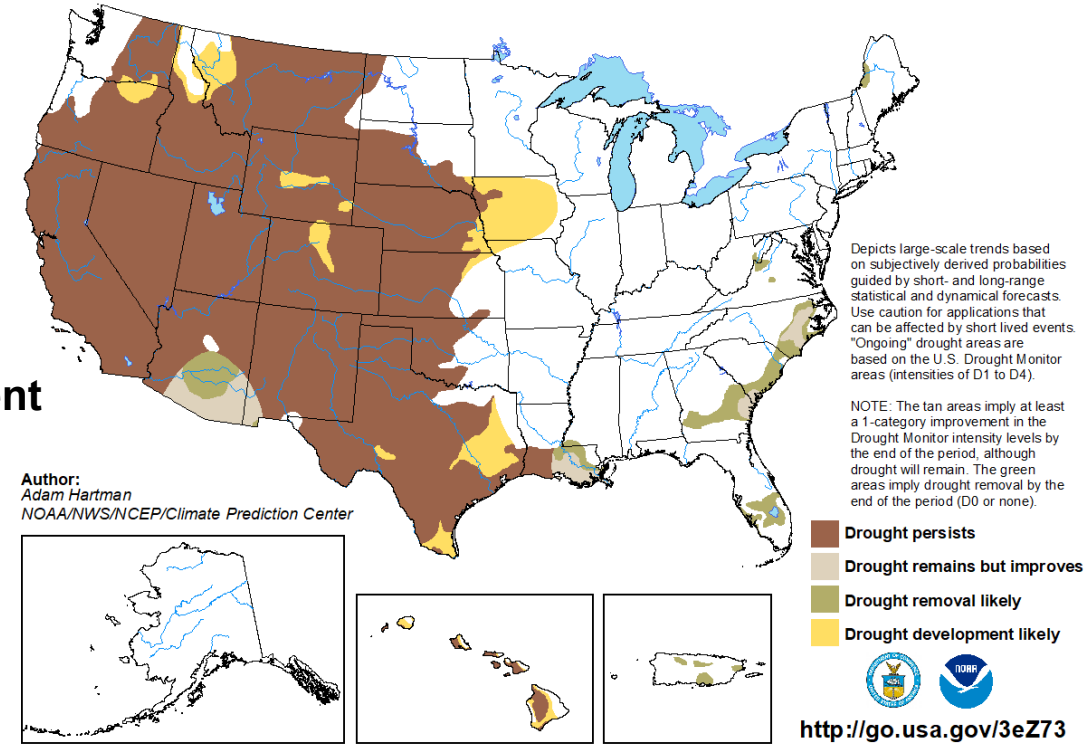


https://www.cpc.ncep.noaa.gov/products/predictions/90day/

Drought Outlook

Outlooks

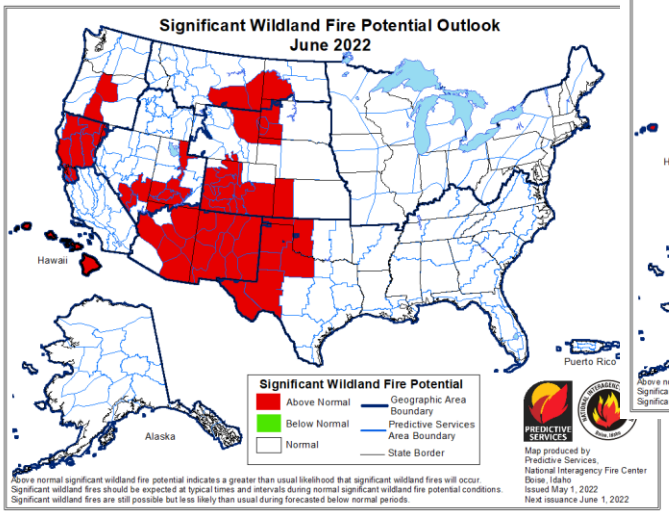
- **Drought development likely across Iowa**

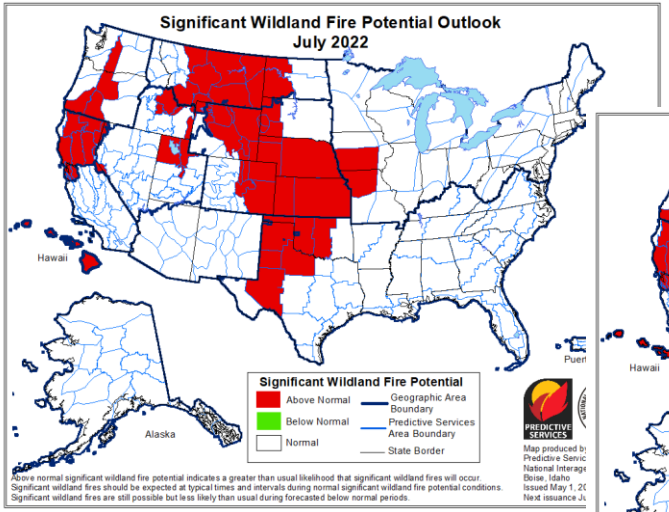


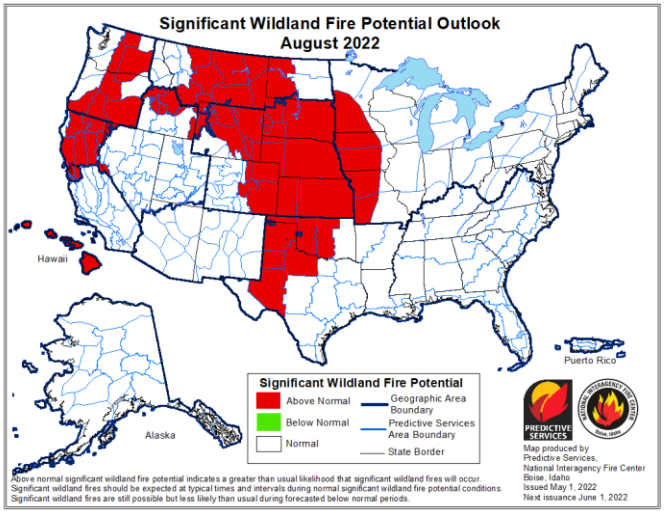
https://www.cpc.ncep.noaa.gov/products/expert_assessment/season_drought.png

Fire

Outlooks







- High wildland fire danger continues across CO, KS, and NE through June
- Expands across parts of the High Plains into much of NE, KS, IA, and MO by July

Source: https://www.predictiveservices.nifc.gov/outlooks/outlooks.htm

Summary of Current Conditions

- **April temperatures were below average for most of the region; A little warmer conditions recently across our region's southern states**
- **Very dry across western portions of the region; Drier than average for the lower Ohio Valley and portions of the Great Lakes; Very wet conditions across ND, MI, and parts of SD and IA.**
- **Ongoing flooding issues for the Red River, James River, and Northern Minnesota**
- **Planting lagging – some improvement in the east and central states; late spring conditions and dampness keeping planting to a minimum across the north**
- **Strong persistent winds continue – dust storms and wildfire risk across the parched areas of NE, KS, and CO**

Outlook Summary

- La Niña conditions persist through summer
- June Outlook reflects temperature probabilities leaning to likely warmer than average across the southern states in the North Central Region and Equal Chances across the north; Precipitation leaning below average across Central Plains
- Summer Outlook reflects temperatures leaning to likely warmer than average across most of the region (EC across the north); Precipitation leaning below average for western states, extending into IA and MO
- Elevated Fire Risk in line with Seasonal Drought Outlook

Additional Information - Partners

Today's and Past Recorded Presentations

https://mrcc.purdue.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/

USDA Climate Hubs https://www.climatehubs.usda.gov/

State climatologists: http://www.stateclimate.org

Regional climate centers: http://mrcc.purdue.edu and http://www.hprcc.unl.edu

Questions

Climate:

Aaron Wilson: wilson.1010@osu.edu, 614-292-7930
Dennis Todey: dennis.todey@usda.gov, 515-294-2013
Doug Kluck: doug.kluck@noaa.gov, 816-994-3008
Melissa Widhalm: mwidhalm@purdue.edu, 765-494-8191
Brian Fuchs: bfuchs2@unl.edu, 402 472-6775

Weather:

crhroc@noaa.gov

North Central U.S. Climate & Drought Outlook
May 19, 2022

THE OHIO STATE UNIVERSITY

THANK YOU!

Aaron Wilson
(wilson.1010@osu.edu)