



NEBRASKA STATE
CLIMATE OFFICE

Update and Outlook

5 March 2024

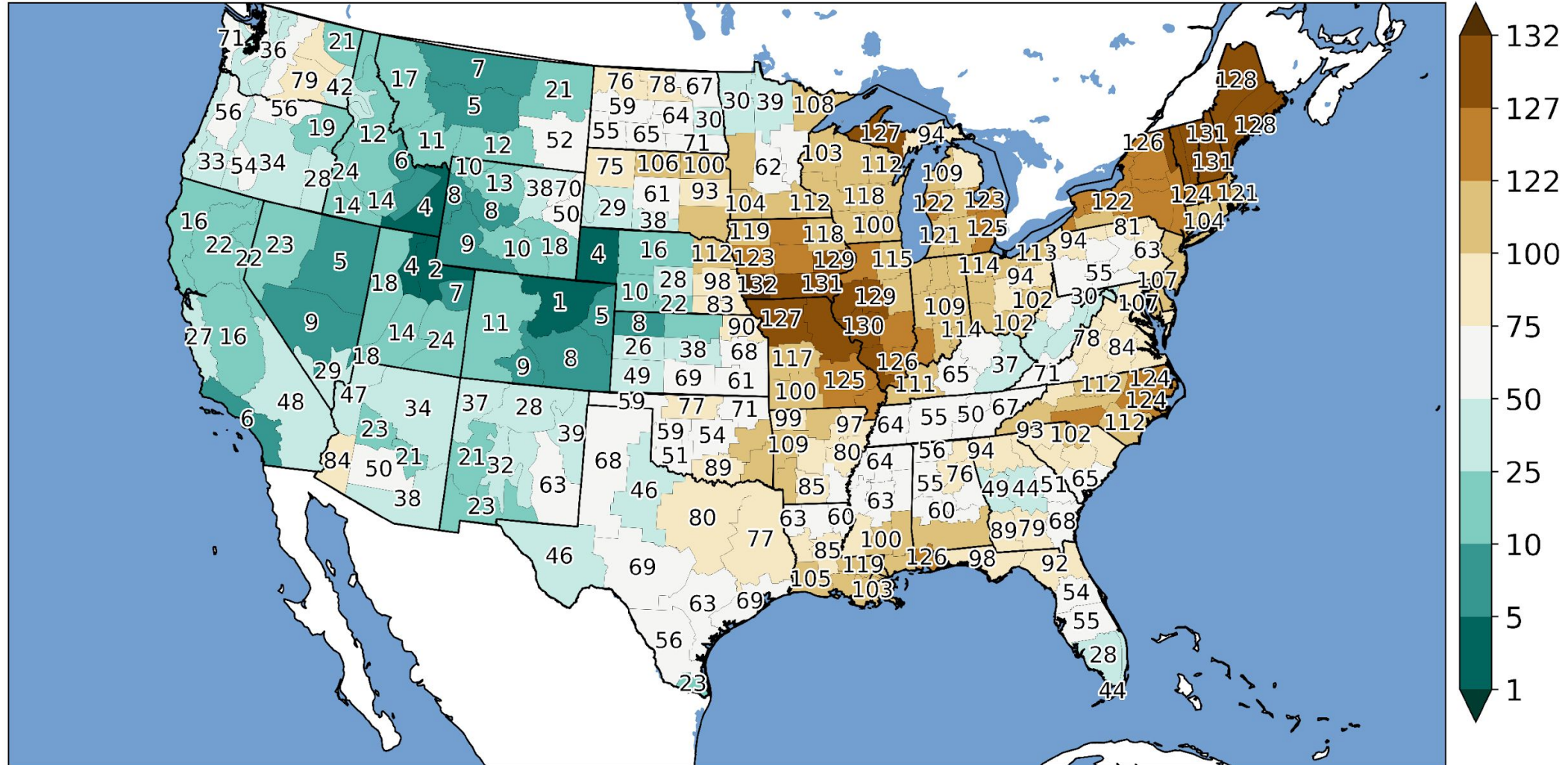
ERIC HUNT
EHUNT2@UNL.EDU
402-617-4190



Dry February



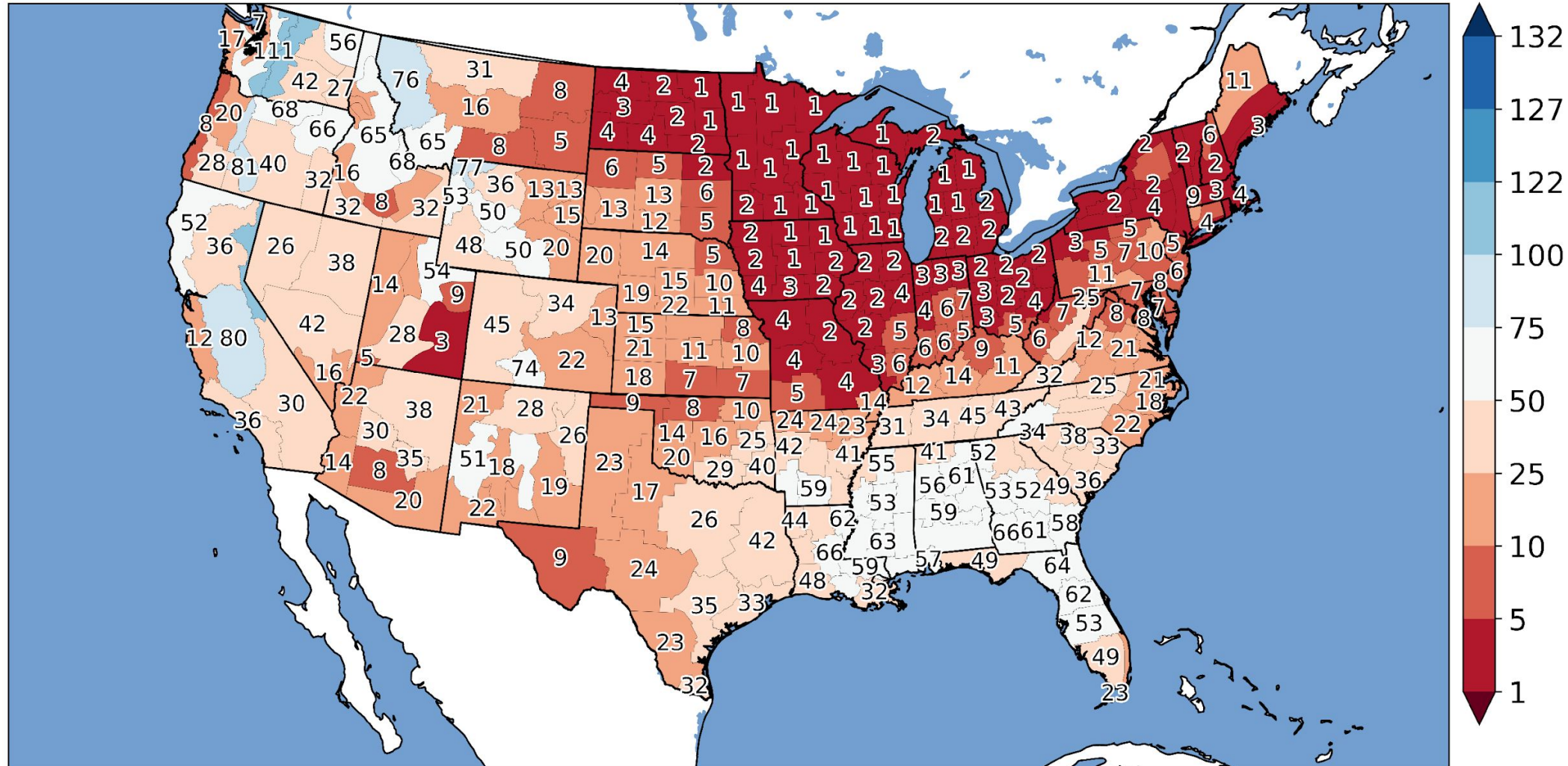
31 Jan 2024 ~7 AM till 29 Feb 2024 ~7 AM Total Precipitation Ranks by Climate District
Based on IEM Estimates, 1 is wettest out of 132 total years (1893-2024)



Mild winter



30 Nov 2023 ~7 AM till 28 Feb 2024 ~7 AM Average Temperature Ranks by Climate District
Based on IEM Estimates, 1 is hottest out of 132 total years (1893-2024)

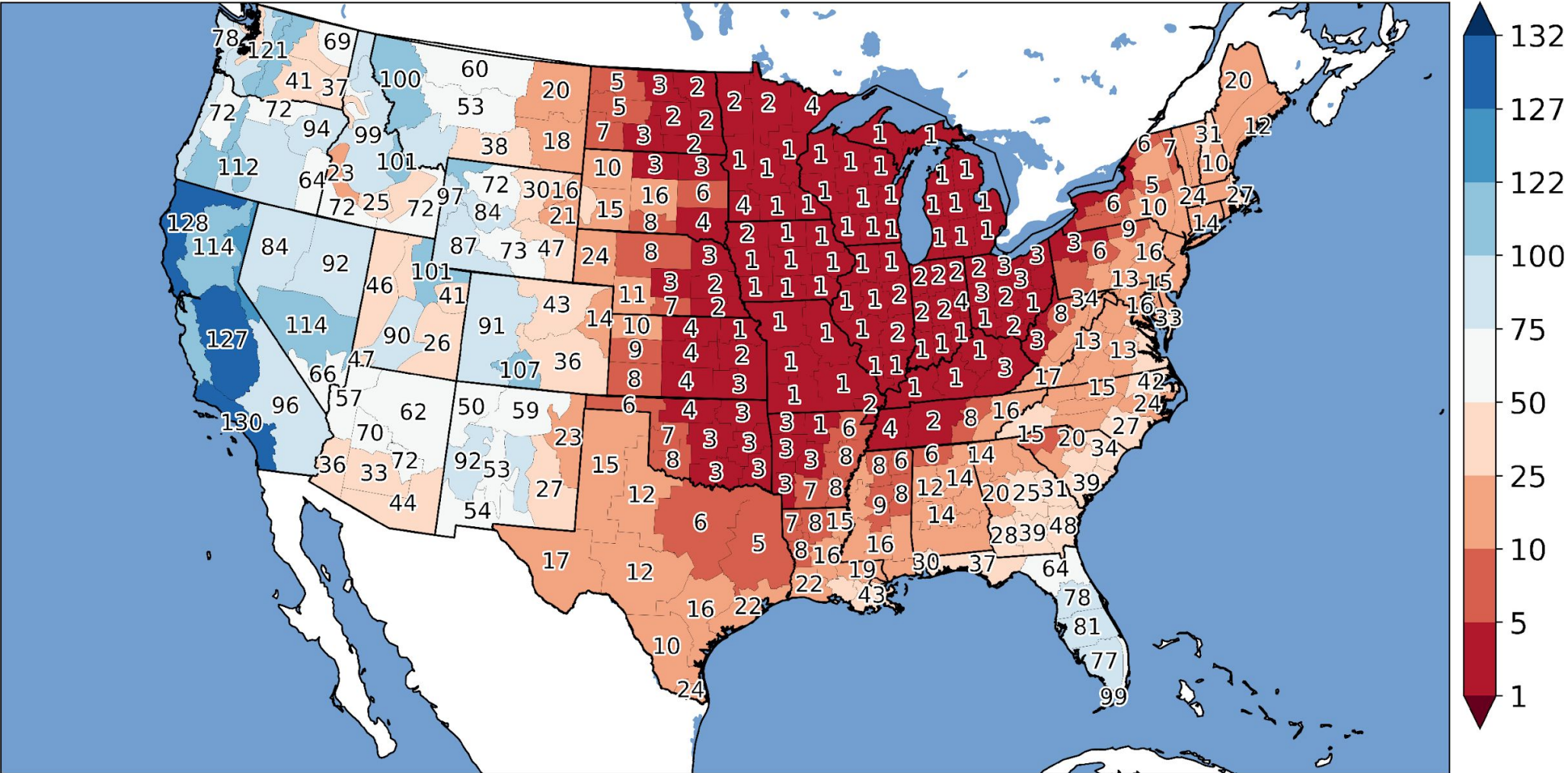


data units ::
IEM Autoplot App #24

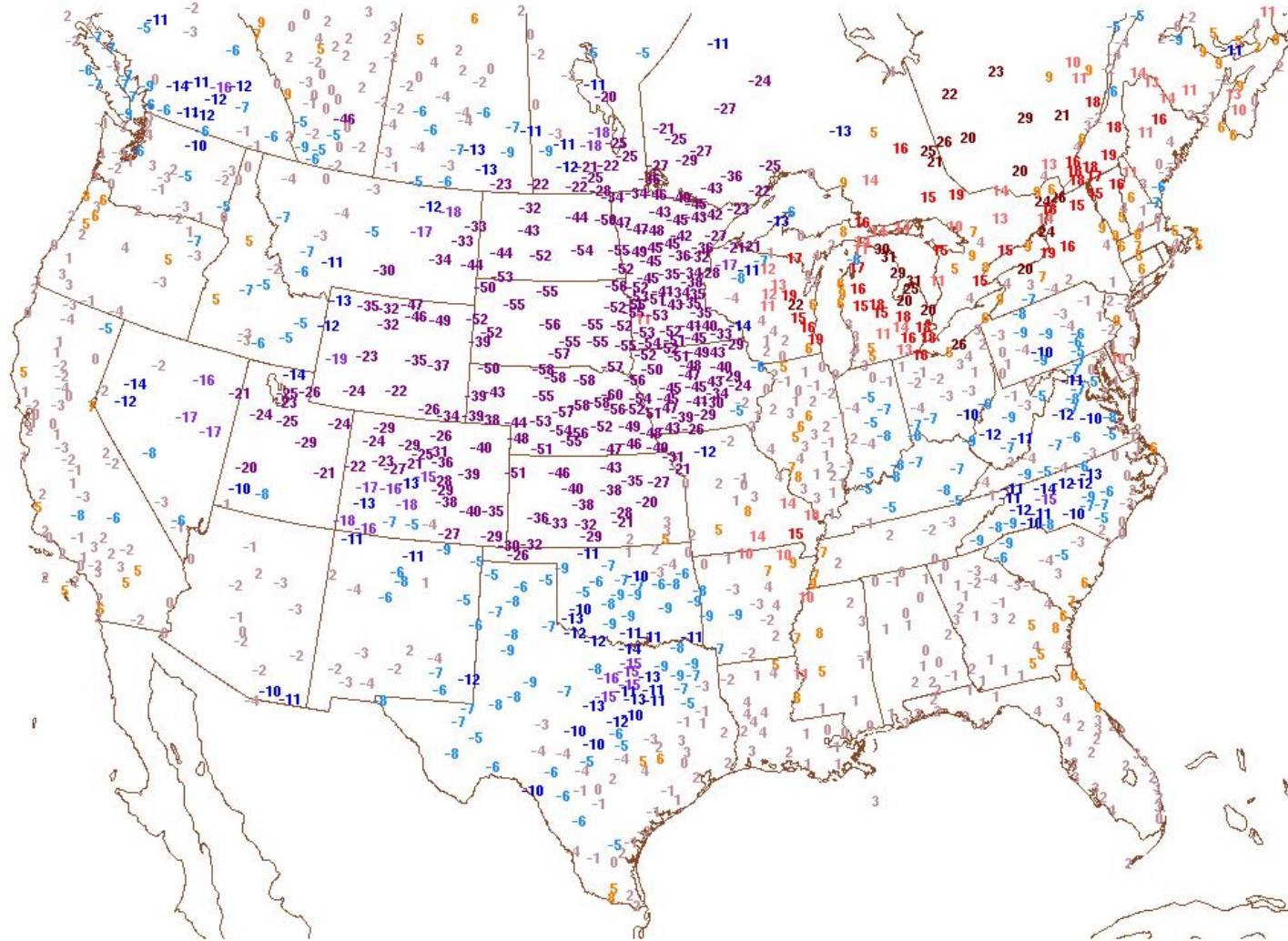
February temperature anomalies



31 Jan 2024 ~7 AM till 28 Feb 2024 ~7 AM Average High Temperature Ranks by Climate District
Based on IEM Estimates, 1 is hottest out of 132 total years (1893-2024)



Big drop

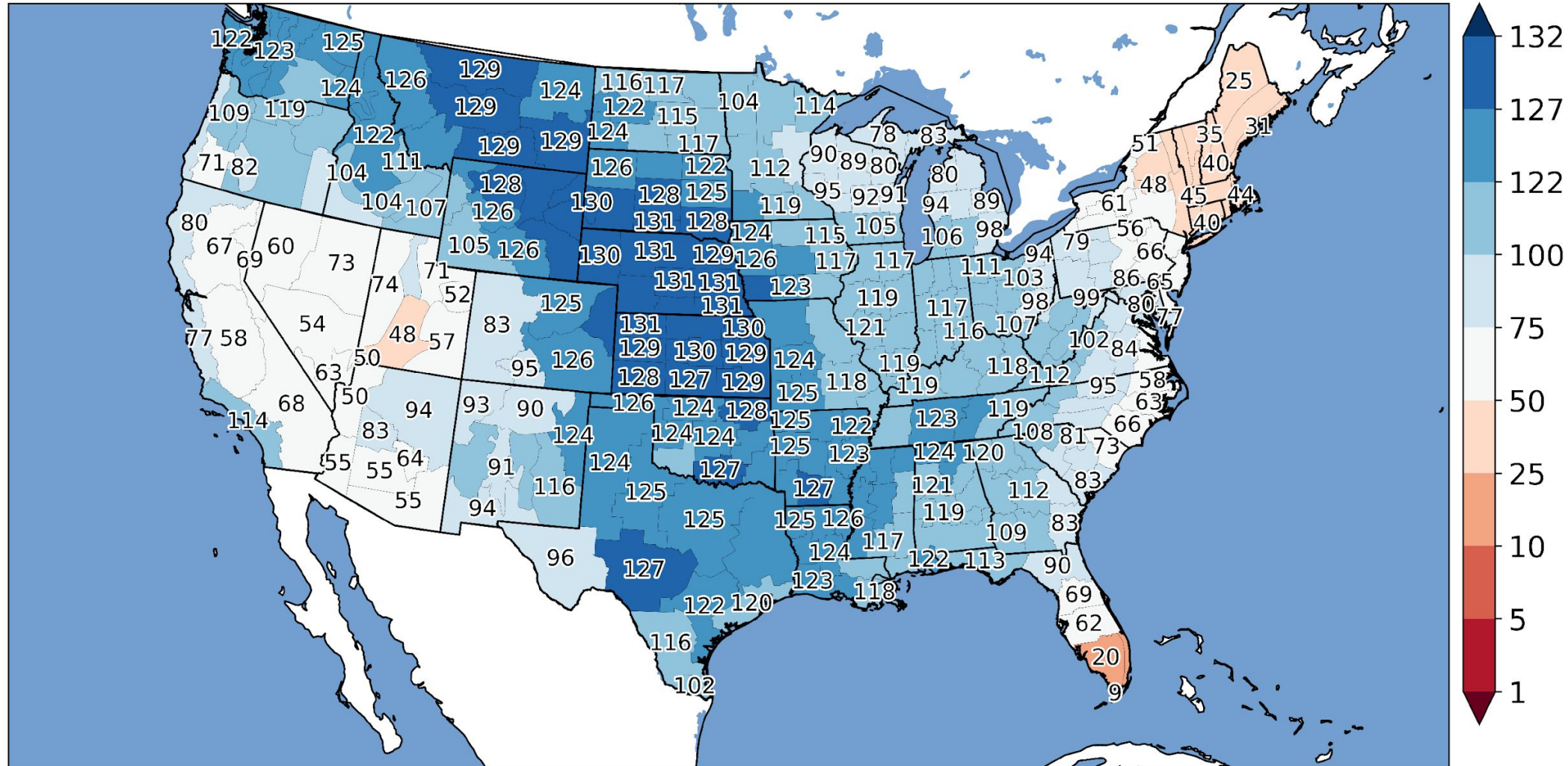


24-HR TEMPERATURE CHANGE VALID 2200 UTC 240227

Near-record cold



7 Jan 2024 ~7 AM till 21 Jan 2024 ~7 AM Average Temperature Ranks by Climate District
Based on IEM Estimates, 1 is hottest out of 132 total years (1893-2024)



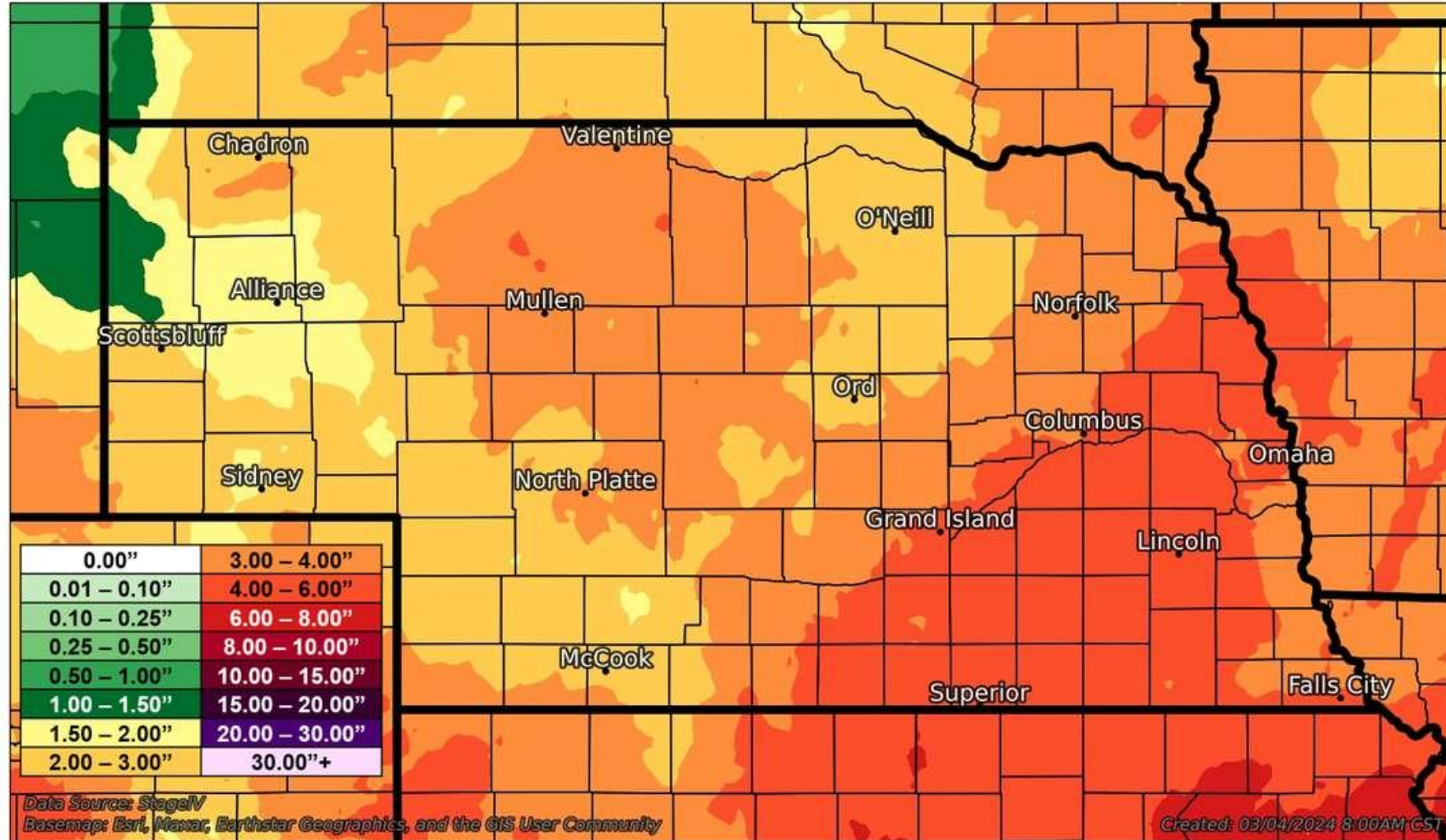
data units ::
IEM Autoplot App #24

Last 90 days



90-Day Precipitation

As of: March 04, 2024 - 6AM CST



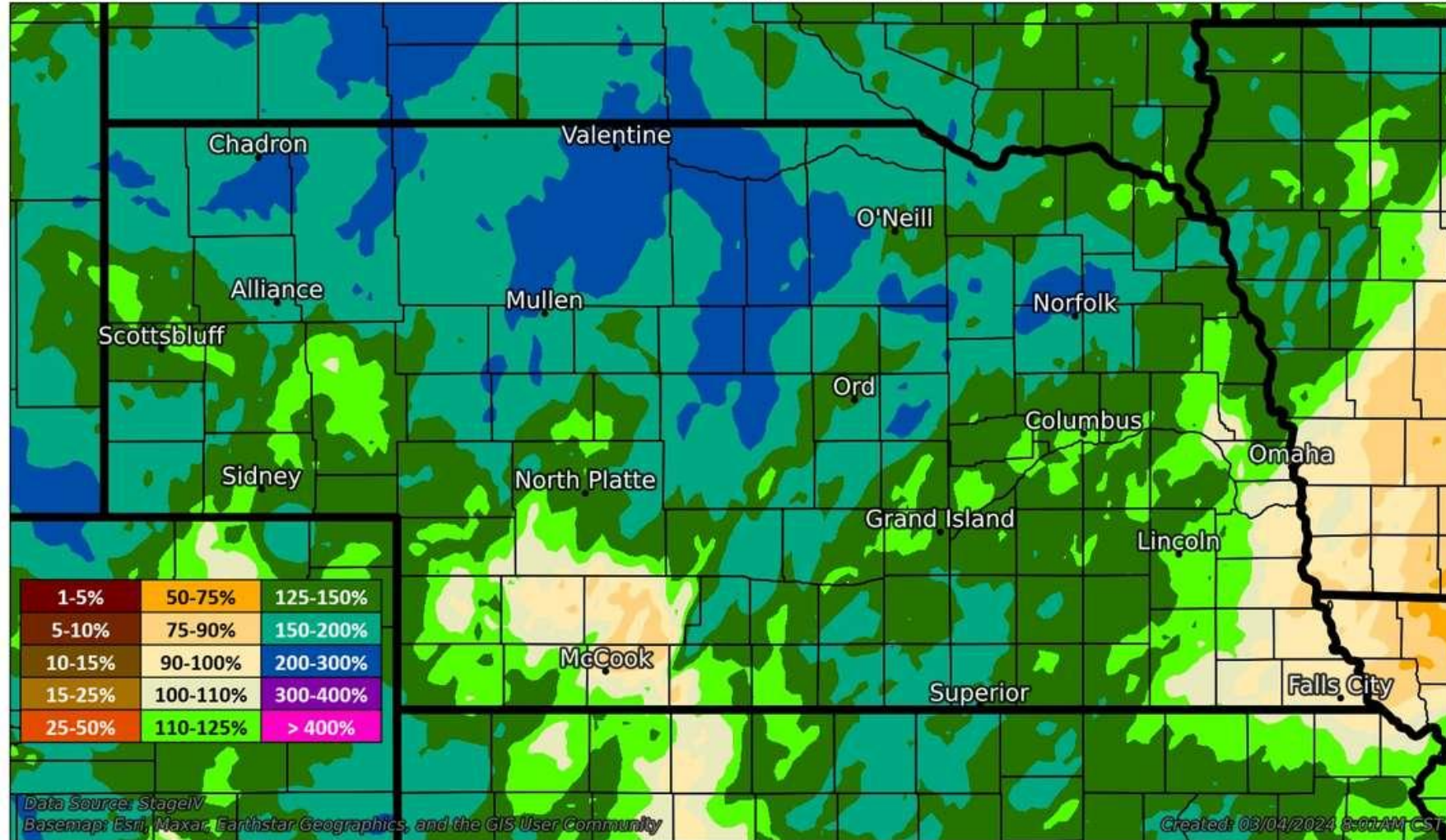
Water Year to Date (% of normal)



Precip Percent Since Oct. 1



As of: March 04, 2024 - 6AM CST

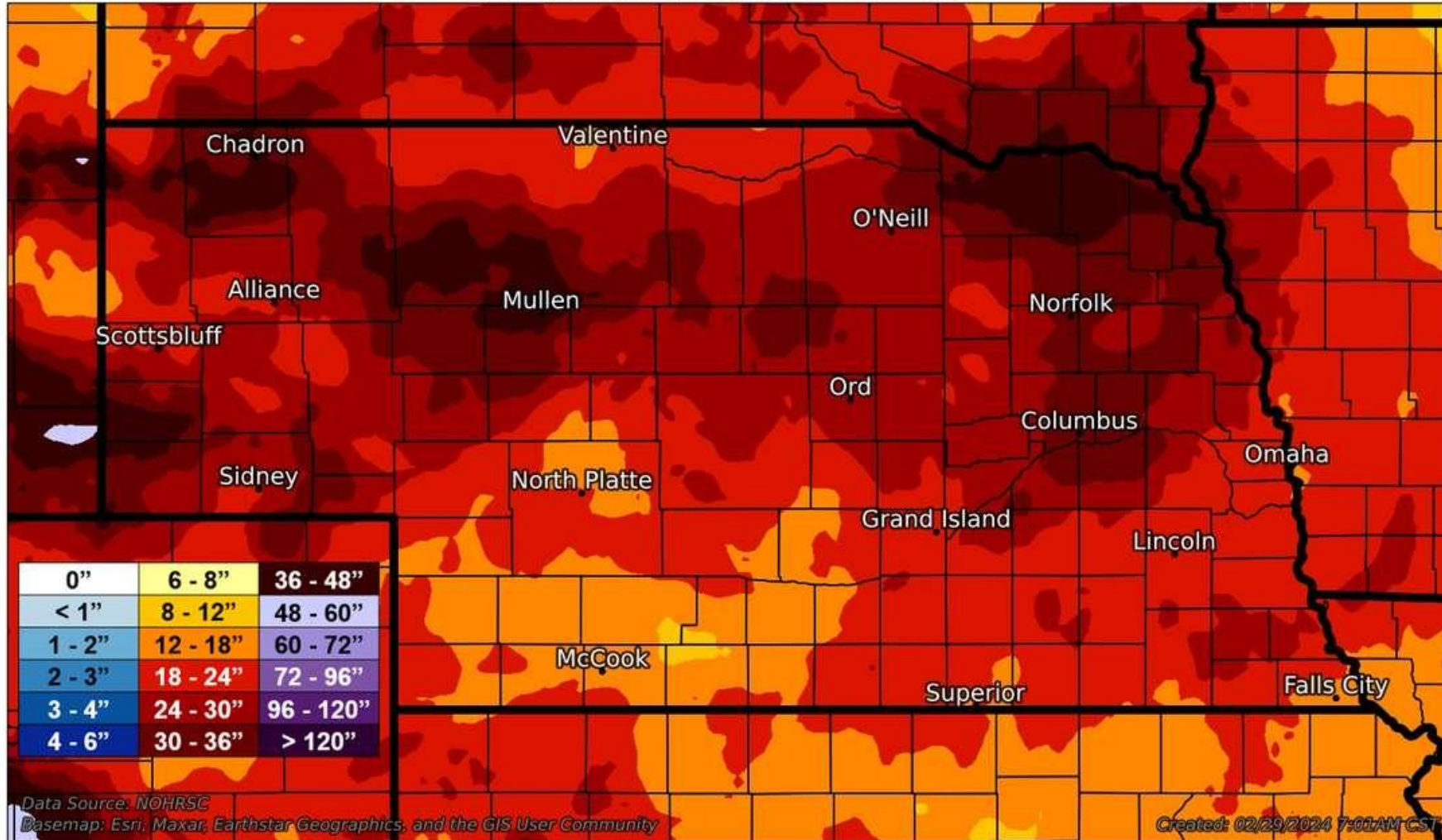


Seasonal snowfall



Season Total Snow

As of: February 28, 2024 - 6AM CST

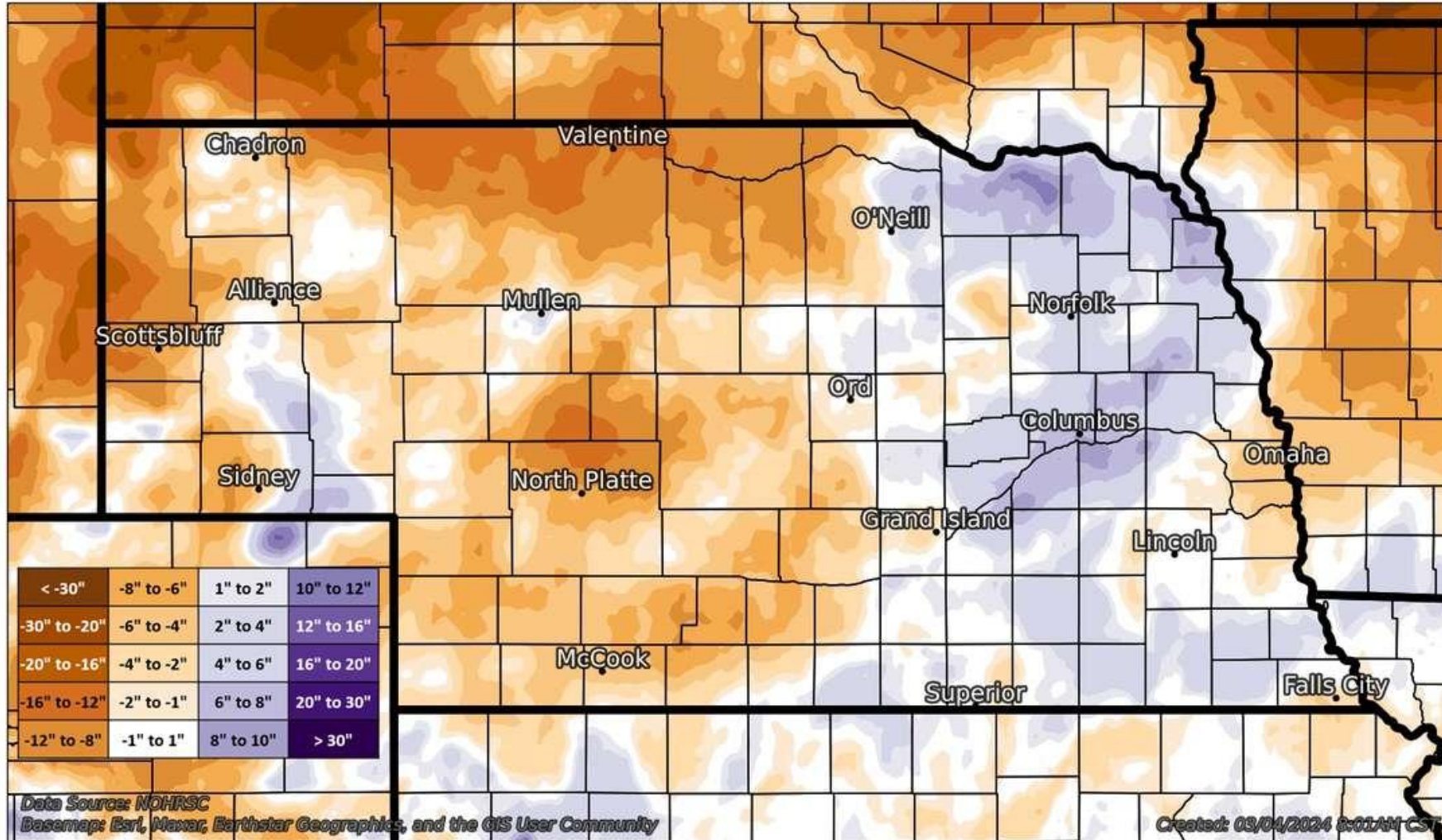


Snowfall anomalies



Season Snow Departure

As of: March 04, 2024 - 6AM CST



Drought in perspective

Conditions one year ago in Nebraska:

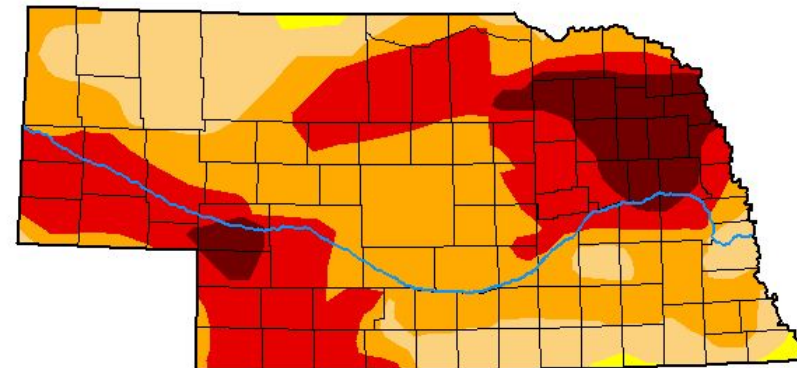
- Almost 100% of state in drought.
- Conditions worst in northeast NE.

U.S. Drought Monitor Nebraska

February 21, 2023
(Released Thursday, Feb. 23, 2023)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.03	99.97	99.04	79.10	40.07	9.22
Last Week <i>02-14-2023</i>	0.00	100.00	99.21	79.82	40.07	9.97
3 Months Ago <i>11-22-2022</i>	0.00	100.00	99.78	85.15	58.39	17.37
Start of Calendar Year <i>01-03-2023</i>	0.00	100.00	99.78	83.95	46.30	12.35
Start of Water Year <i>09-27-2022</i>	0.00	100.00	94.94	74.27	30.52	10.50
One Year Ago <i>02-22-2022</i>	0.05	99.95	91.20	15.19	0.00	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 Heim
NCEI/NOAA



droughtmonitor.unl.edu

Drought in perspective

Conditions now in Nebraska:

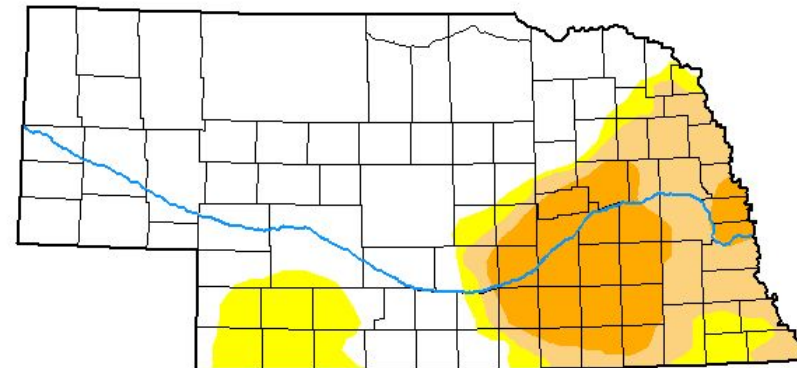
- 24.5% in drought
- Significant improvement in western and north central NE

U.S. Drought Monitor Nebraska

February 27, 2024
(Released Thursday, Feb. 29, 2024)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	65.67	34.33	24.53	12.08	0.00	0.00
Last Week 02-20-2024	65.67	34.33	24.53	12.08	0.00	0.00
3 Months Ago 11-28-2023	59.51	40.49	27.08	20.47	10.90	3.71
Start of Calendar Year 01-02-2024	60.04	39.96	26.38	18.81	7.18	0.17
Start of Water Year 09-26-2023	35.05	64.95	44.76	27.38	14.02	4.65
One Year Ago 02-28-2023	0.26	99.74	98.39	77.07	40.07	6.12



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:

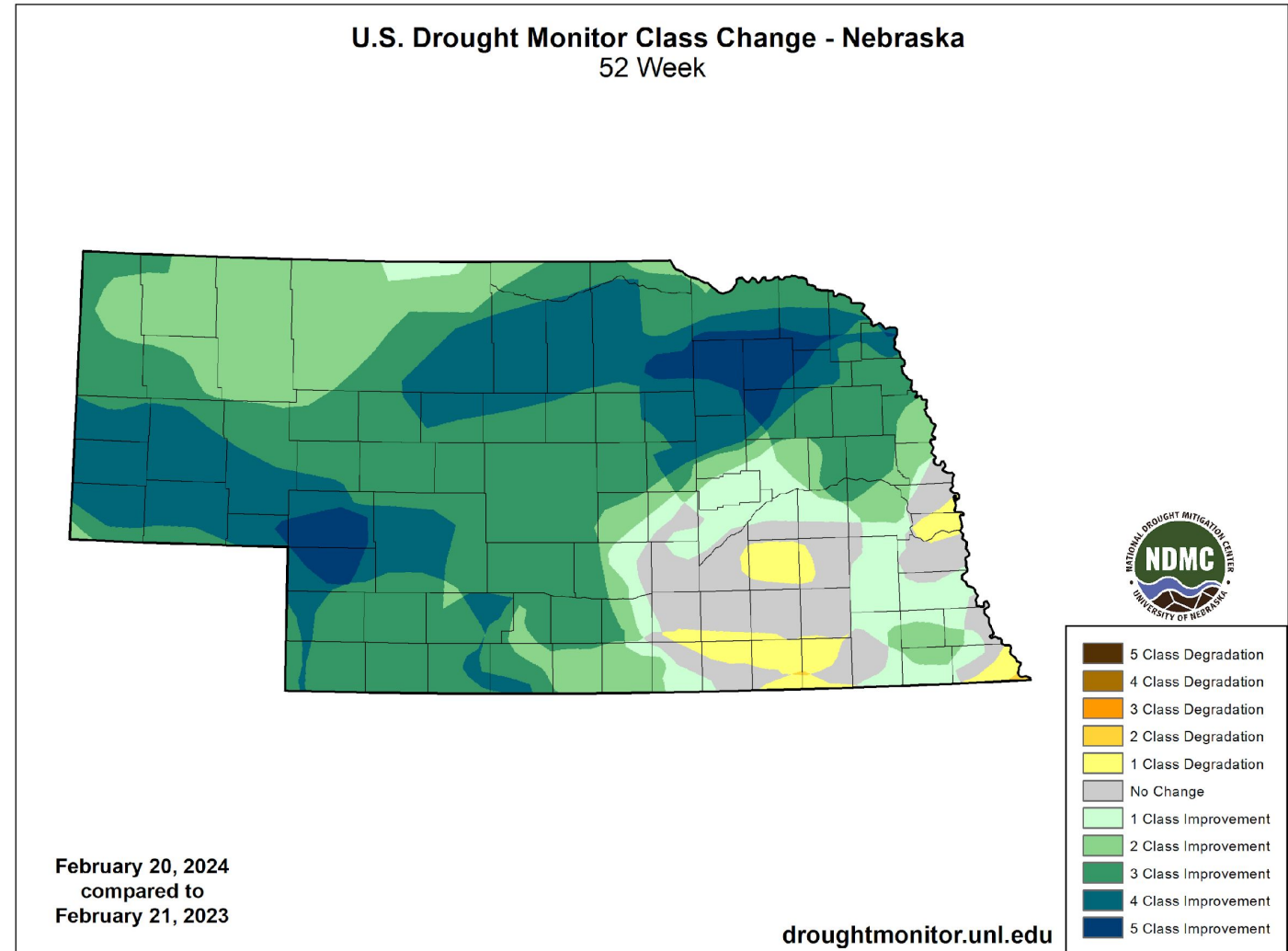
Richard Heim
NCEI/NOAA



droughtmonitor.unl.edu

Drought in perspective

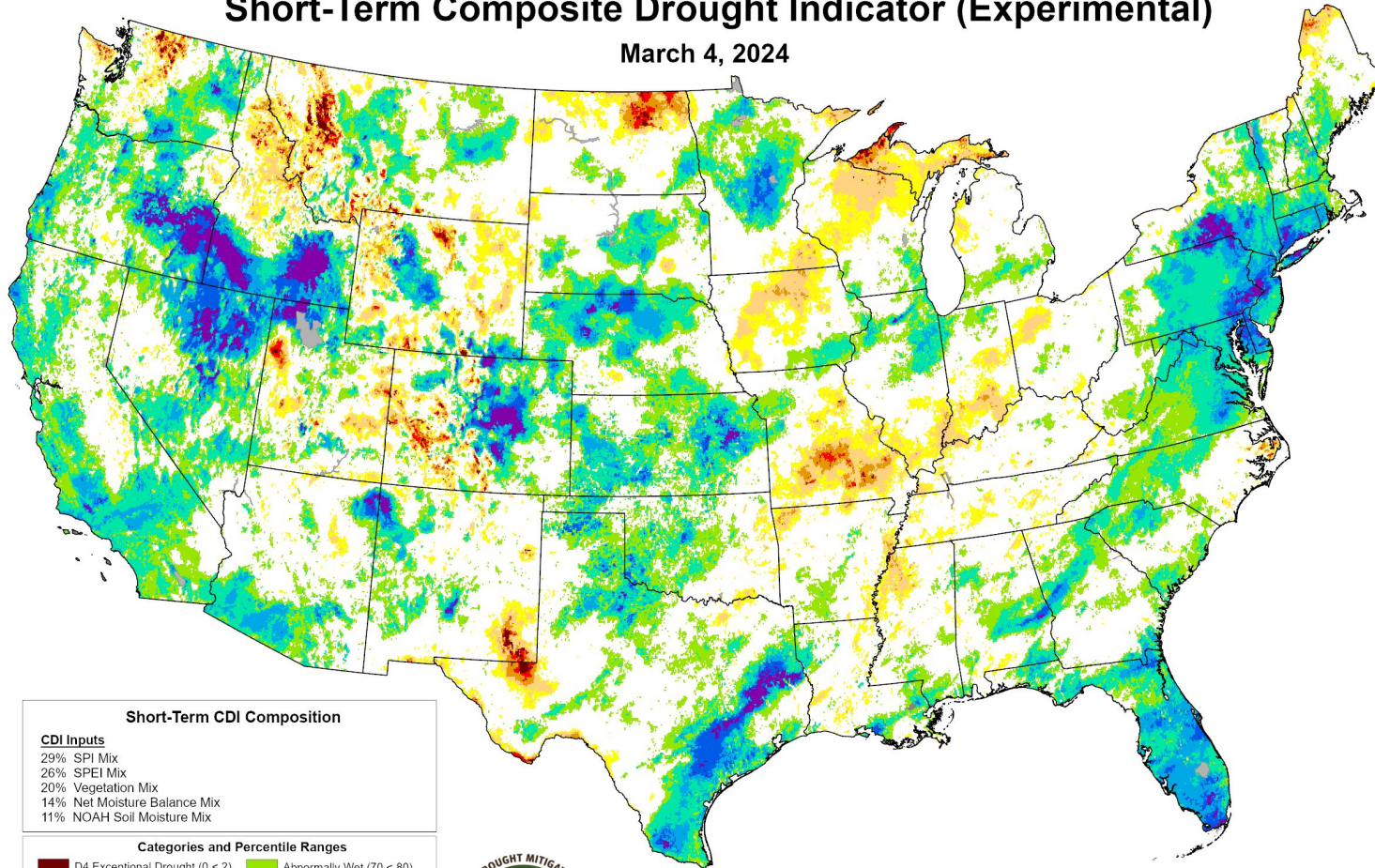
- Drought conditions have improved considerably in most of the state over the past year



Drought in perspective

Short-Term Composite Drought Indicator (Experimental)

March 4, 2024



Short-Term CDI Composition

CDI Inputs

29% SPI Mix
26% SPEI Mix
20% Vegetation Mix
14% Net Moisture Balance Mix
11% NOAA Soil Moisture Mix

Categories and Percentile Ranges

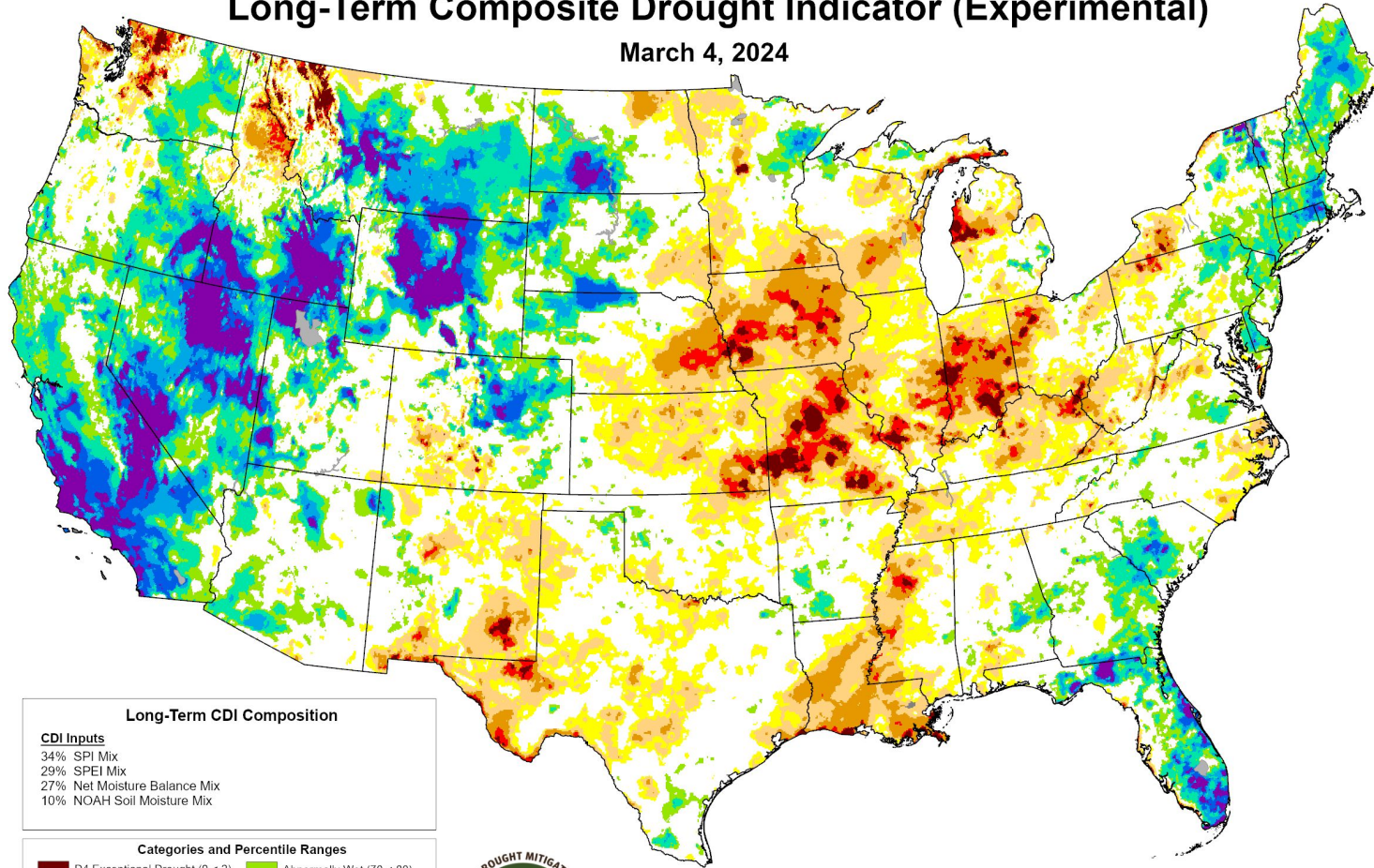
D4 Exceptional Drought (0 < 2)	Abnormally Wet (70 < 80)
D3 Extreme Drought (2 < 5)	Moderately Wet (80 < 90)
D2 Severe Drought (5 < 10)	Severely Wet (90 < 95)
D1 Moderate Drought (10 < 20)	Extremely Wet (95 < 98)
D0 Abnormally Dry (20 < 30)	Exceptionally Wet (98 - 100)
Near Normal (30 < 70)	No Data



Drought in perspective

Long-Term Composite Drought Indicator (Experimental)

March 4, 2024



Long-Term CDI Composition

CDI Inputs

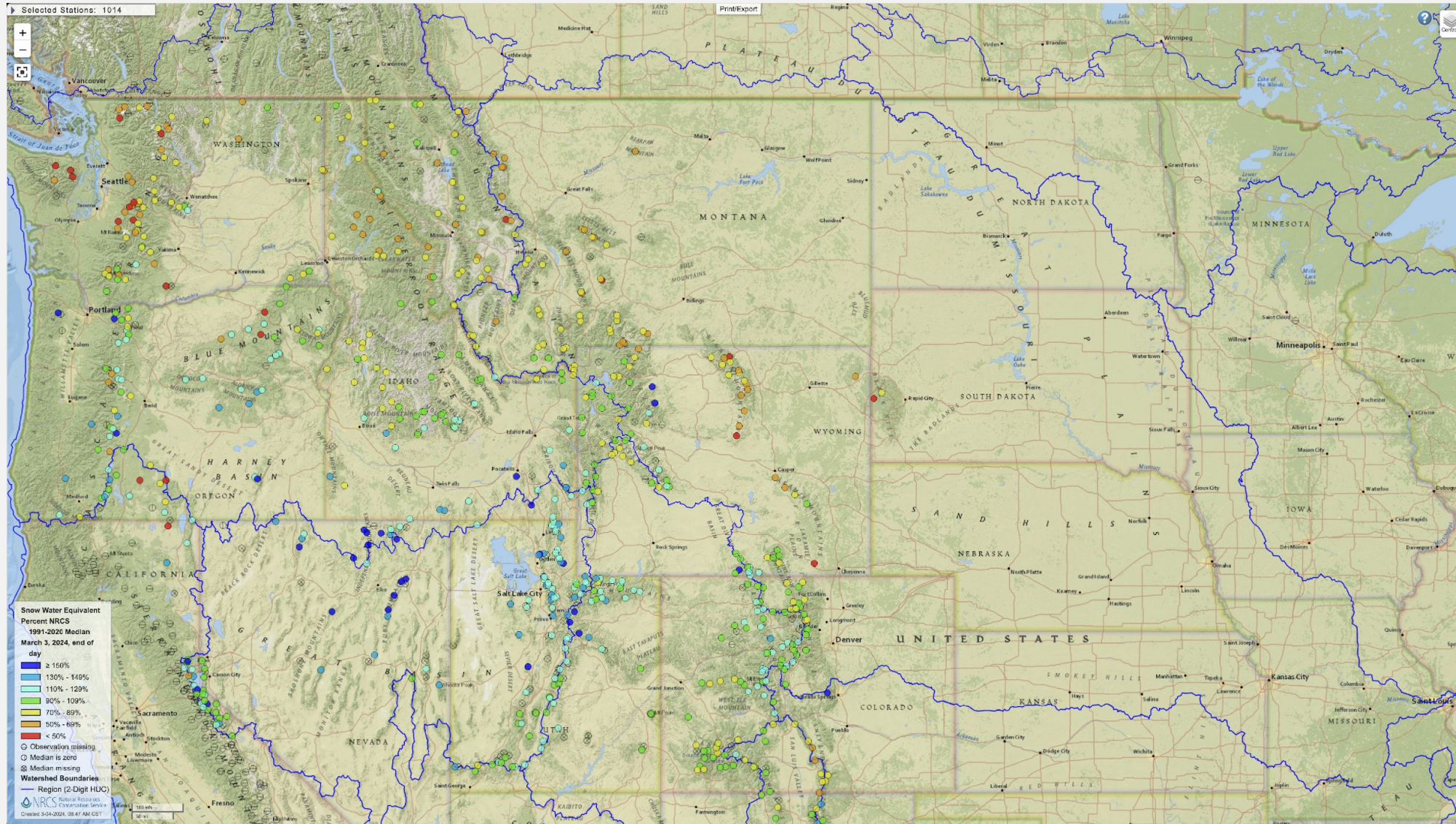
34% SPI Mix
29% SPEI Mix
27% Net Moisture Balance Mix
10% NOAA Soil Moisture Mix

Categories and Percentile Ranges

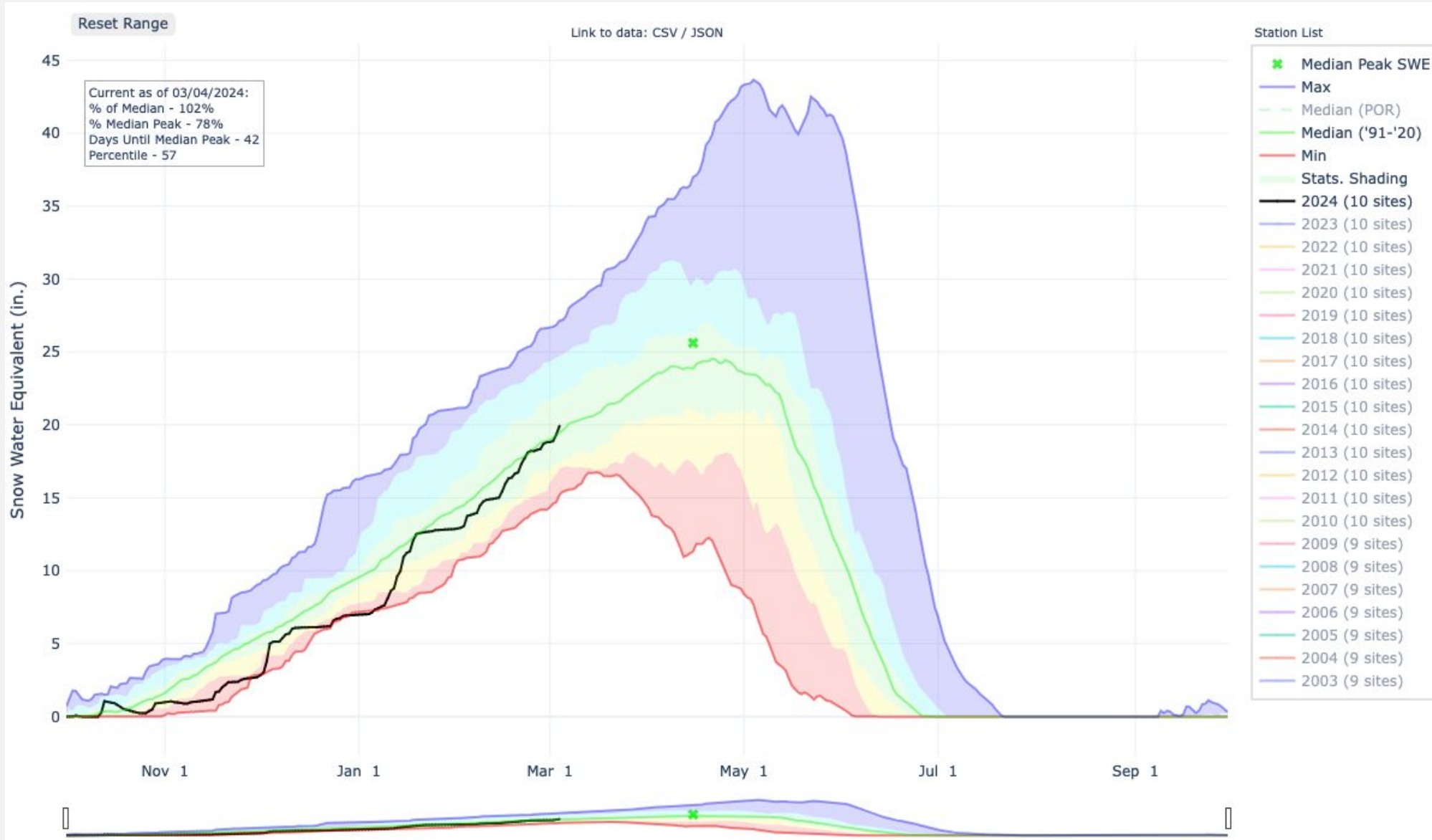
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D1 Moderate Drought (10 < 20)	Extremely Wet (95 < 98)
D0 Abnormally Dry (20 < 30)	Exceptionally Wet (98 - 100)
Near Normal (30 < 70)	No Data



Current snow water equivalent



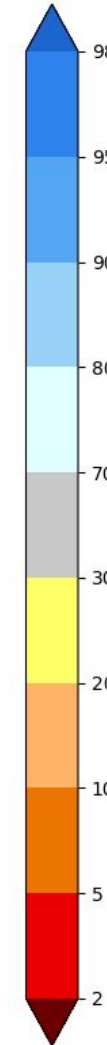
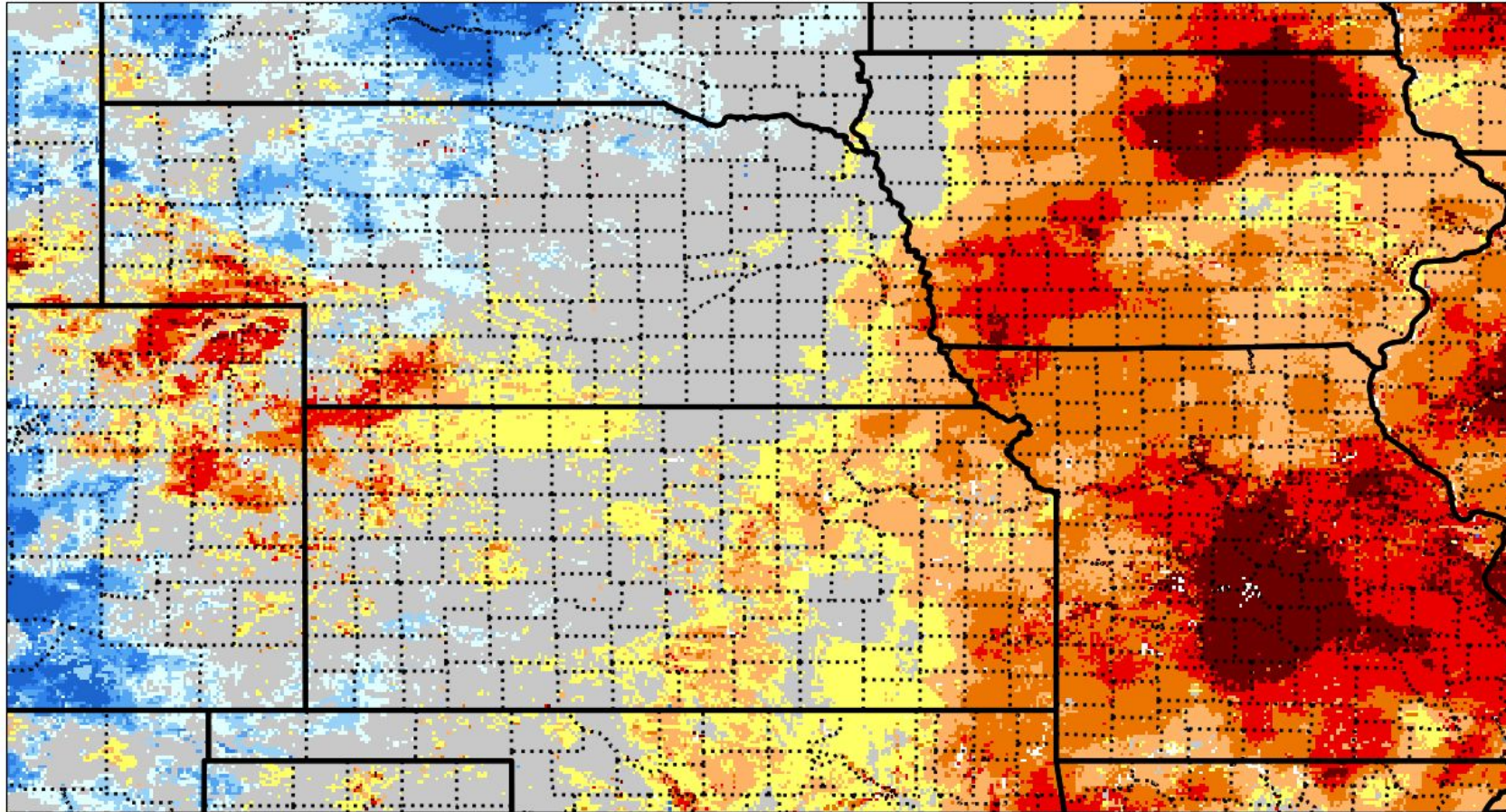
Current SWE- North Platte River Headwaters



Current root zone soil moisture

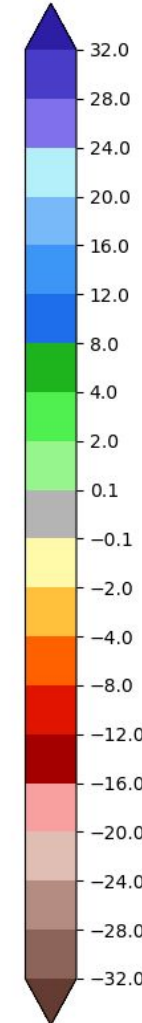
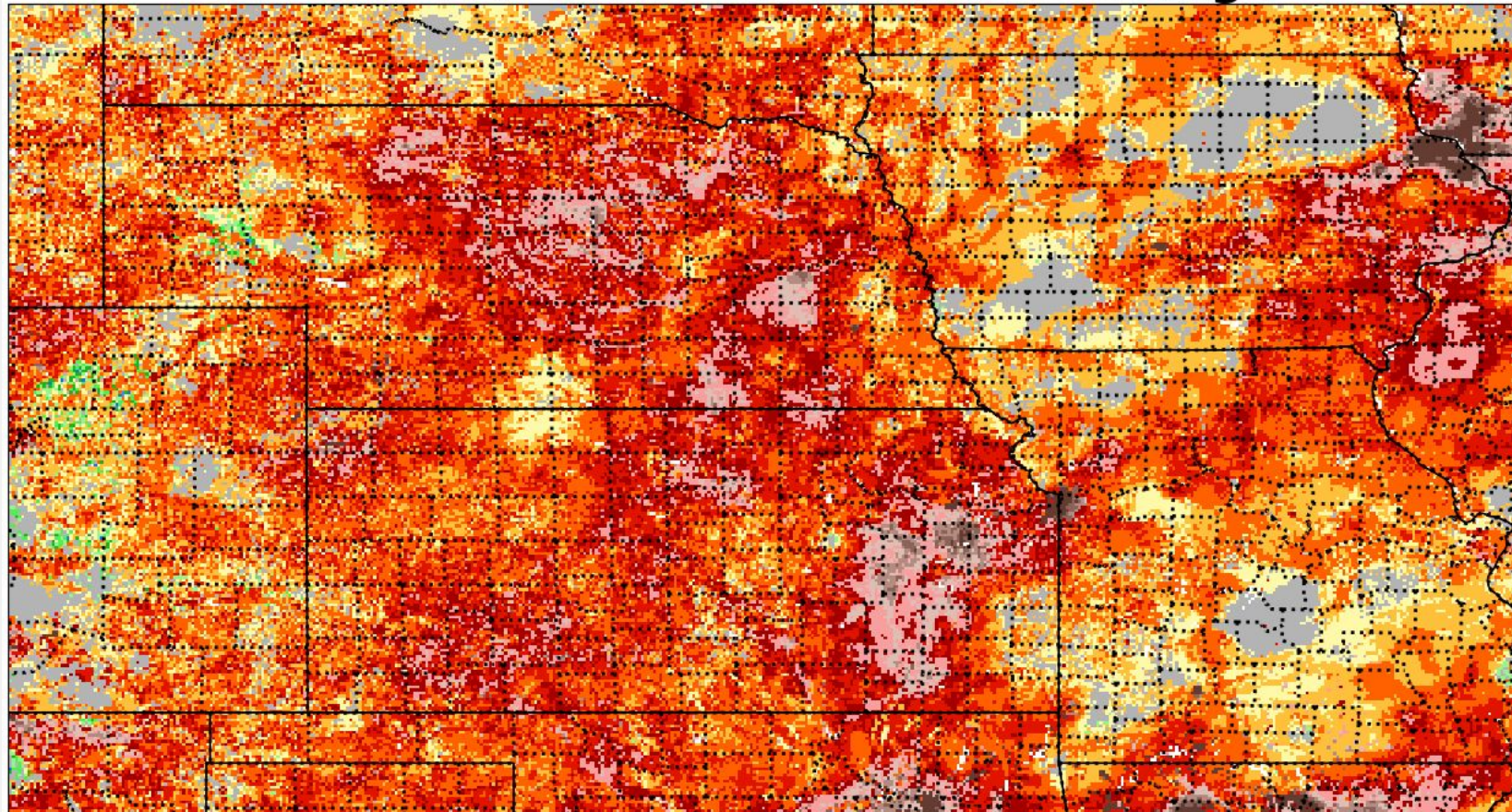
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Soil Moisture Percentile valid 03-04-2024 (0-100cm)



Recent soil moisture changes

2-week Root Zone Percentiles Change

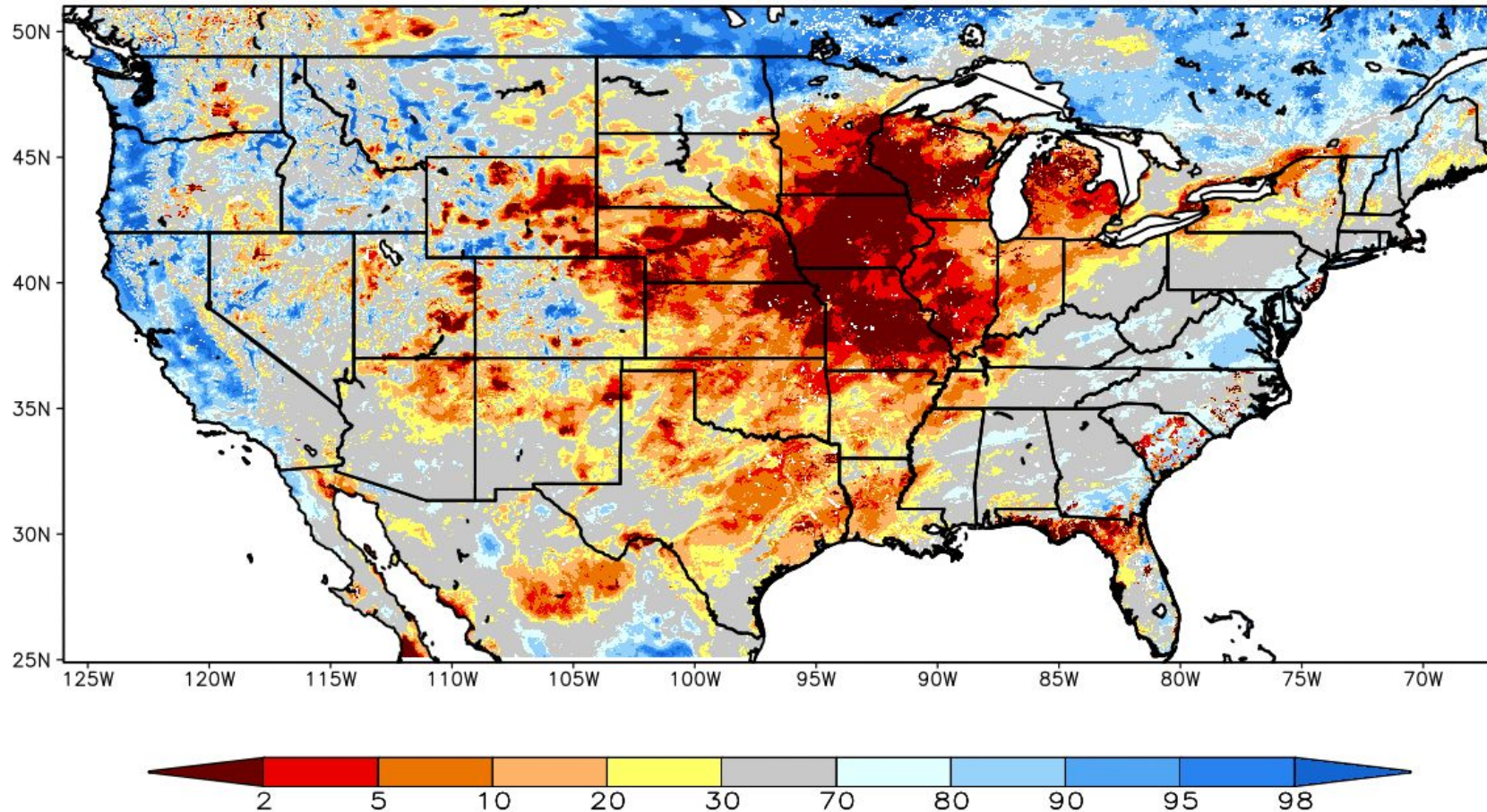


EXTENSION *SPORT*



Current top-layer soil moisture

SPoRT-LIS 0-10 cm Soil Moisture percentile valid 04 Mar 2024

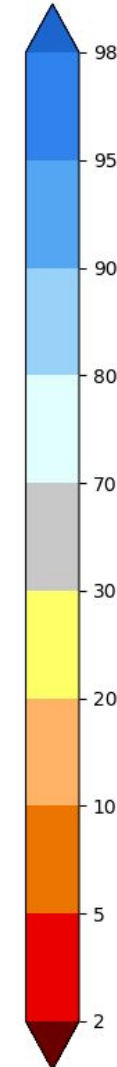
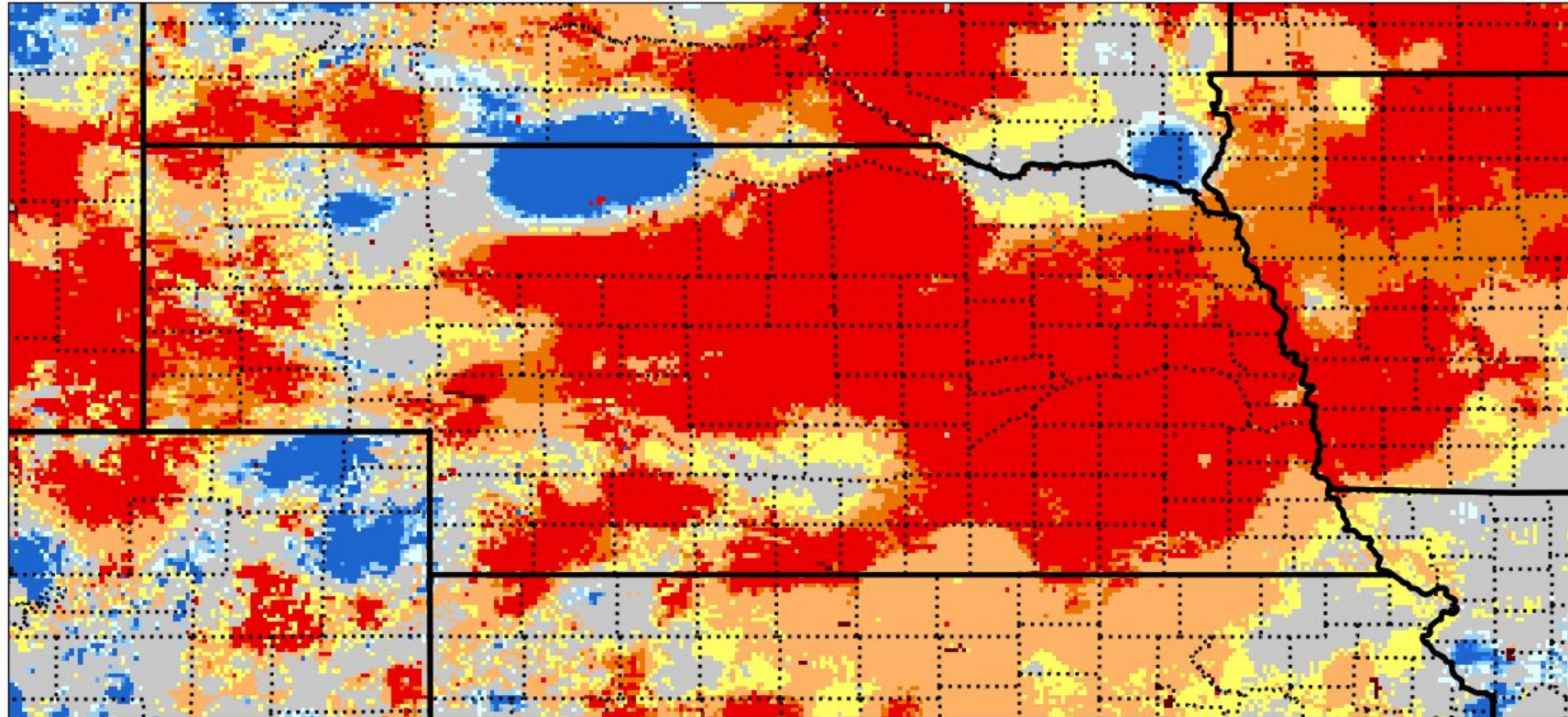


****NOTE****
****Experimental****

Soil moisture in mid-April

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Soil Moisture Percentile valid 04-14-2023 (0-100cm)



EXTENSION

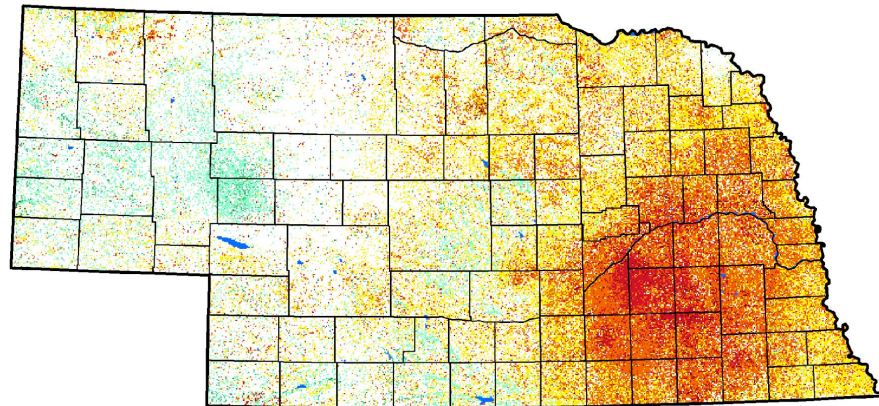
SPORT



VegDRI comparison

Vegetation Drought Response Index Complete: Nebraska

June 25, 2023



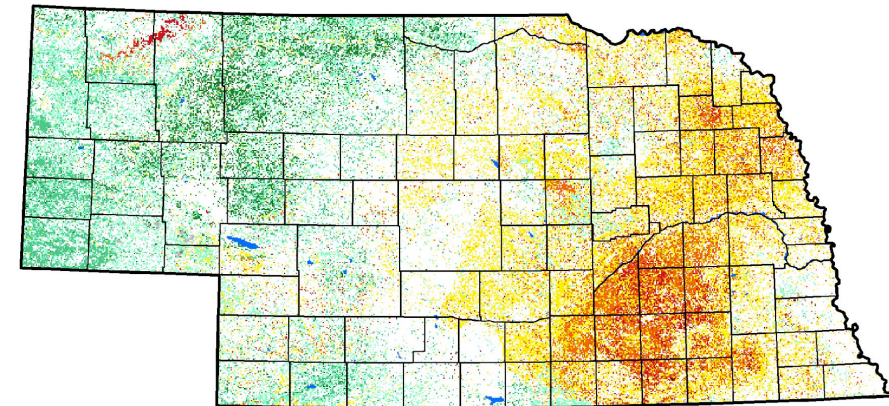
Vegetation Condition

- Extreme Drought
- Severe Drought
- Moderate Drought
- Pre-drought stress
- Near Normal
- Unusually Moist
- Very Moist
- Extreme Moist
- Out of Season
- Water



Vegetation Drought Response Index Complete: Nebraska

August 6, 2023

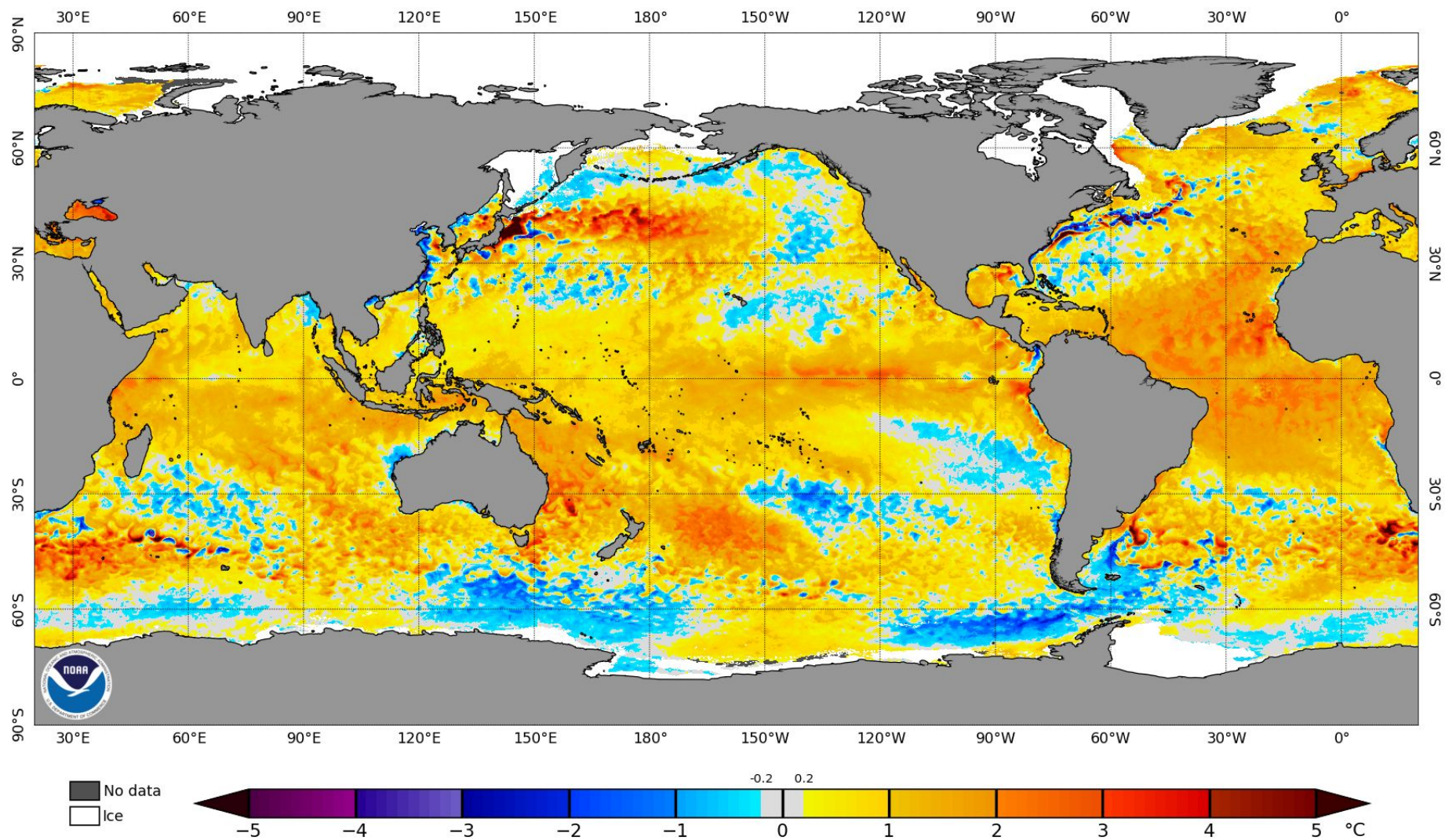


Vegetation Condition

- Extreme Drought
- Severe Drought
- Moderate Drought
- Pre-drought stress
- Near Normal
- Unusually Moist
- Very Moist
- Extreme Moist
- Out of Season
- Water



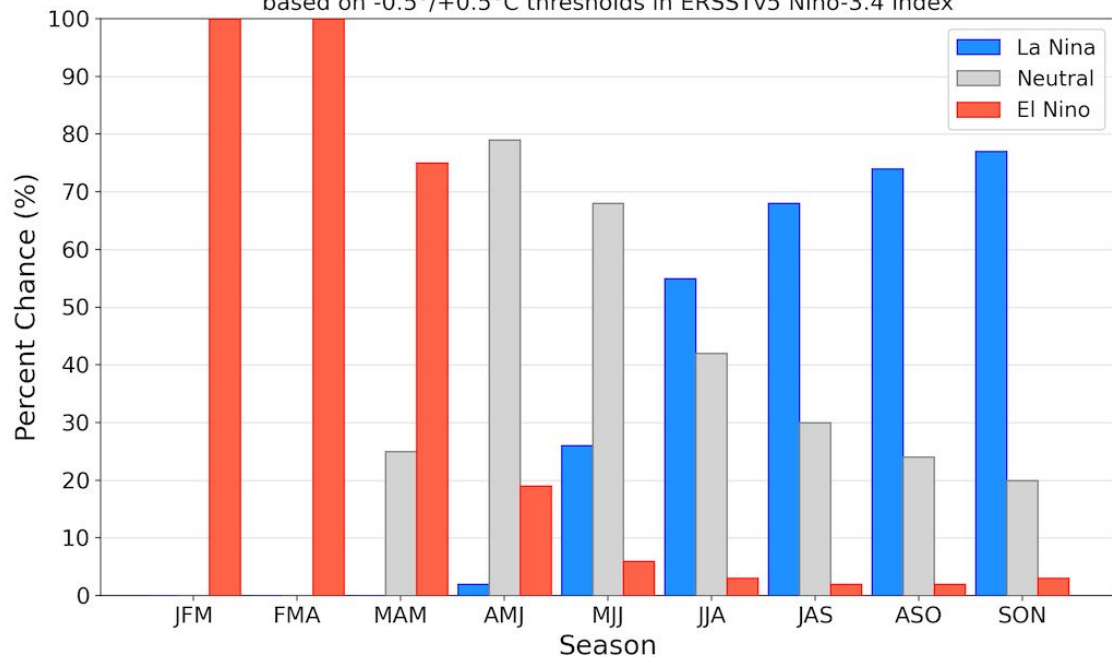
NOAA Coral Reef Watch Daily 5km SST Anomalies (v3.1) 3 Mar 2024



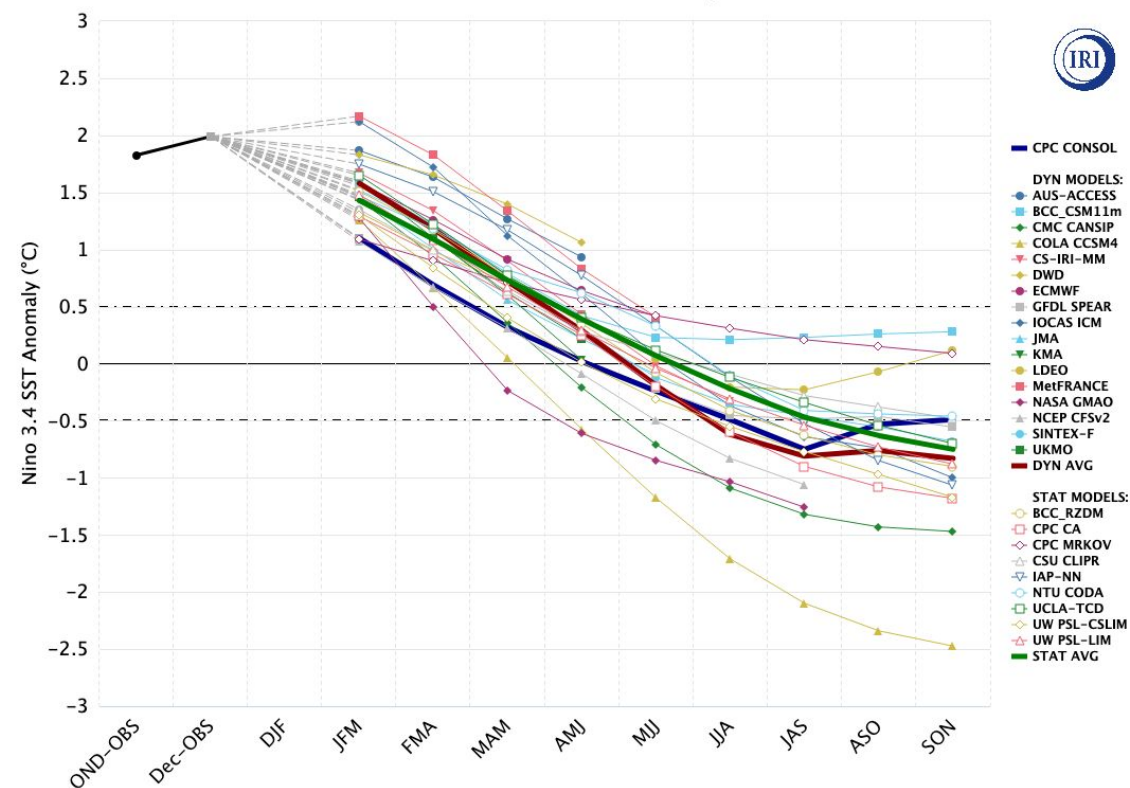
El Nino likely has peaked. Expected to persist into the spring and transition to neutral or weak La Nina by summer 2024.

Official NOAA CPC ENSO Probabilities (issued Feb. 2024)

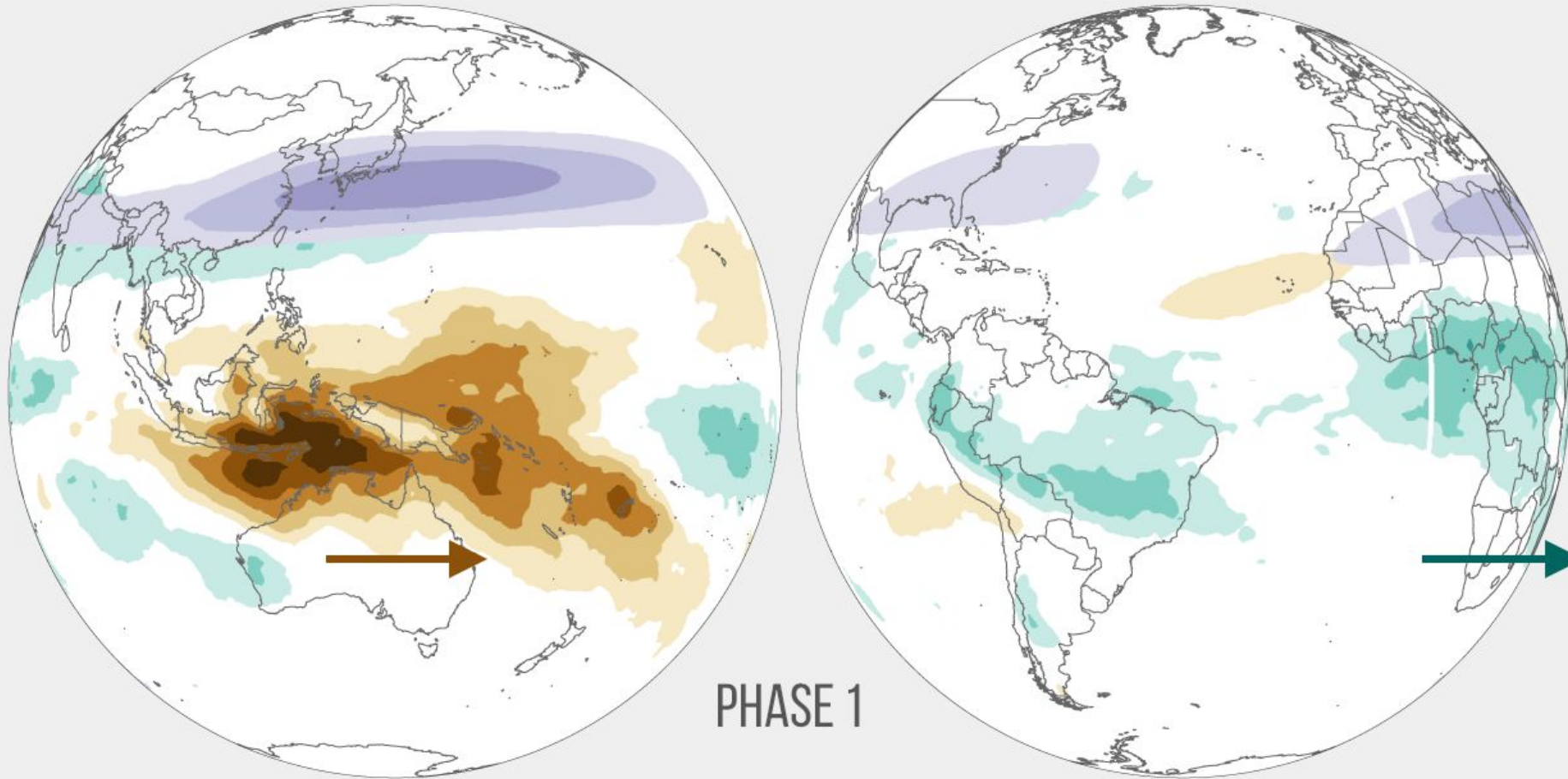
based on $-0.5^{\circ}/+0.5^{\circ}\text{C}$ thresholds in ERSSTv5 Niño-3.4 index



Model Predictions of ENSO from Jan 2024



Average MJO cloud and wind patterns

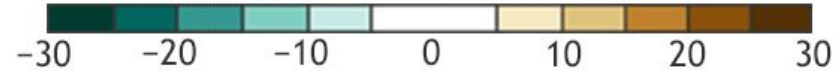


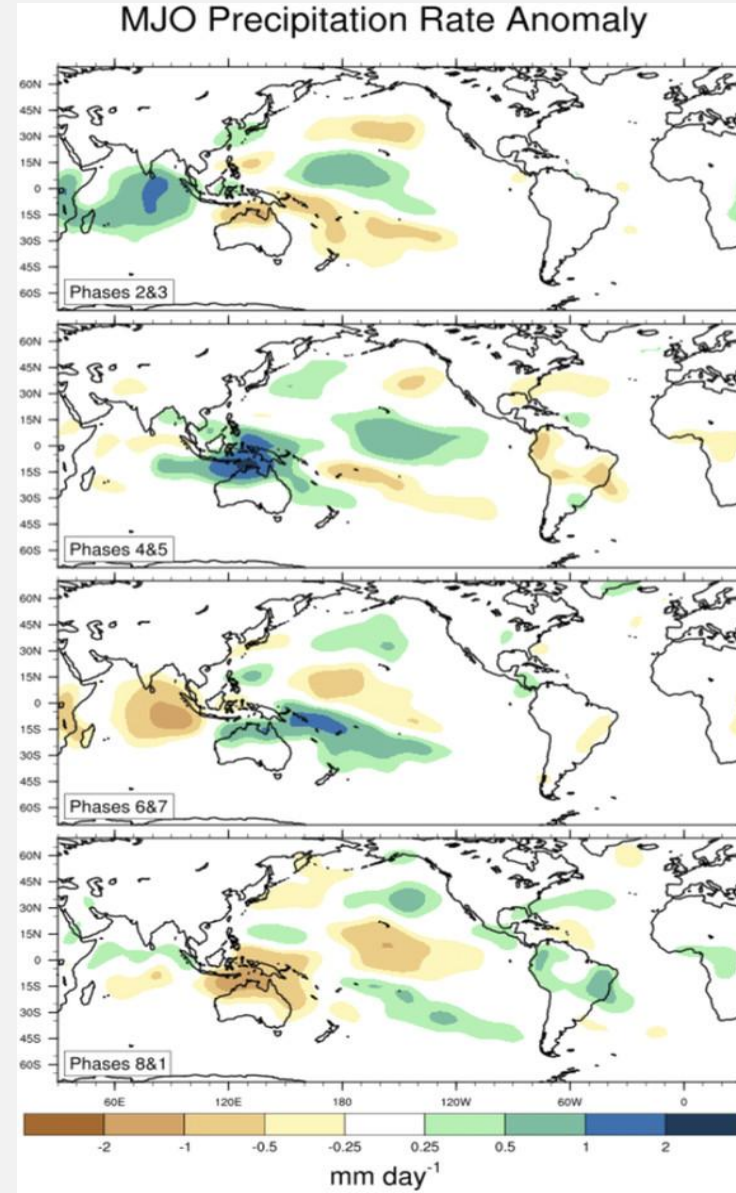
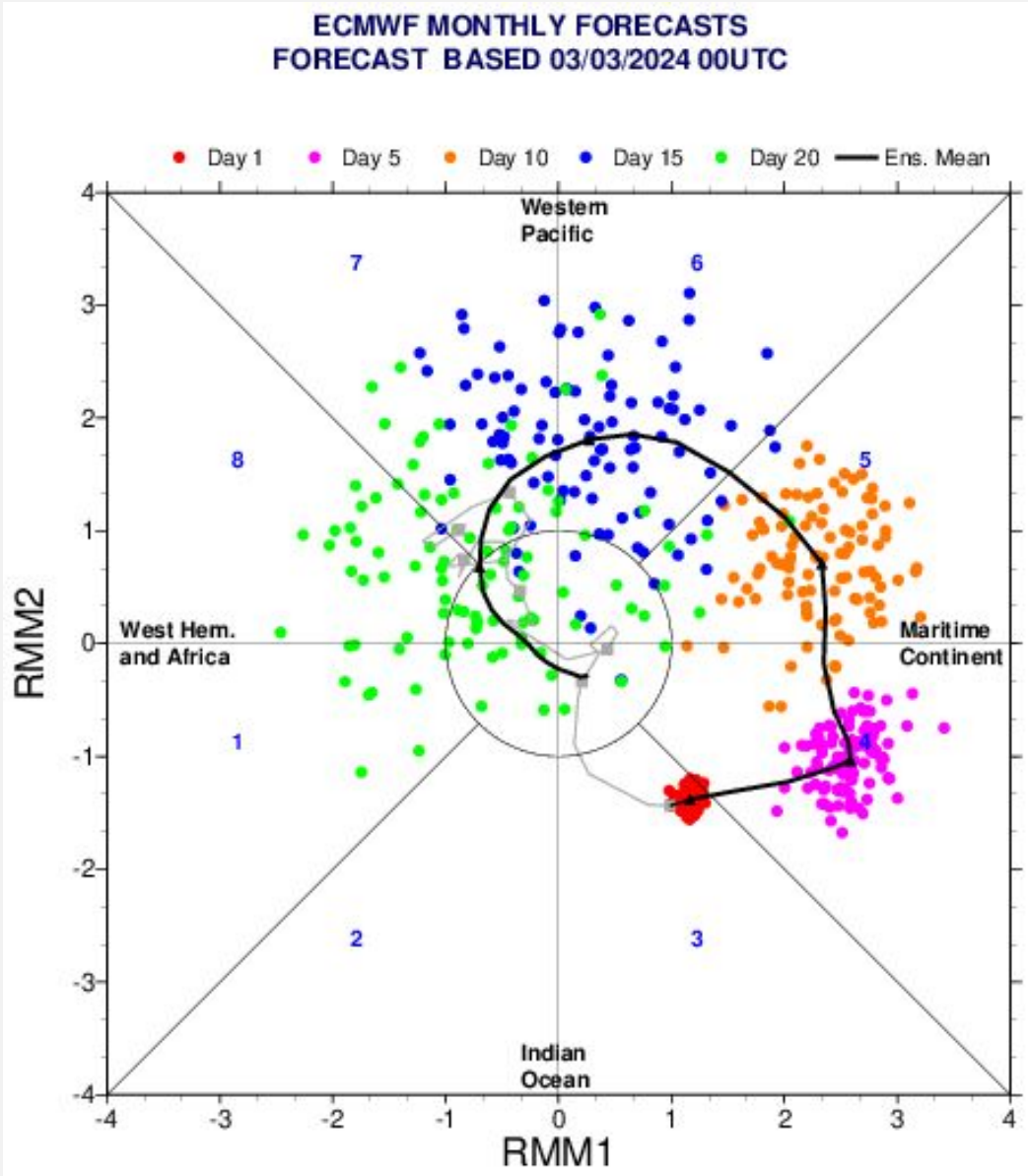
PHASE 1

Pacific jetstream velocity (m/s)



Compared to average OLR (W/m²)



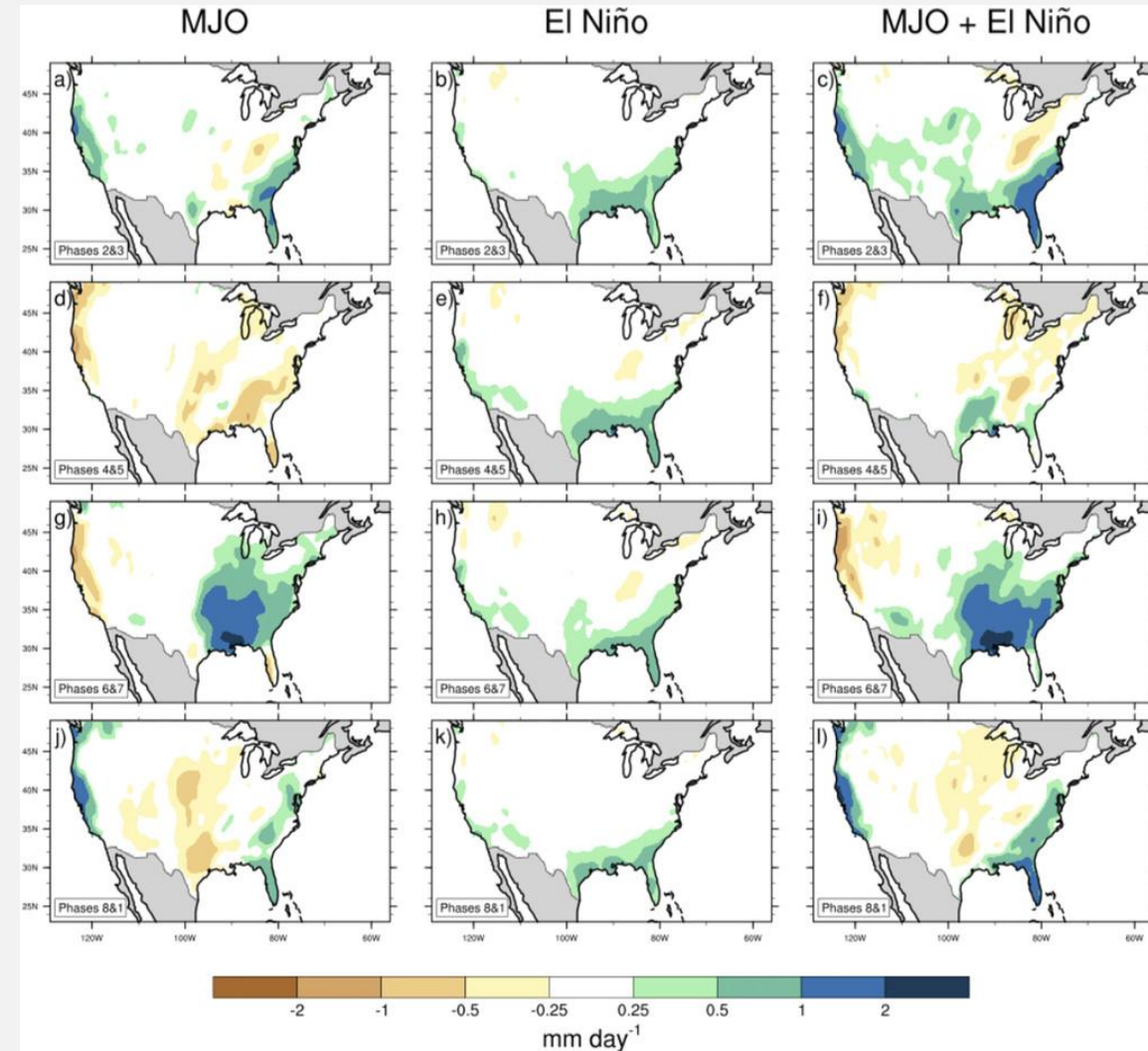
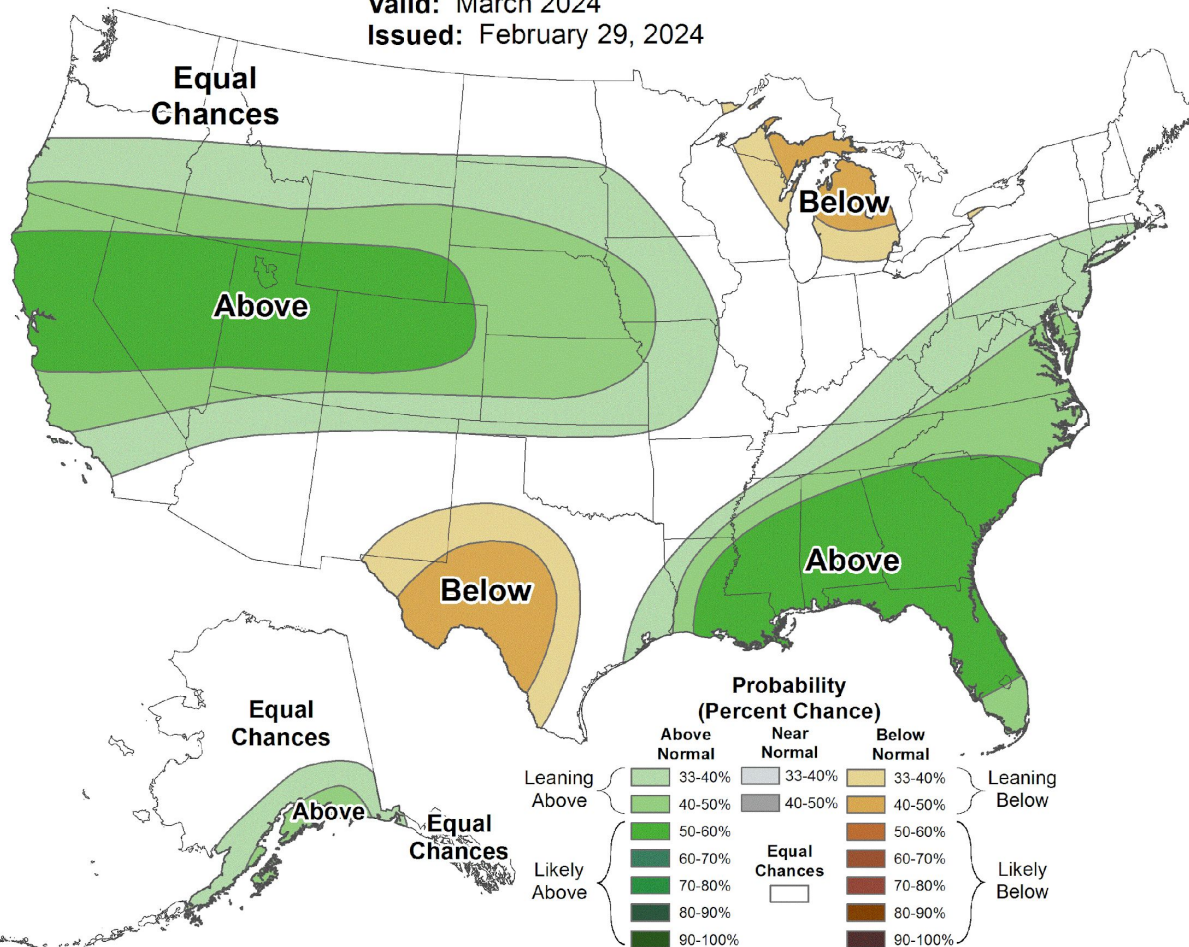




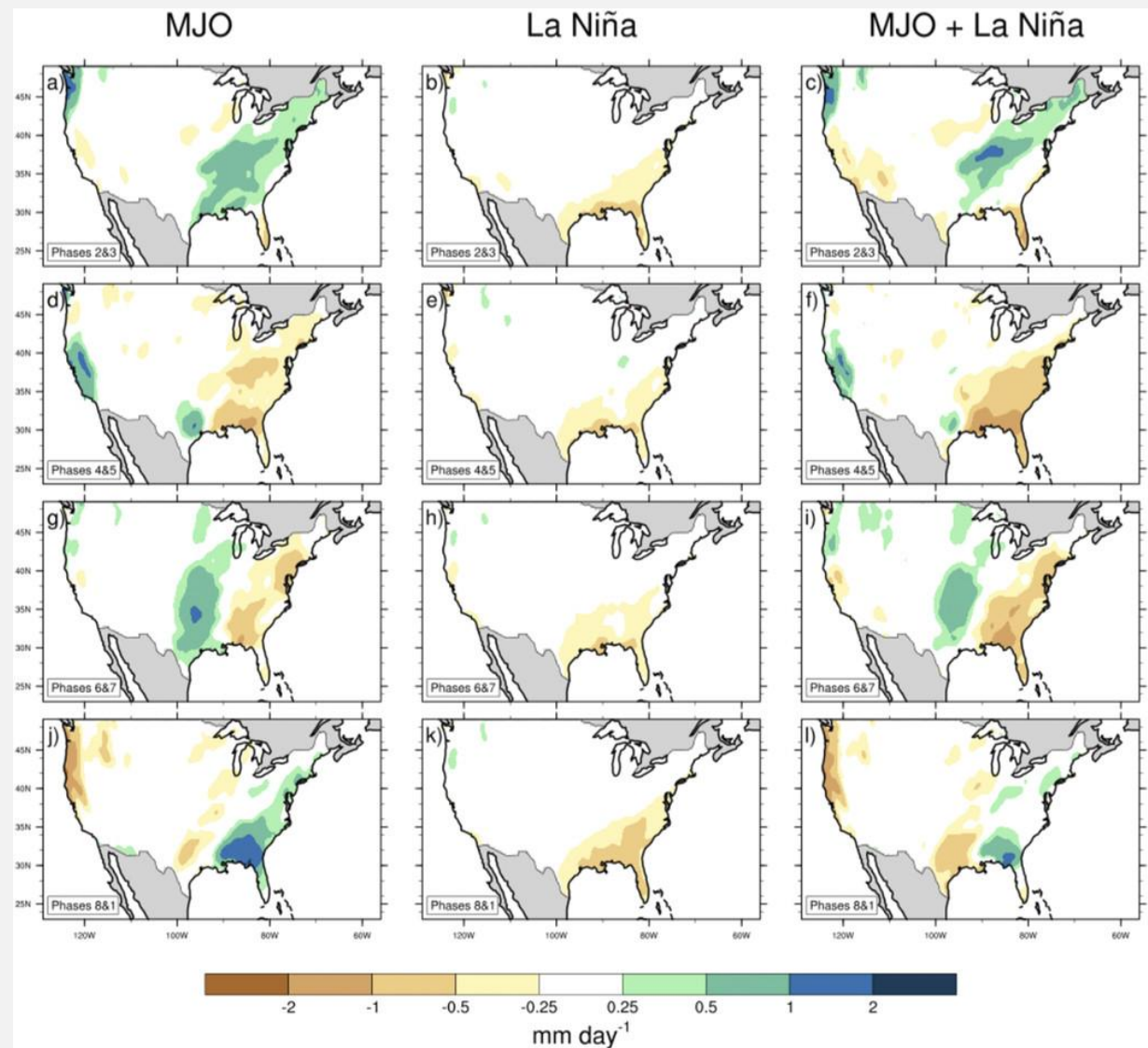
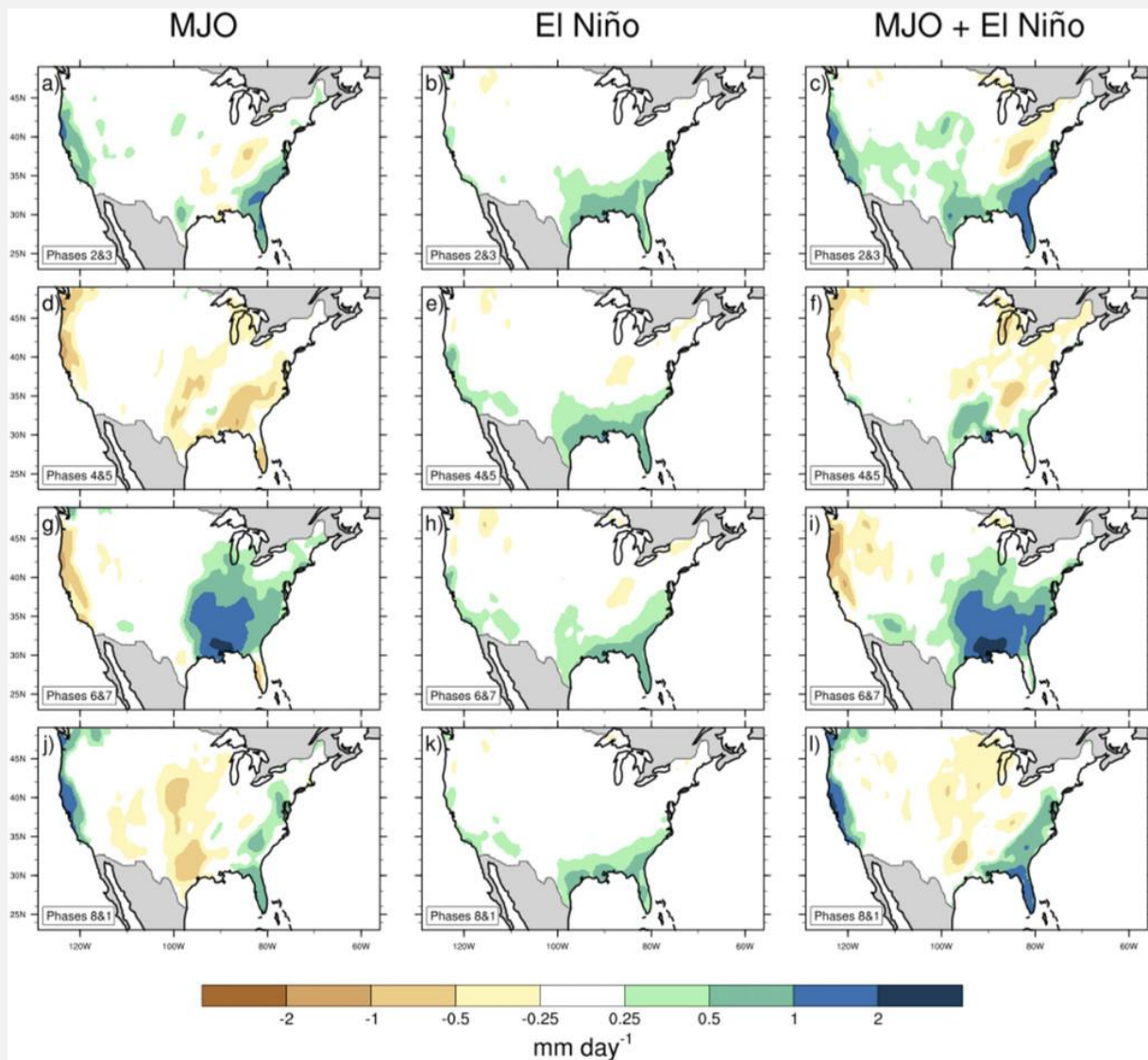
Monthly Precipitation Outlook



Valid: March 2024
 Issued: February 29, 2024



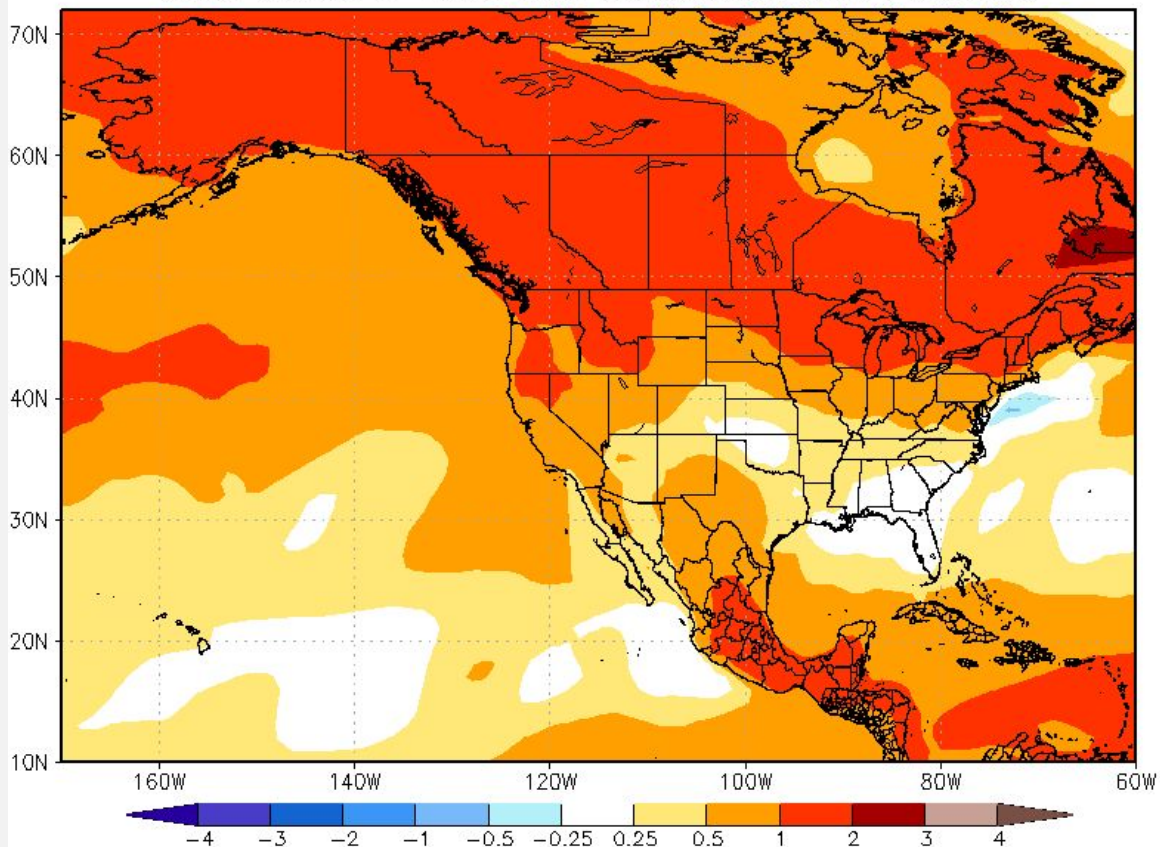
MJO influence (cool season)



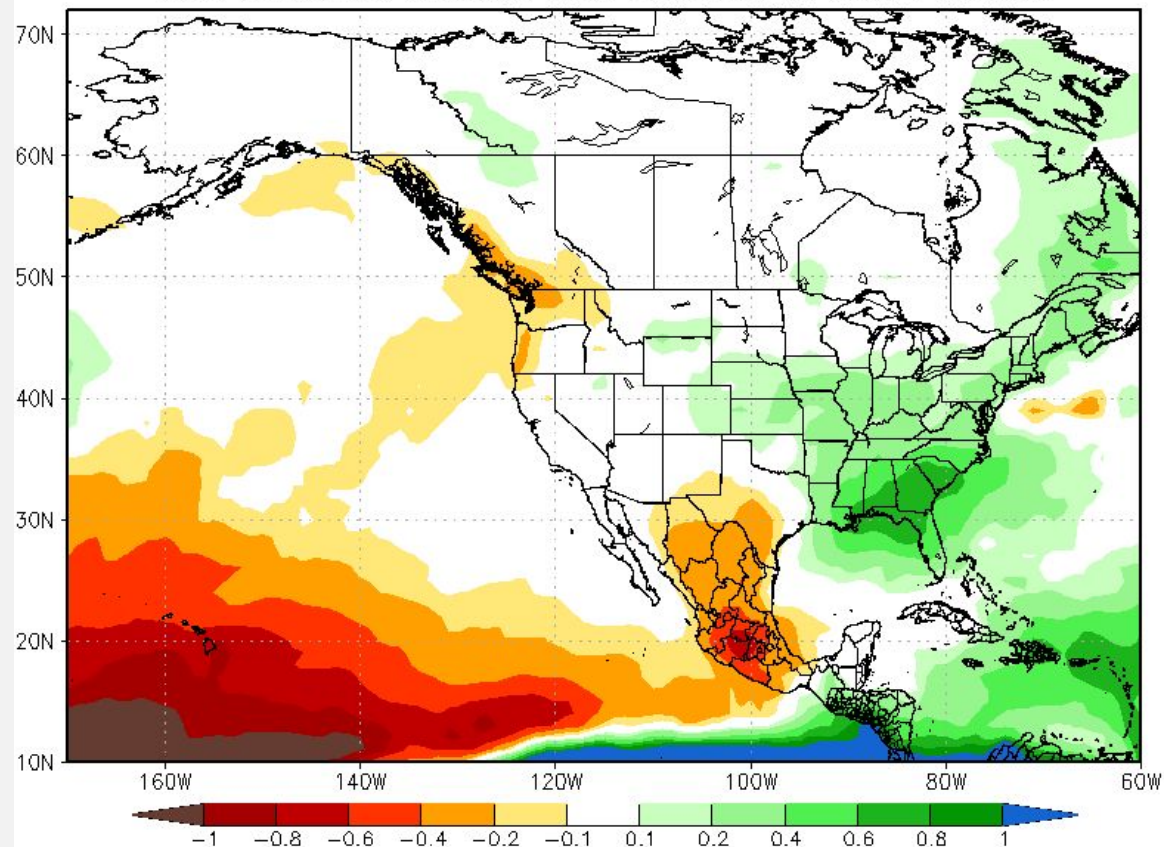
Spring outlook

Warmer than average and above average precipitation favored by the NMME

NMME Forecast of TMP2m Anom IC=202402 for Lead 1 2024MAM

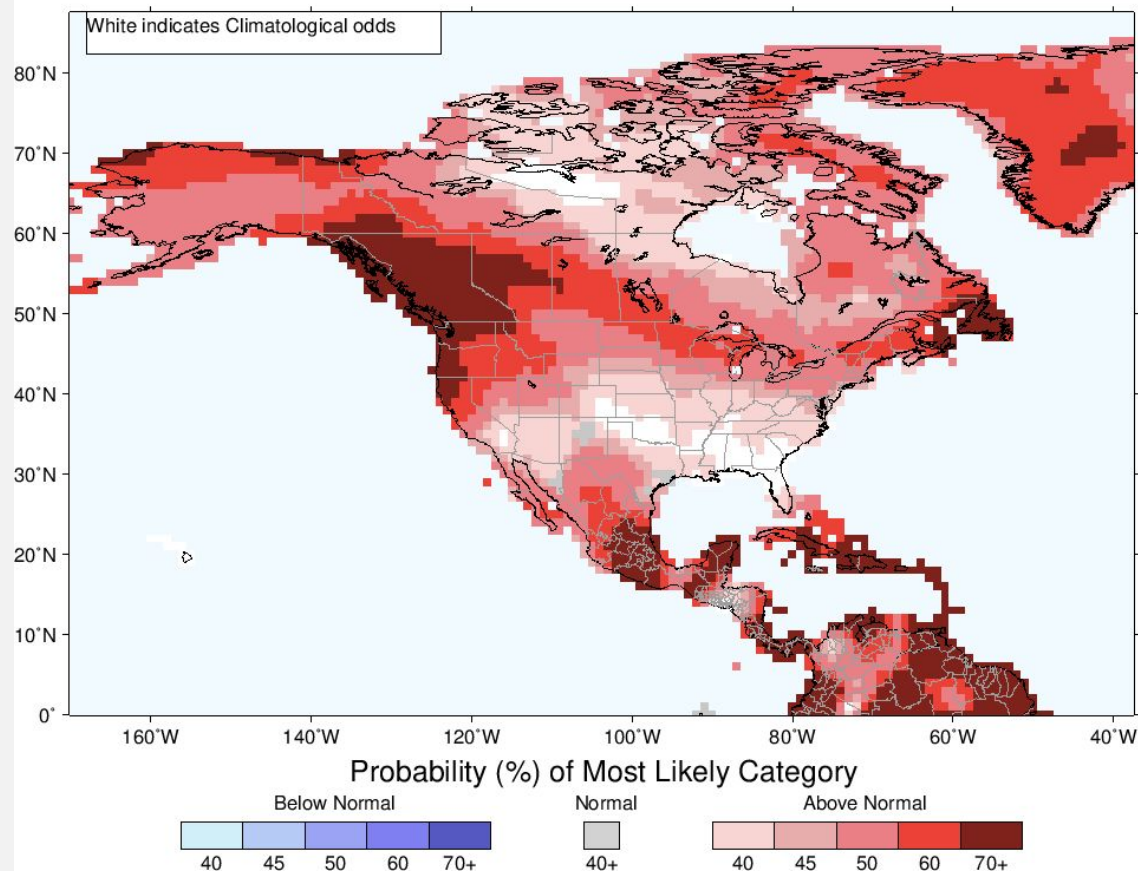


NMME Forecast of Prec. rate Anom IC=202402 for Lead 1 2024MAM

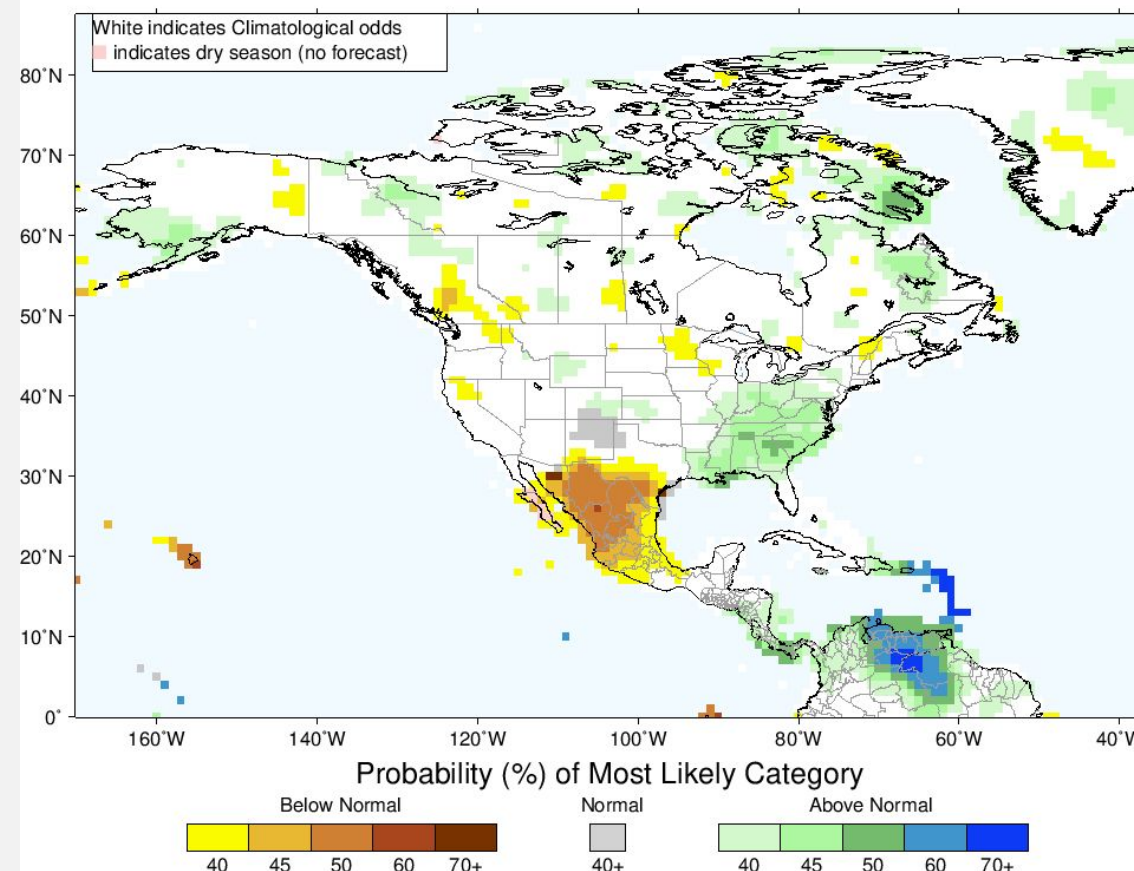


Spring outlook

IRI Multi-Model Probability Forecast for Temperature for
March–April–May 2024, Issued February 2024



IRI Multi-Model Probability Forecast for Precipitation for
March–April–May 2024, Issued February 2024

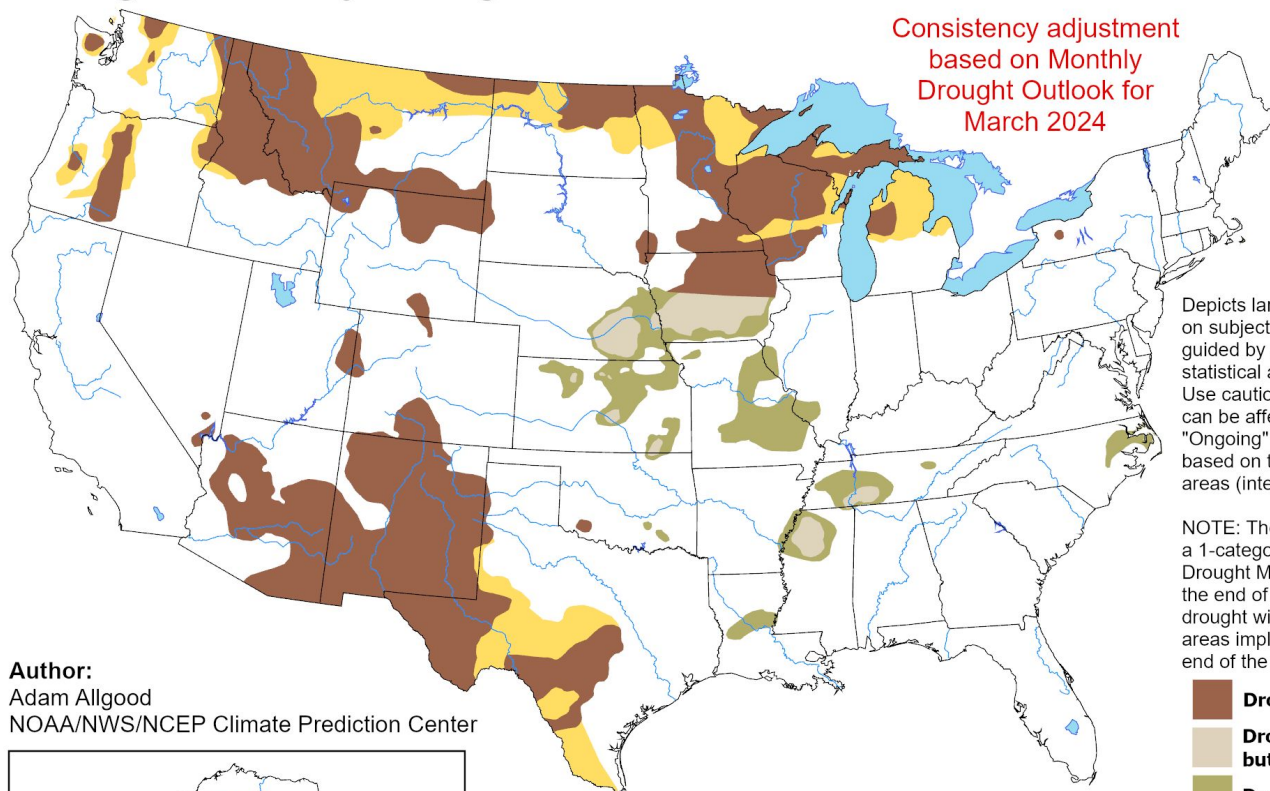


Drought outlook

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

Valid for March 1 - May 31, 2024
Released February 29, 2024

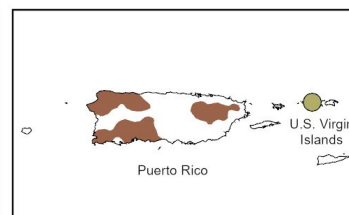
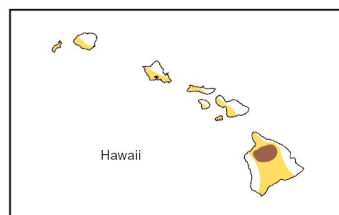
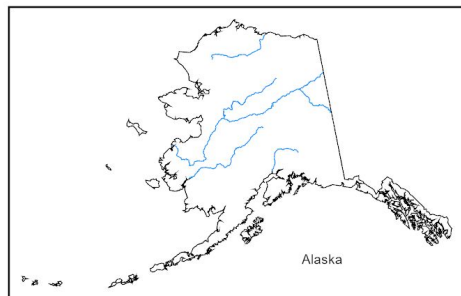
Consistency adjustment
based on Monthly
Drought Outlook for
March 2024



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:
Adam Allgood
NOAA/NWS/NCEP Climate Prediction Center



-  **Drought persists**
-  **Drought remains, but improves**
-  **Drought removal likely**
-  **Drought development likely**
-  **No drought**

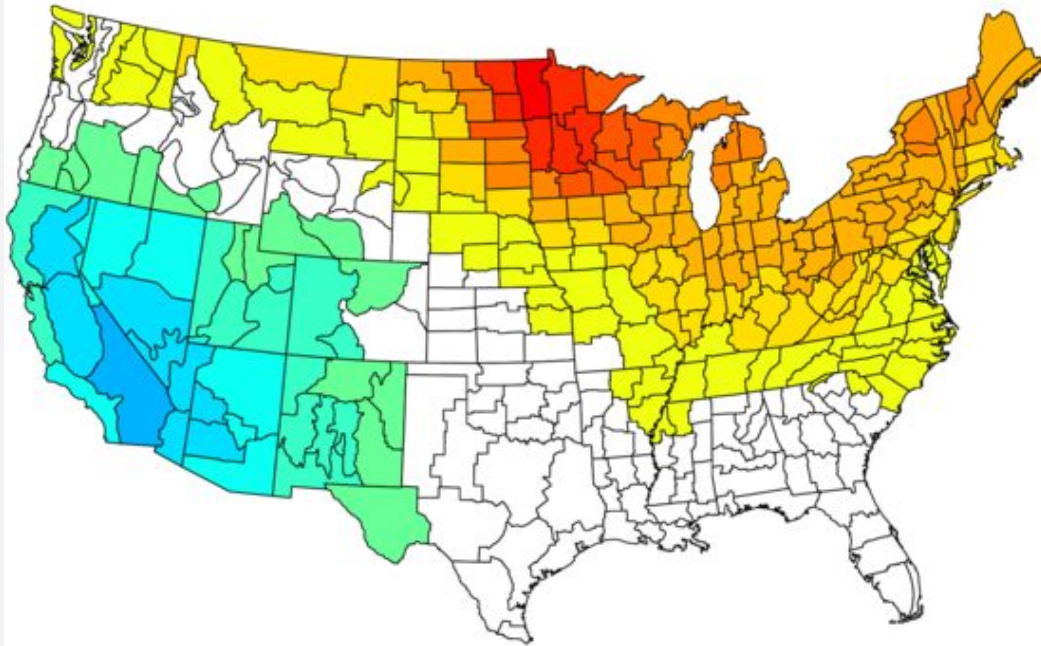


<https://go.usa.gov/3eZ73>

Spring composites

If past history is any guide, we would have increased chances for wetter spring. Warmer than average favored.

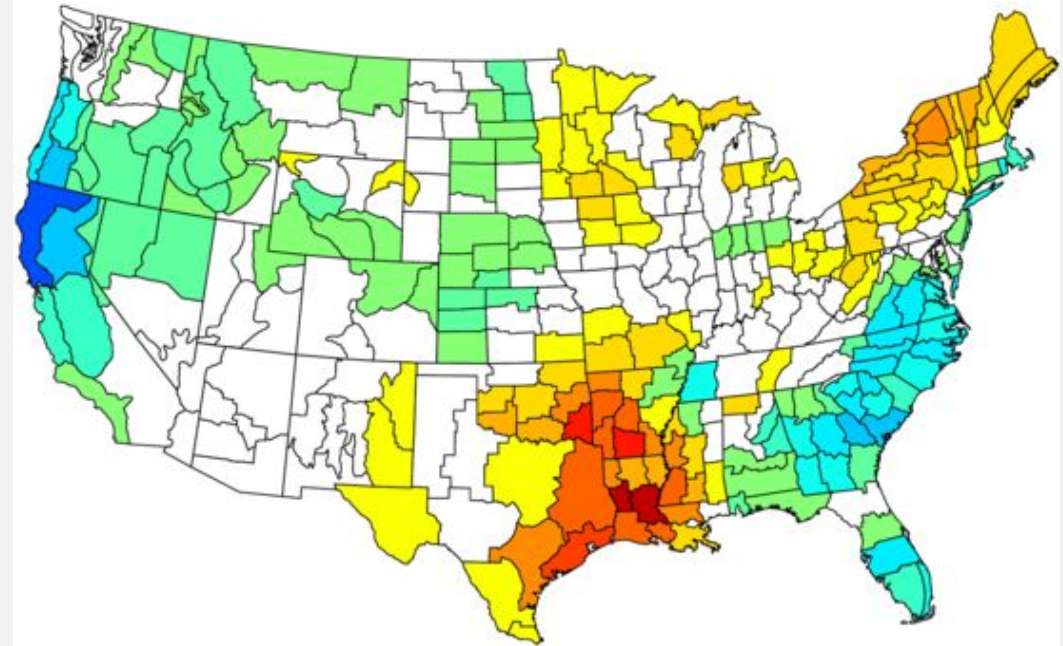
NOAA/NCEI Climate Division Composite Temperature Anomalies (F)
Mar to May 2016,2010,2003,1998
Versus 1991–2020 Longterm Average



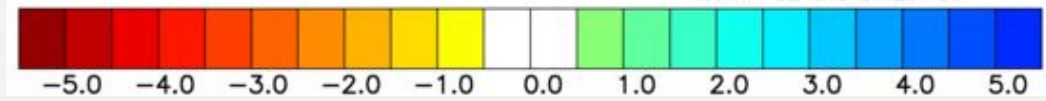
NOAA PSL and CIRES-CU



NOAA/NCEI Climate Division Composite Precipitation Anomalies (in)
Mar to May 2016,2010,2003,1998
Versus 1991–2020 Longterm Average

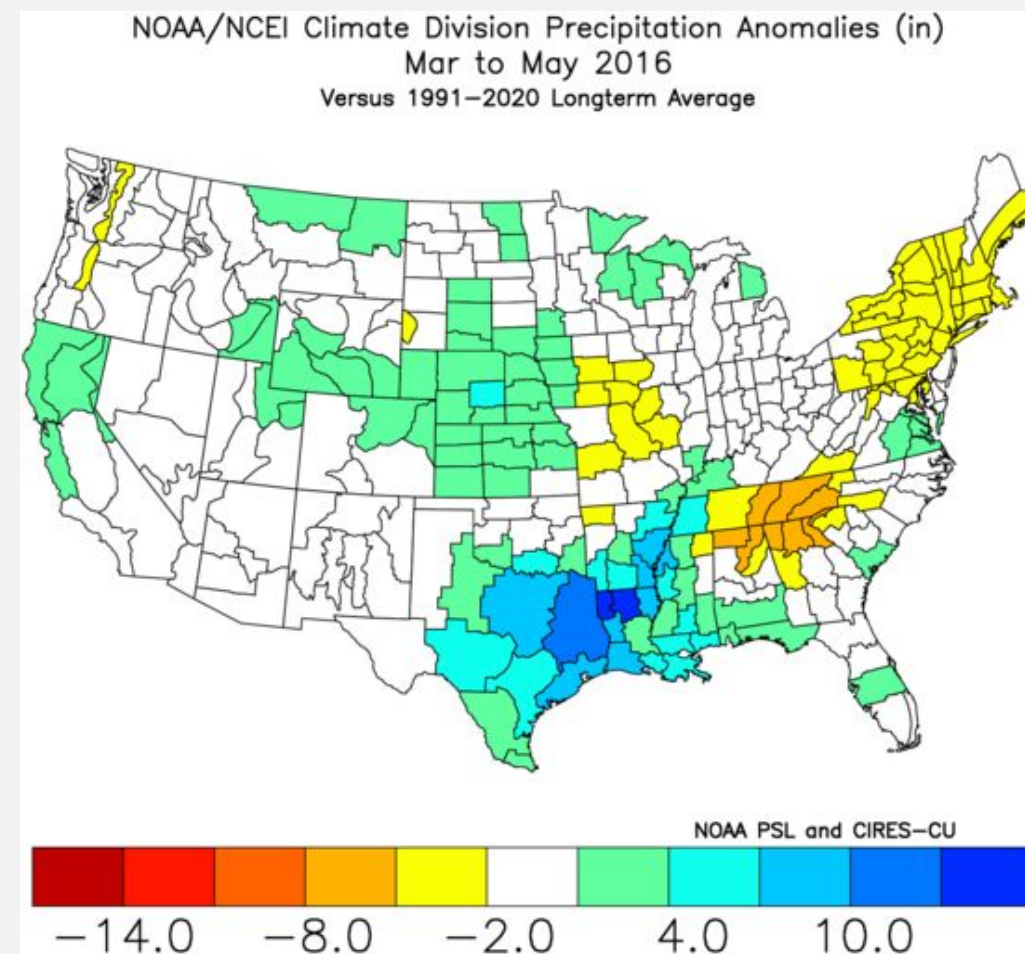
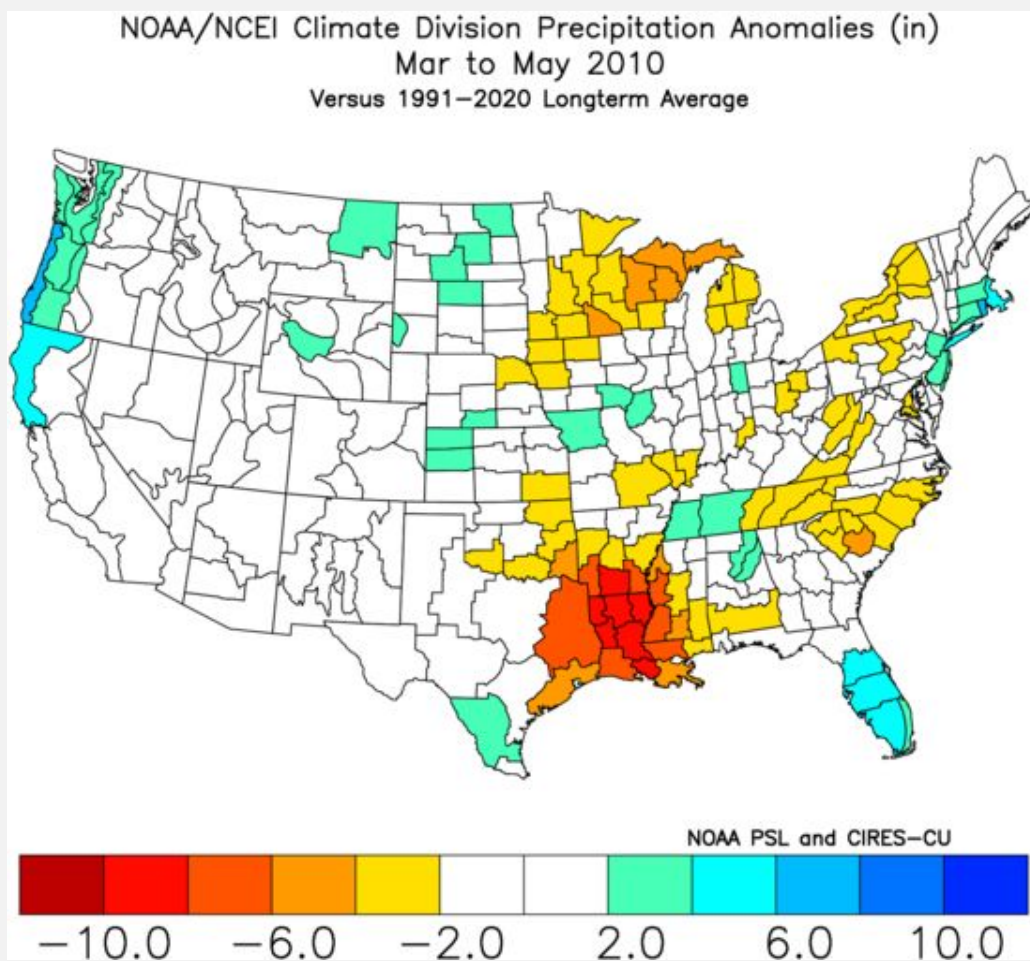


NOAA PSL and CIRES-CU



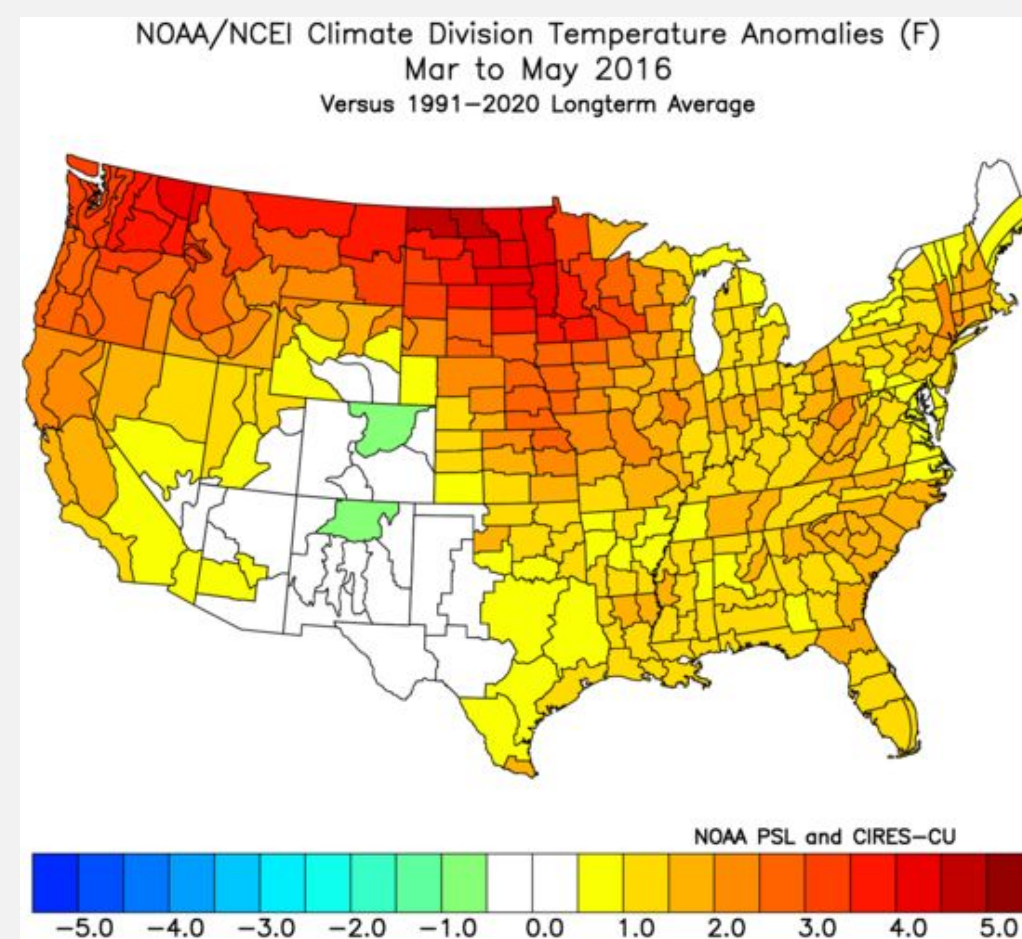
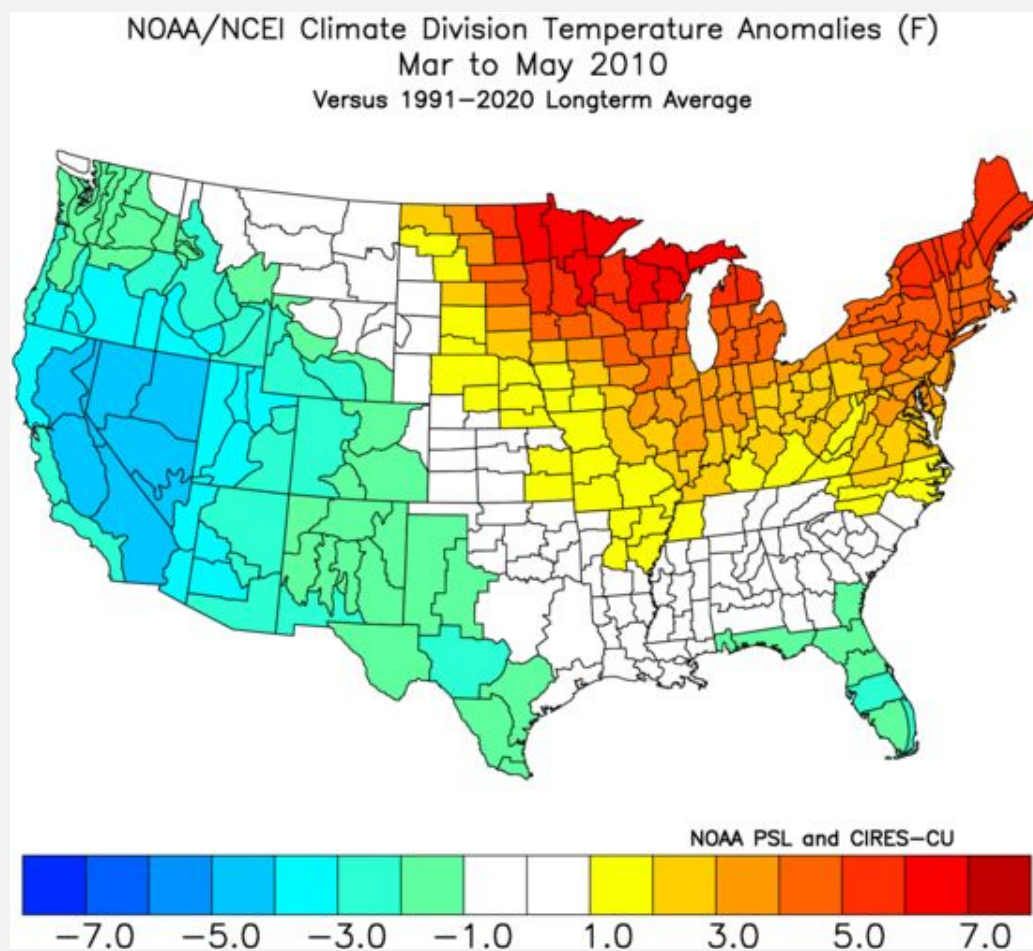
2016 vs. 2010 spring precip

Spring 2016 much wetter than 2010.



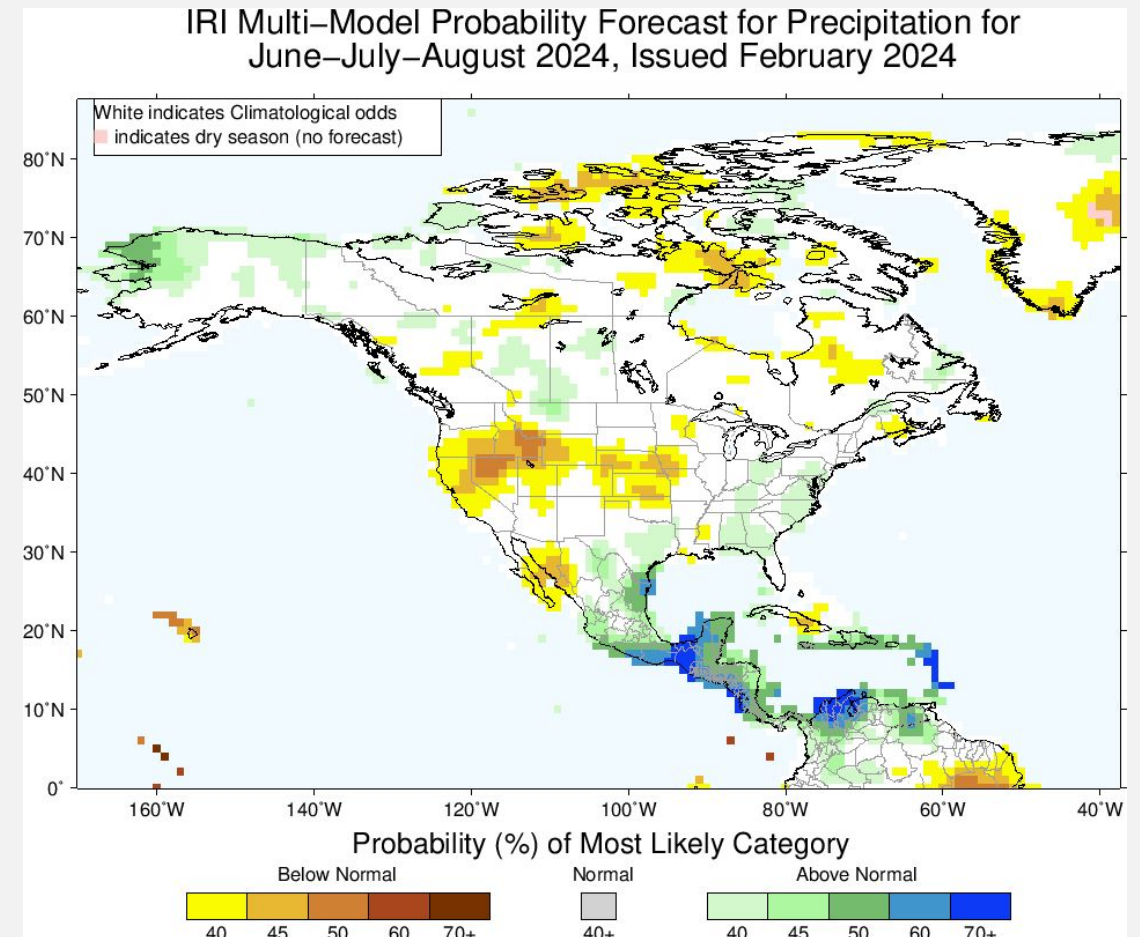
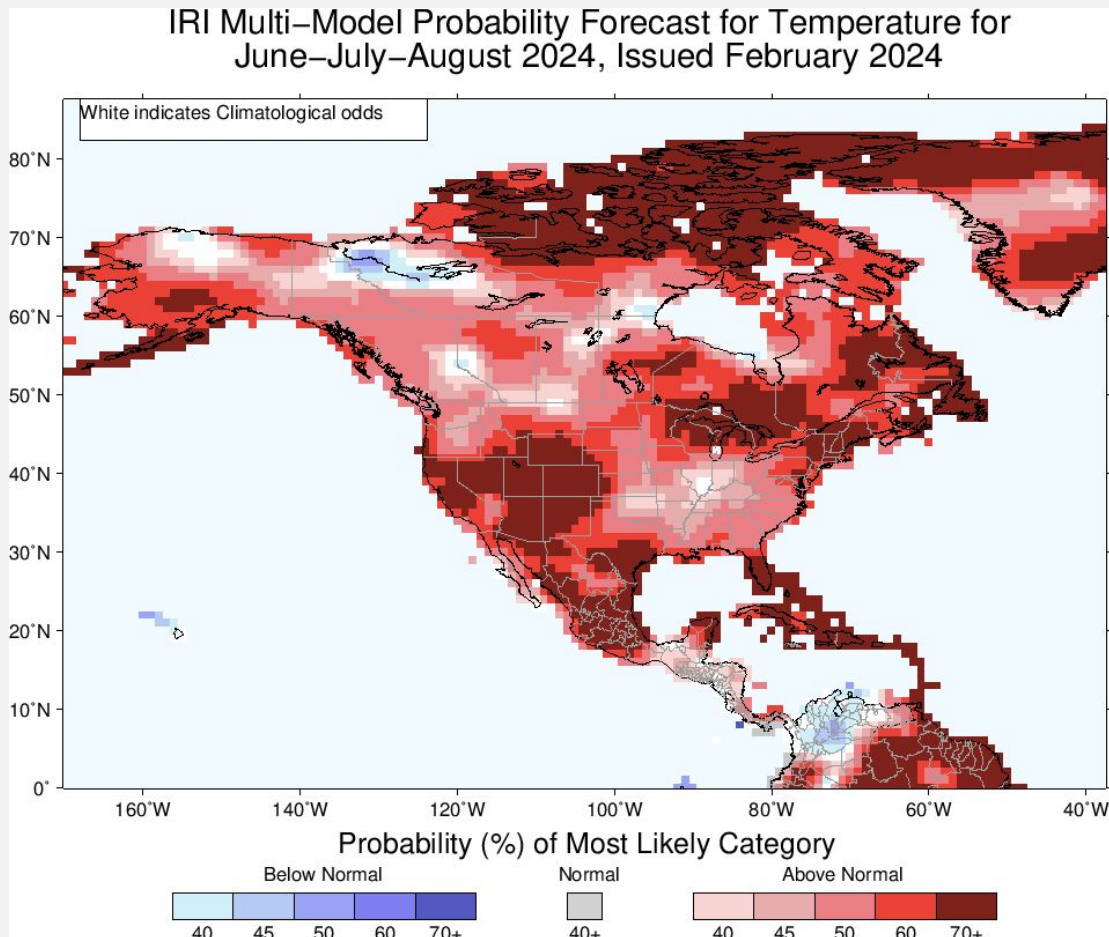
2016 vs. 2010 spring temps

Both were mild in our area. Very different western U.S.



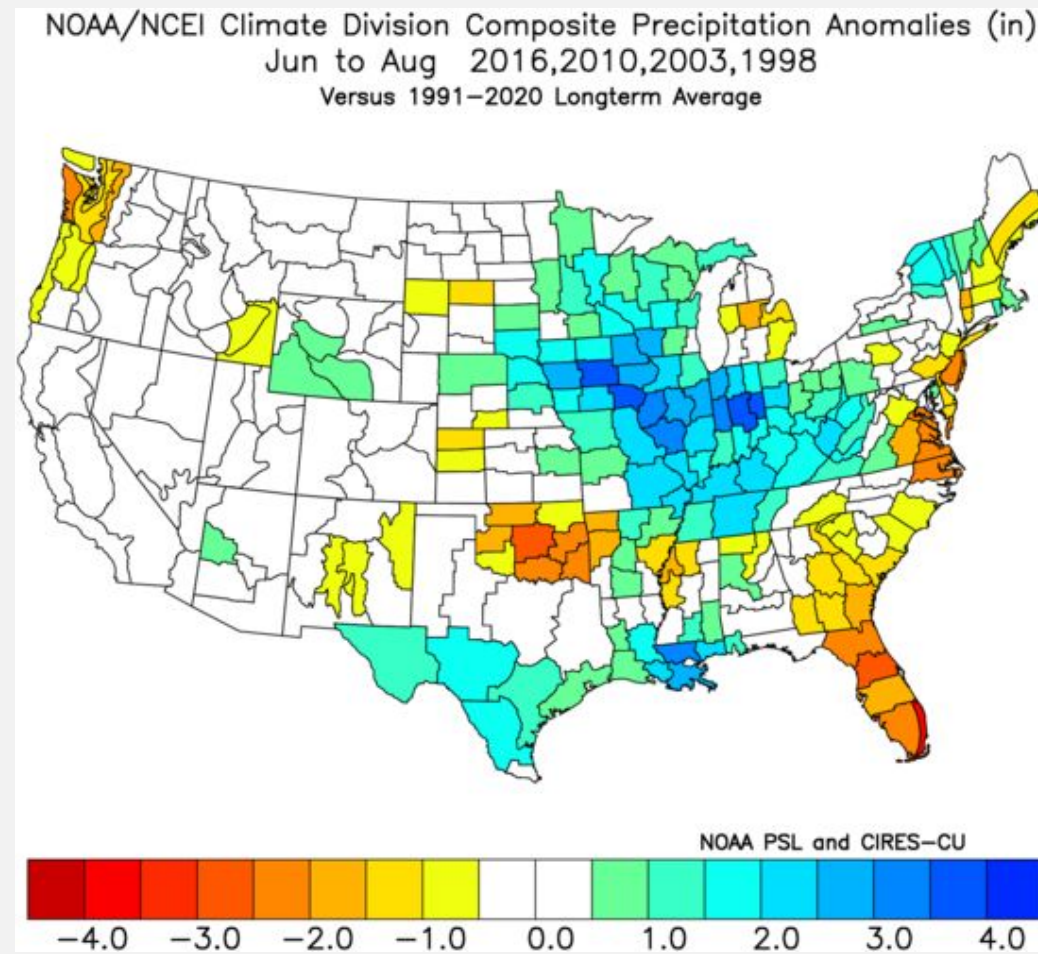
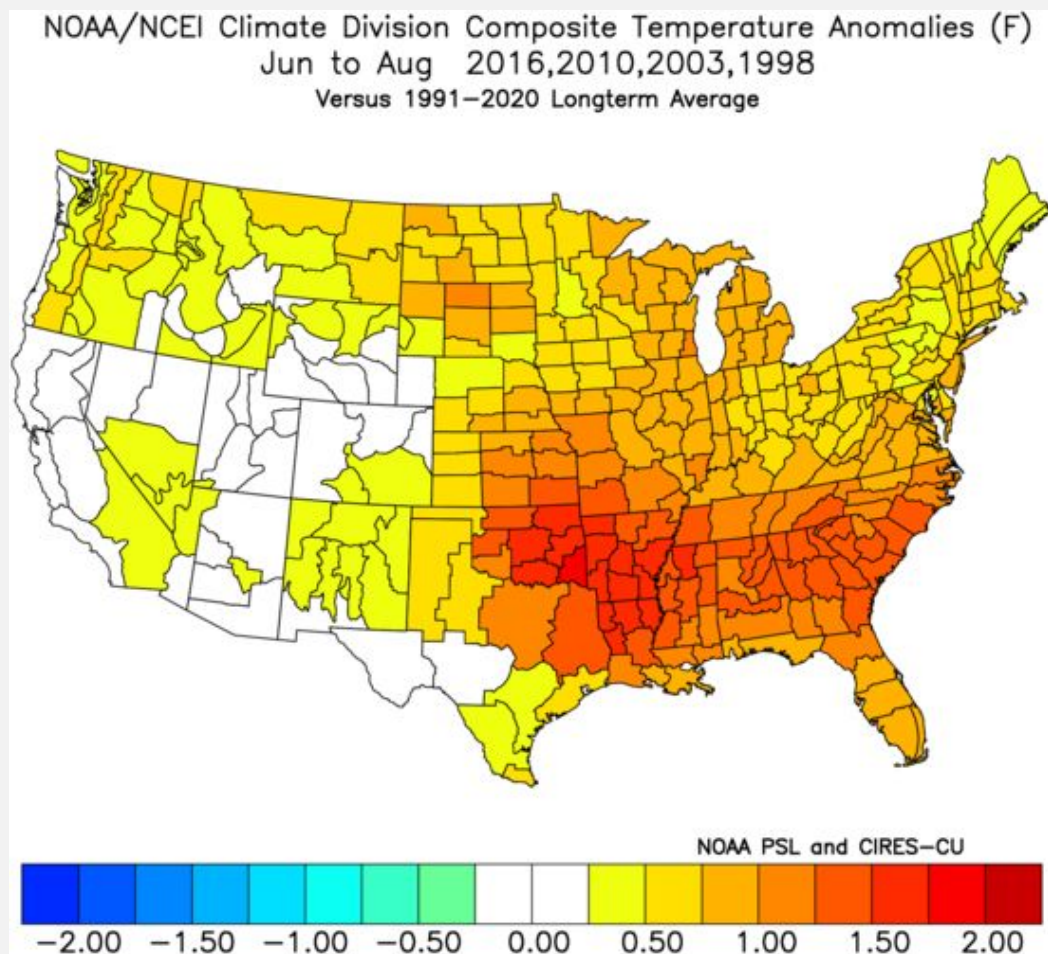
Summer outlook

Columbia IRI model drier in western U.S.



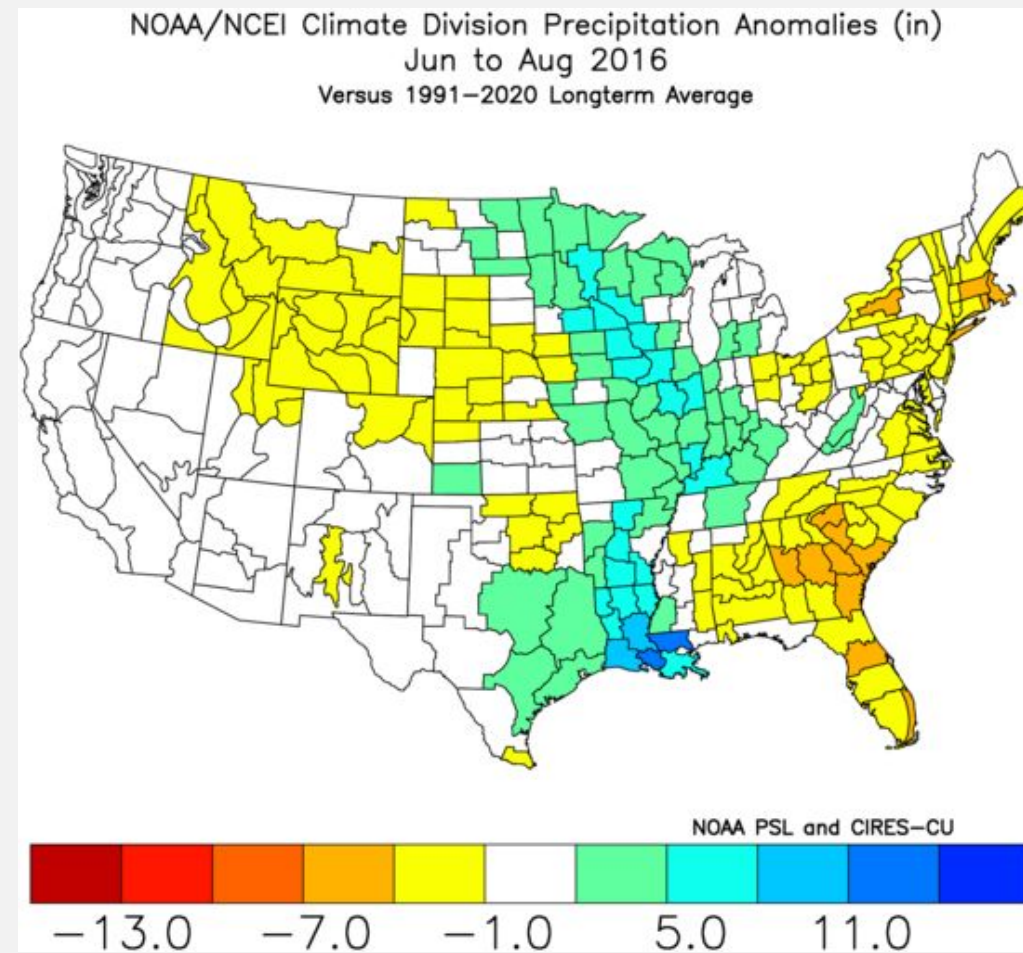
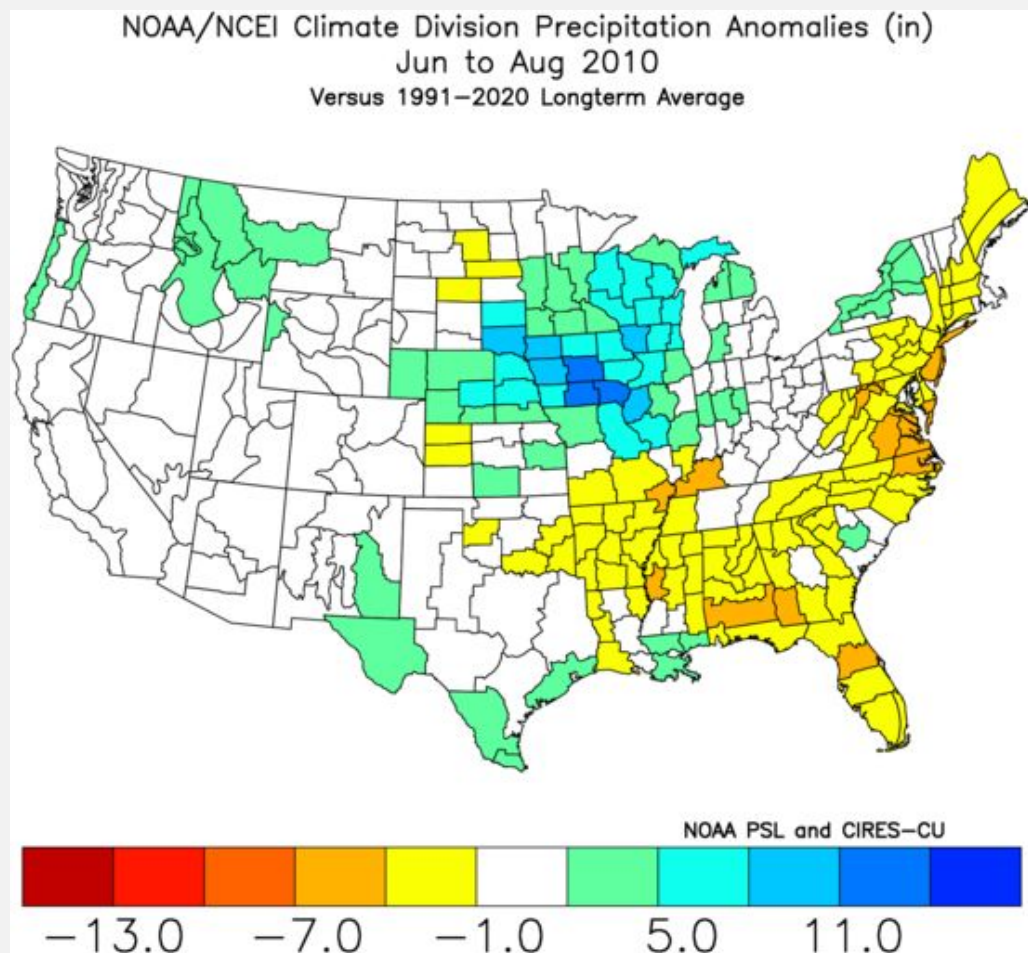
Summer composites

If past history is any guide, we would also have increased chances for a wetter summer. Warm signal.



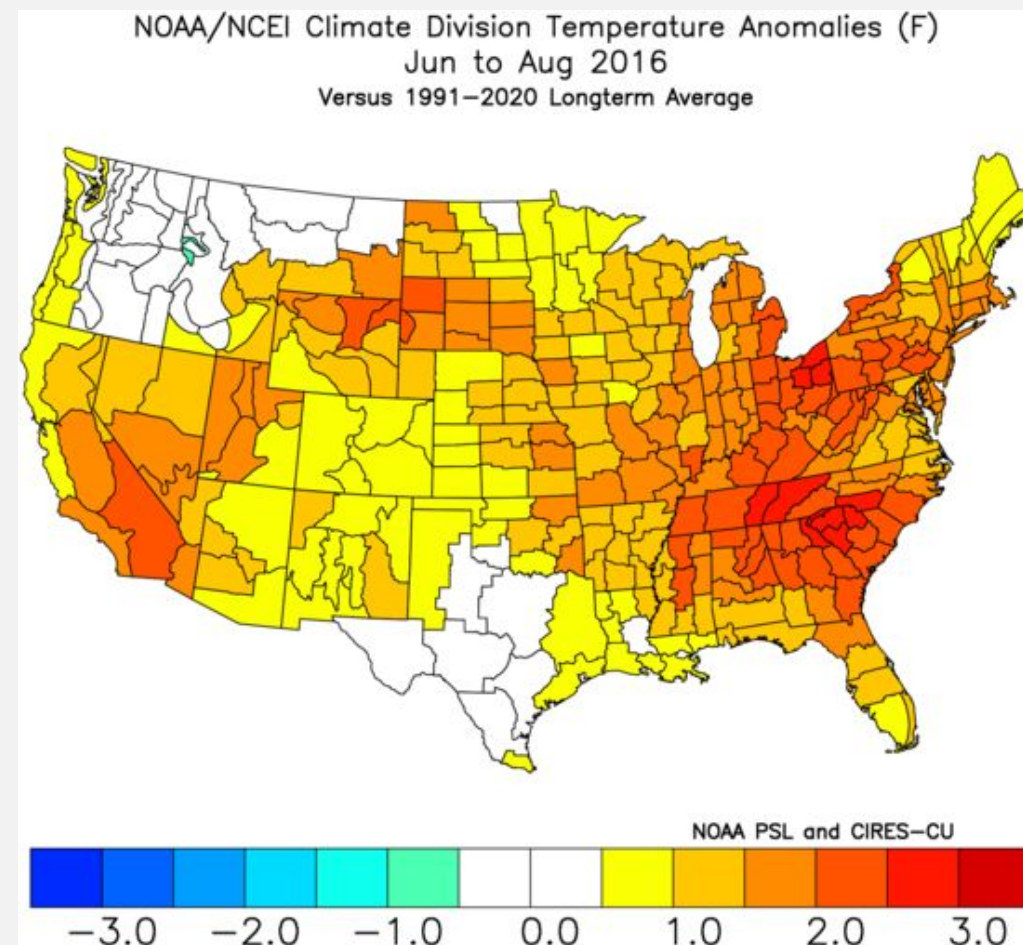
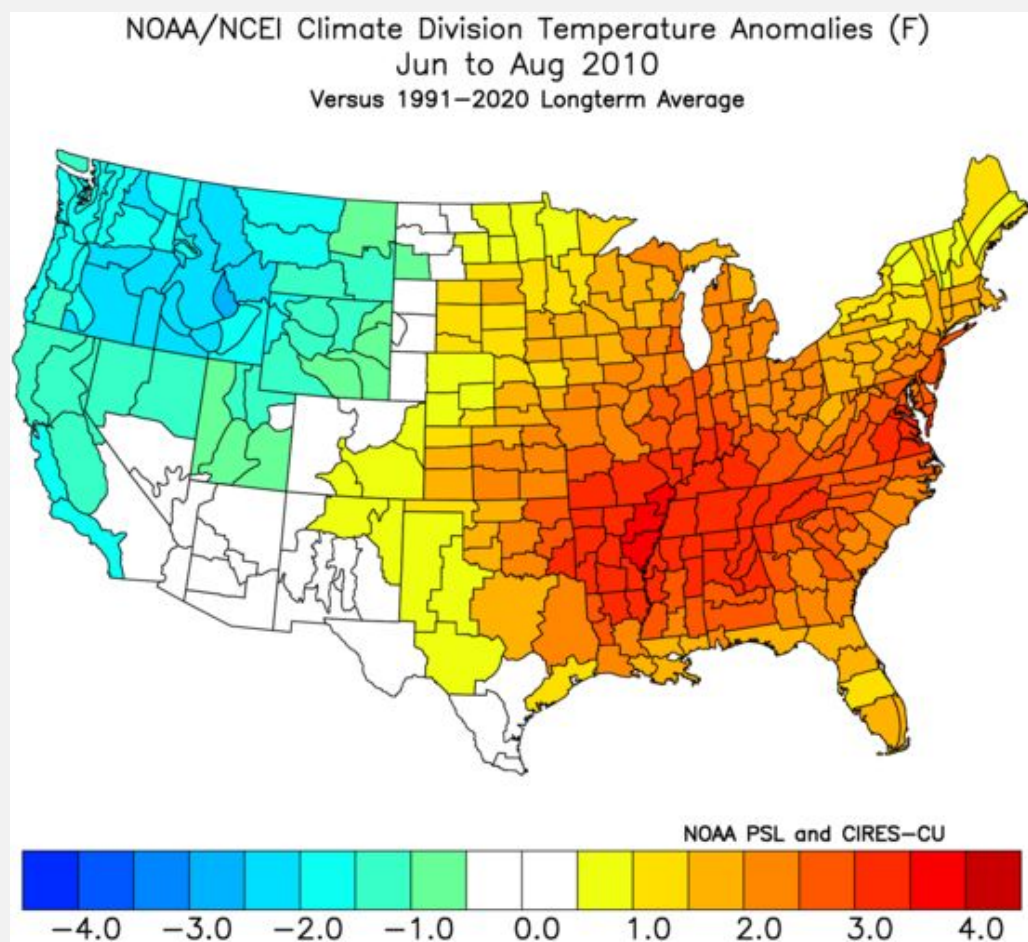
2016 vs. 2010 summer precip

Summer 2010 wetter overall.



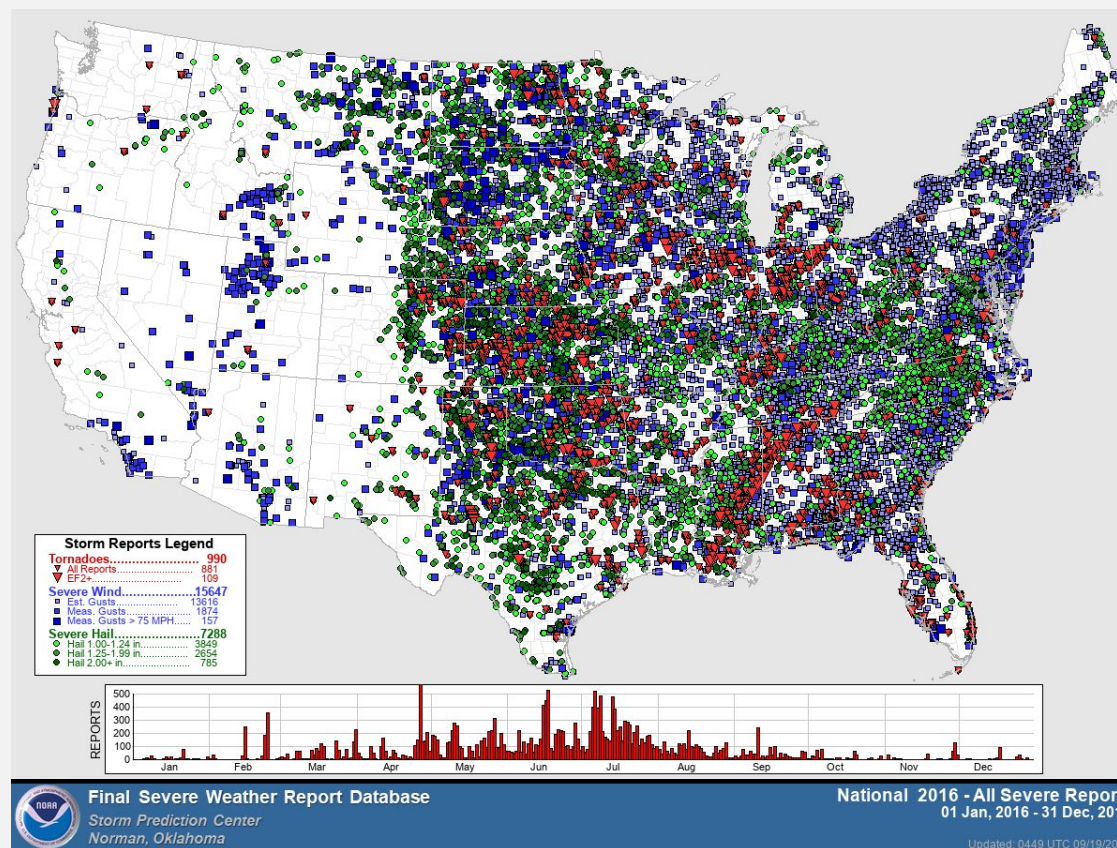
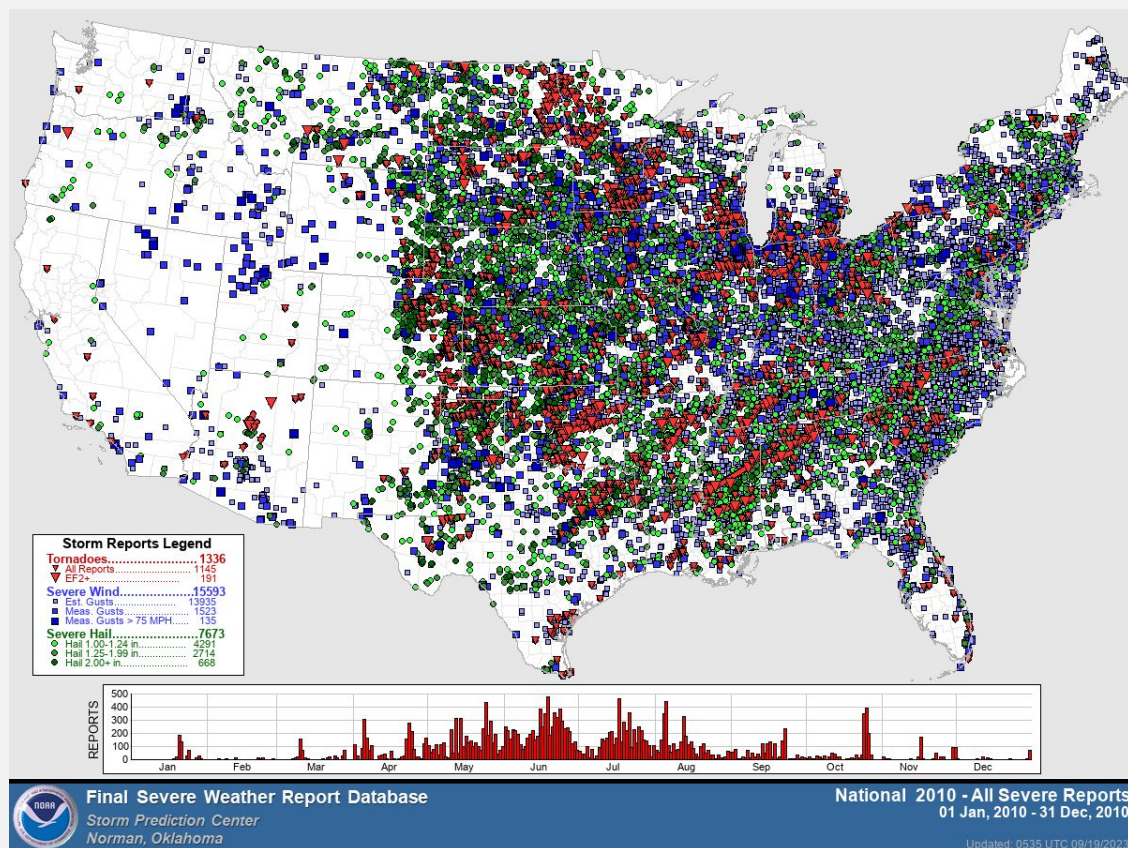
2016 vs 2010 summer temps

Comparable temps in our area.



Severe weather reports

2010 had a lot more hail than recent years in NE and more concentrated in June. 2016 in line with recent years.



Weather Ready Farms

PREPARING FOR EXTREME WEATHER

NEW STRATEGIES AND TECHNOLOGIES FOR EXTREME WEATHER EVENTS AND CLIMATE VARIATION.

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WHAT MAKES WEATHER READY FARMS UNIQUE?

The Weather Ready Farms program is designed to provide quality educational materials related to disaster preparedness, soil and crop health, and innovative technology and couple these educational resources with consistent engagement with the mentorship of trusted, locally-based Extension educators.

Weather Ready Farms is a climate-smart agriculture education program run by Nebraska Extension. Through this program, Extension professionals work directly with producers to:

- ☞ Increase agricultural resilience
- ☞ Foster adaptation to extreme events including hail, drought, heat stress and more
- ☞ Foster prosperity and financial stability for producers and rural communities in Nebraska

The 5 Stage Designation Process

Agricultural producers that participate in the Weather Ready Farms program will complete a thorough and comprehensive five-stage process to earn designation as a Weather Ready Farm. Stages include:



Each stage is aimed at building farmers and ranchers understanding of vulnerabilities and resilience opportunities on their operation. WRF emphasizes participant involvement in decision making, creates learning environments for peer-to-peer education, and works to empower producers during high-stress events.

Increasing the use of climate-based services to assist the agricultural sector in preparation for extreme weather events

Eric Hunt, Daniel Hulbert, Lindsey Johnson

Introduction

Disasters in the agricultural sector negatively impact crop yields, livestock production, ecosystem resilience and biodiversity, farm profitability, human health and safety, rural infrastructure, and community resilience. These disasters are also increasingly frequent and expensive with a changing climate. To maximize disaster preparation, producers must understand their historical, present and future risk to extreme weather events exacerbated by climate change.

Weather Ready Farms

Weather Ready Farms (WRF) is a resilience centered, climate-smart agricultural education and extension program that offers farmers strategies to prepare for and recover from extreme weather events, climate change effects, and other stressors through a five-step certification process: assessment, education, implementation, verification, and designation. We will compile and create robust educational resources that enables agricultural producers complete a thorough self-assessment of their operation and to implement practices that reduce agricultural, ecological, and financial risk. Furthermore, these educational resources can be a broader group of agricultural professionals (e.g., extension educators, crop advisers, ag lenders) to better understand and assess client risk and to advise producers on most effective strategies to implement in an operation.

Figure 1: A section of the assessment done by the Weather Ready Farms team.

AgriClimate Tools



Figure 2: A look at a few of the many tools available at the High Plains Regional Climate Center.

Soil Moisture Percentile valid 10-18-2023 (0-100cm)

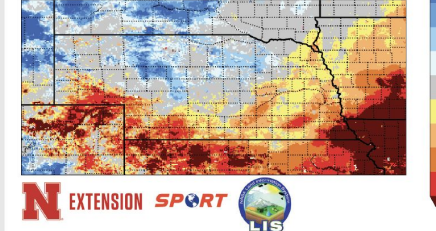


Figure 3: Root zone soil moisture percentiles for October 18, 2023 from NASA's SPoRT LIS.

Peril Example: Hail

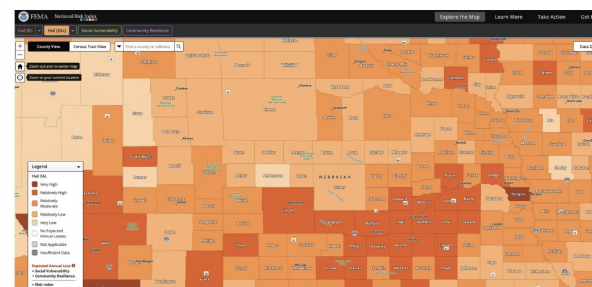


Figure 4: A FEMA risk assessment on expected annual loss due to hail by county.



Figure 5: A look at the effects of hail on irrigated corn in Scotts Bluff County.





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