

Oklahoma Drought Update

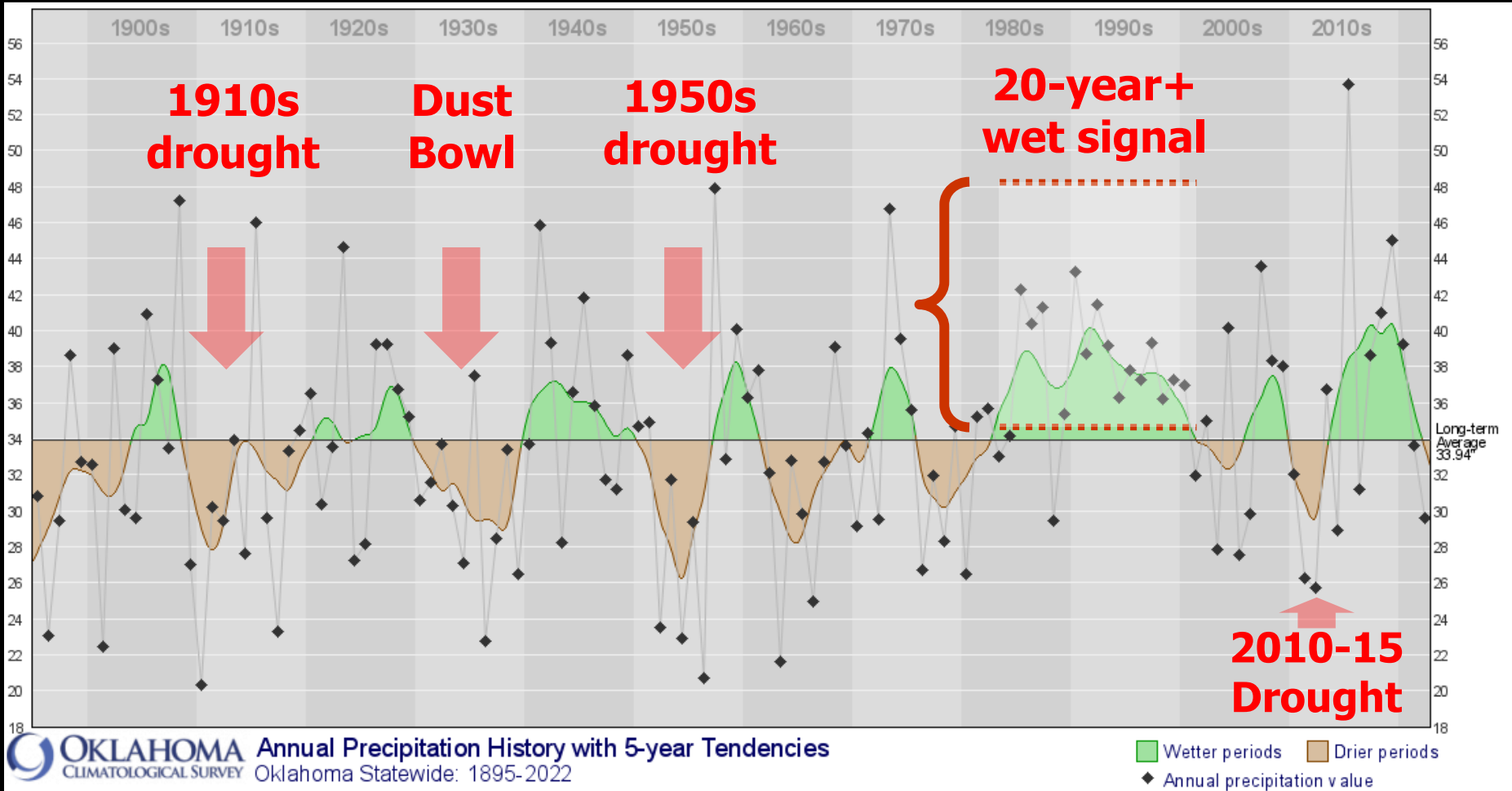
Oct. 10, 2023

**Gary McManus
State Climatologist
Oklahoma Mesonet
Oklahoma Climatological Survey**

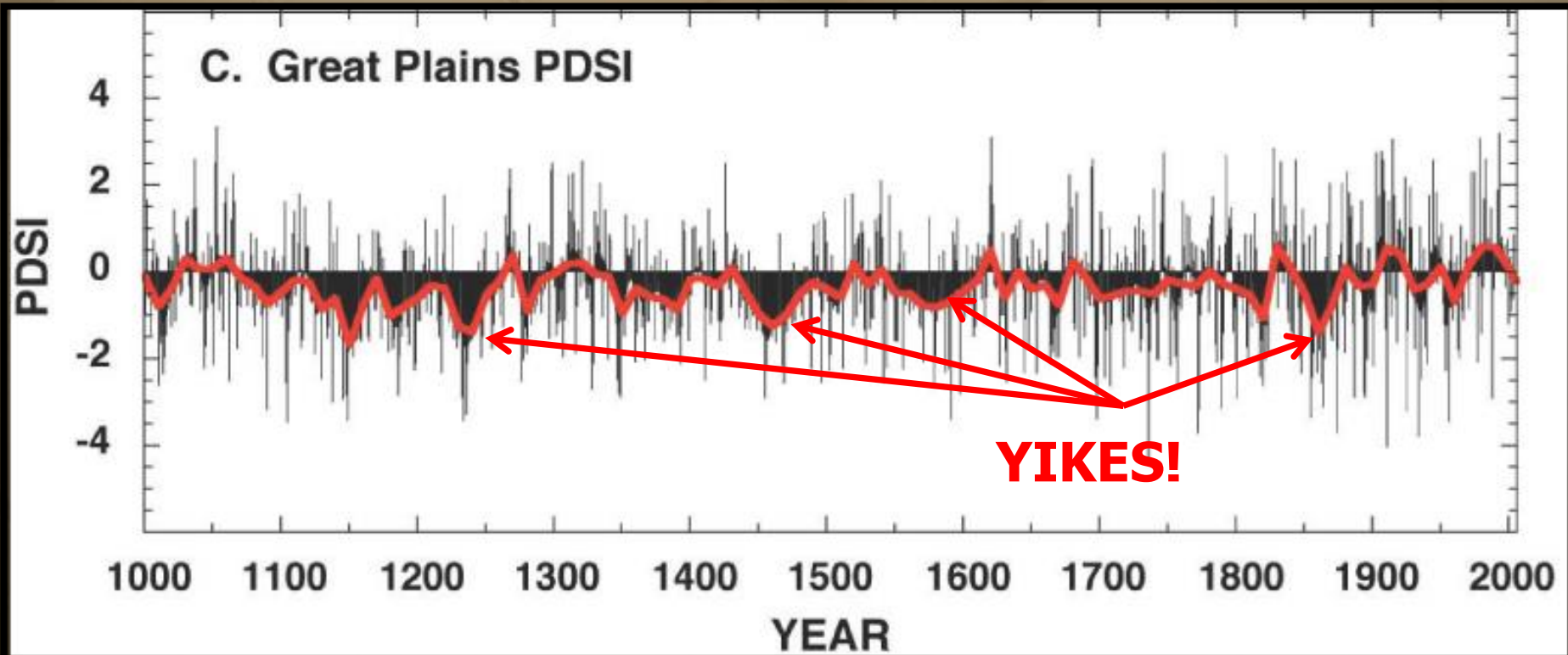
A Brief History of Drought in Oklahoma



The Biggies



A Bit Further Back

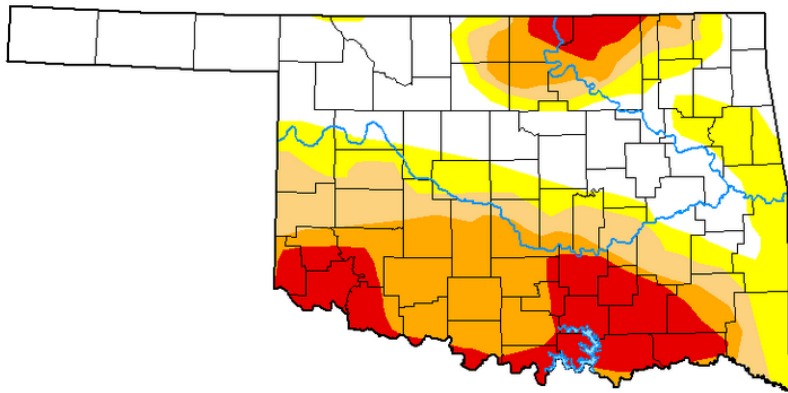




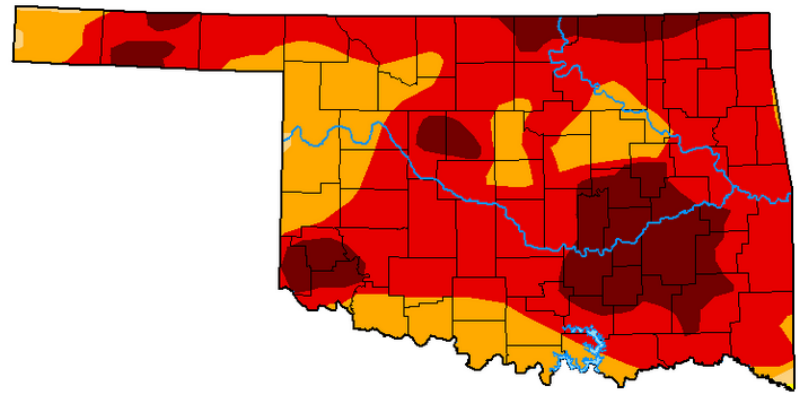
**Jackson County, Oklahoma
August 2023**

Synopsis of our 2021-23 Drought

- **August 2021:** Drought “begins”
- **December 2021:** Rare cool season flash drought!
- **Spring 2022:** Relief for eastern two-thirds, western OK drought remains
- **June 28, 2022:** Only 31% of the state in drought
- **June 11, 2022:** Flash drought #2 begins, rapid intensification due to extreme lack of rainfall, above normal temperatures, sun, and wind
- **Mid-October 2022:** Drought peaks (worst since February 2013)
- **First half of Summer 2023:** More widespread relief, drought hanging on in far southwest and north central
- **Second half of Summer 2023:** Similar to Summer 2022, flash drought blossoms once again
- **July 21-Current:** FLASH DROUGHT #3! Good relief, but spotty
- **Unknowns as we go forward:** Duration, intensity, location

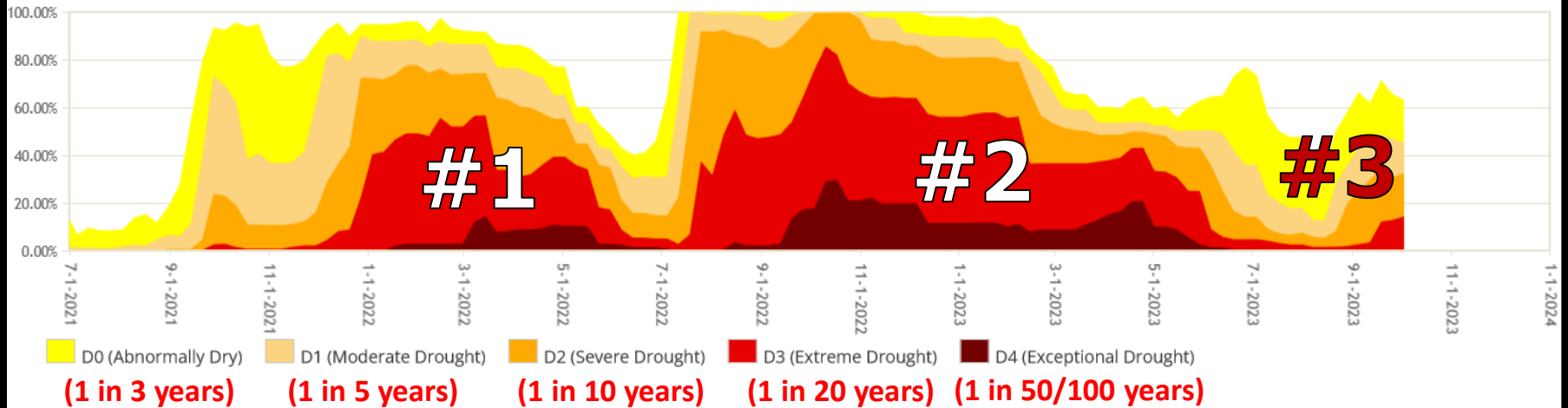


This year

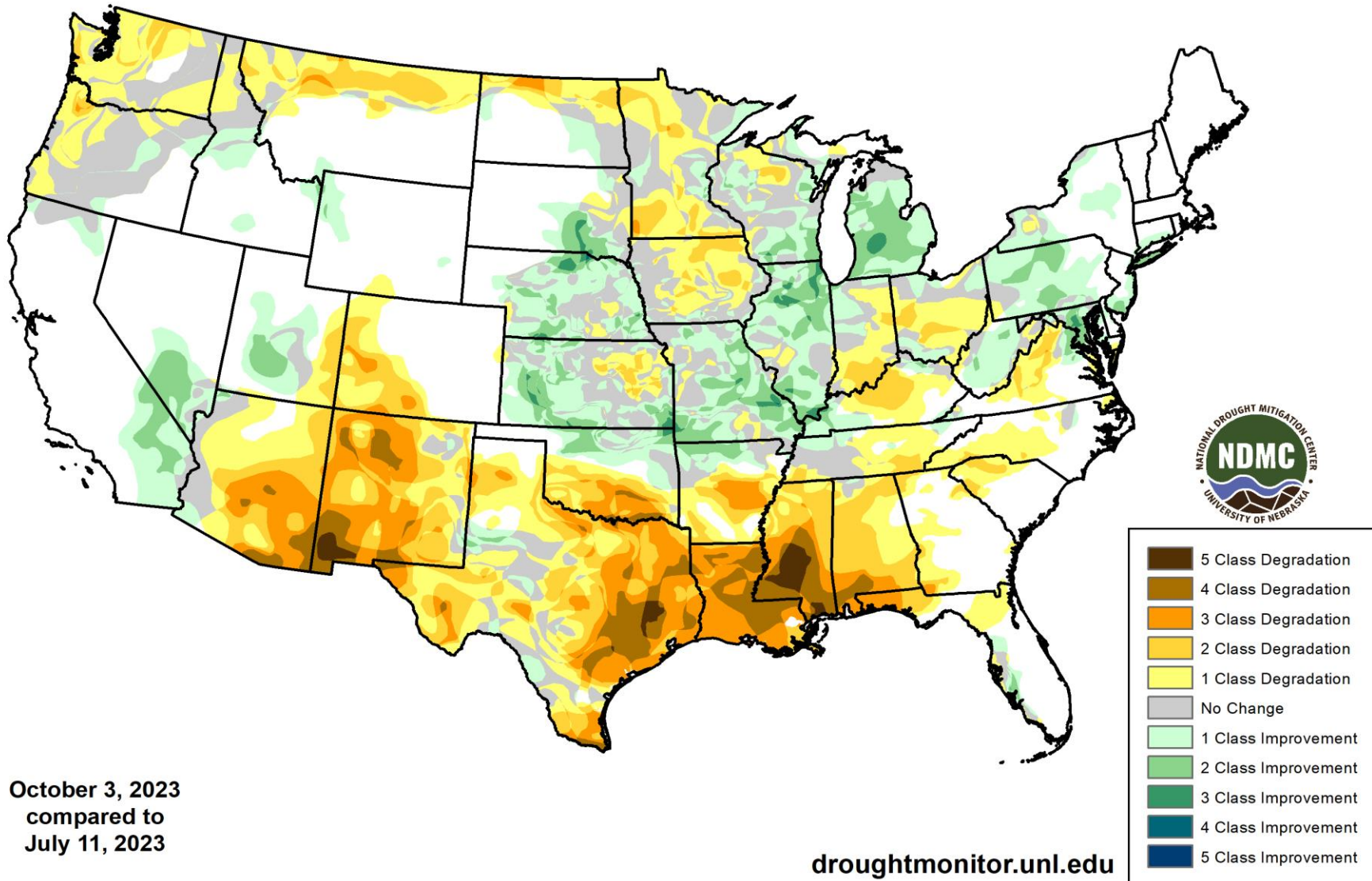


Last year

Oklahoma Percent Area in U.S. Drought Monitor Categories



U.S. Drought Monitor Class Change - CONUS 12 Week



October 3, 2023
compared to
July 11, 2023

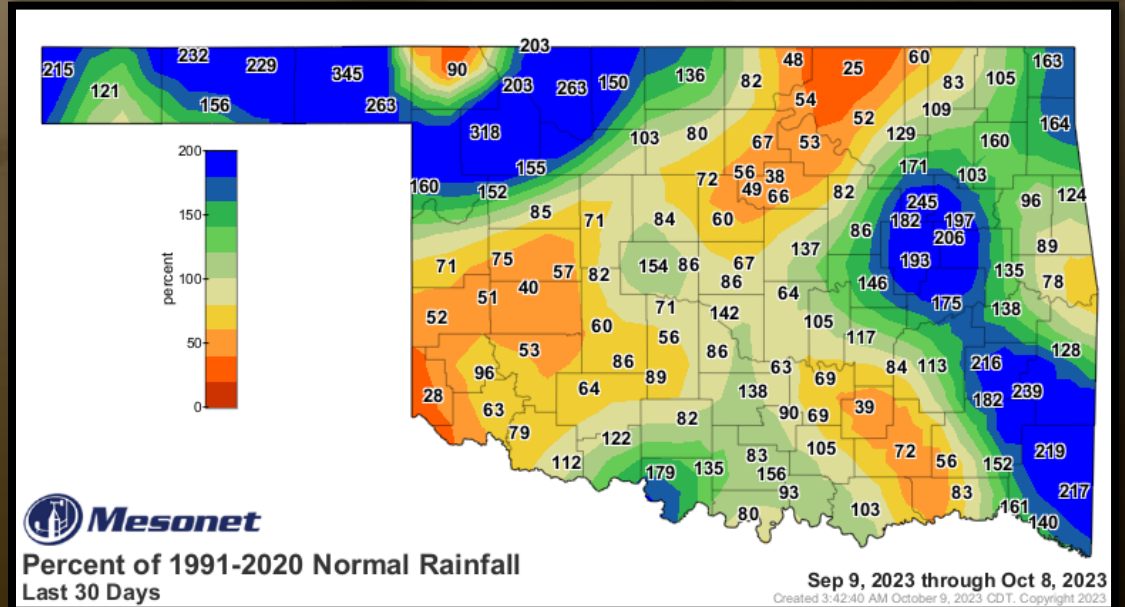
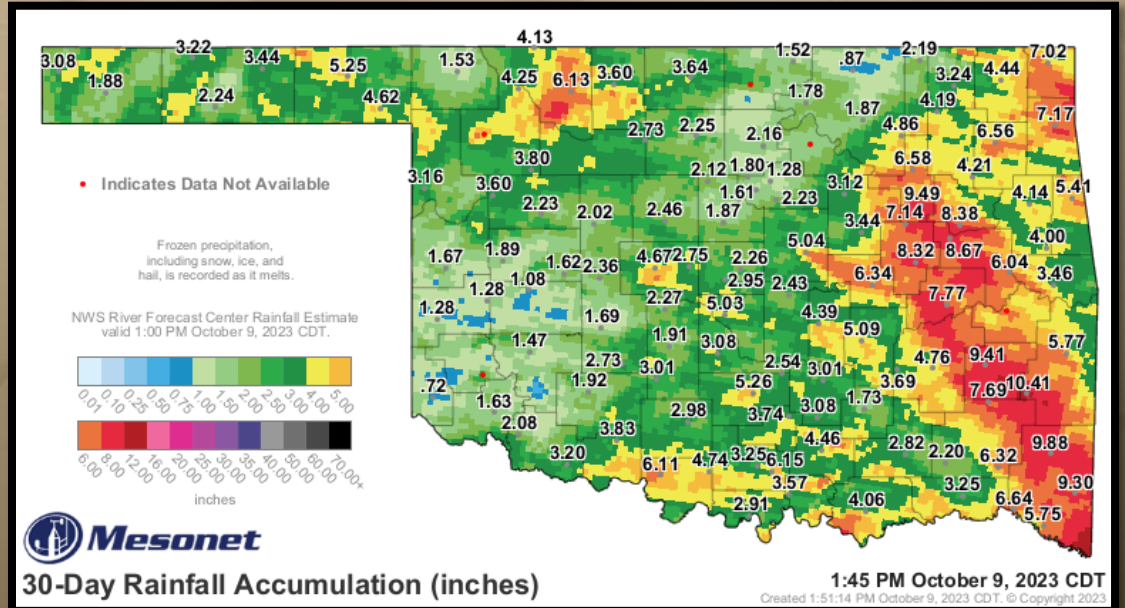
droughtmonitor.unl.edu

Current Conditions

Recent Relief

Some big rains on the 30-day map (and some not-so-big 30-day rains)

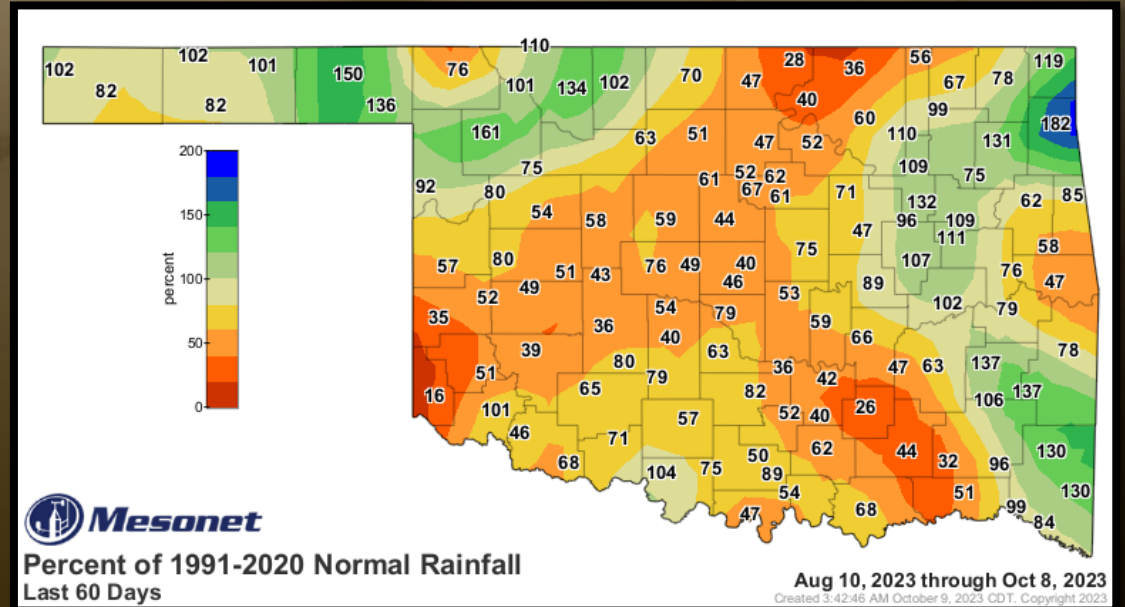
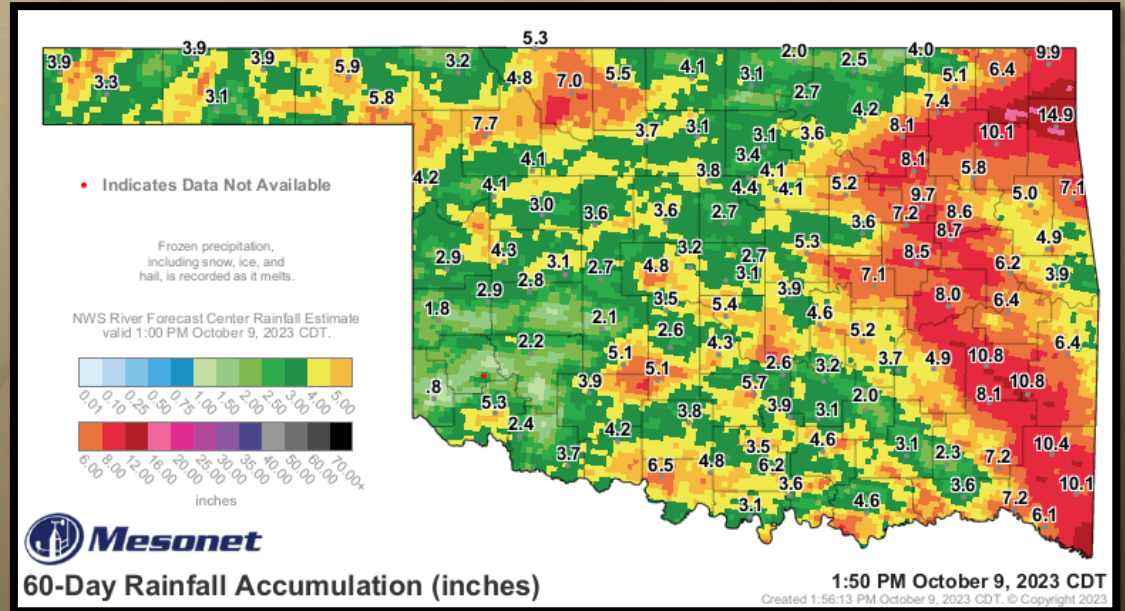
Top-20 for west central and SW OK



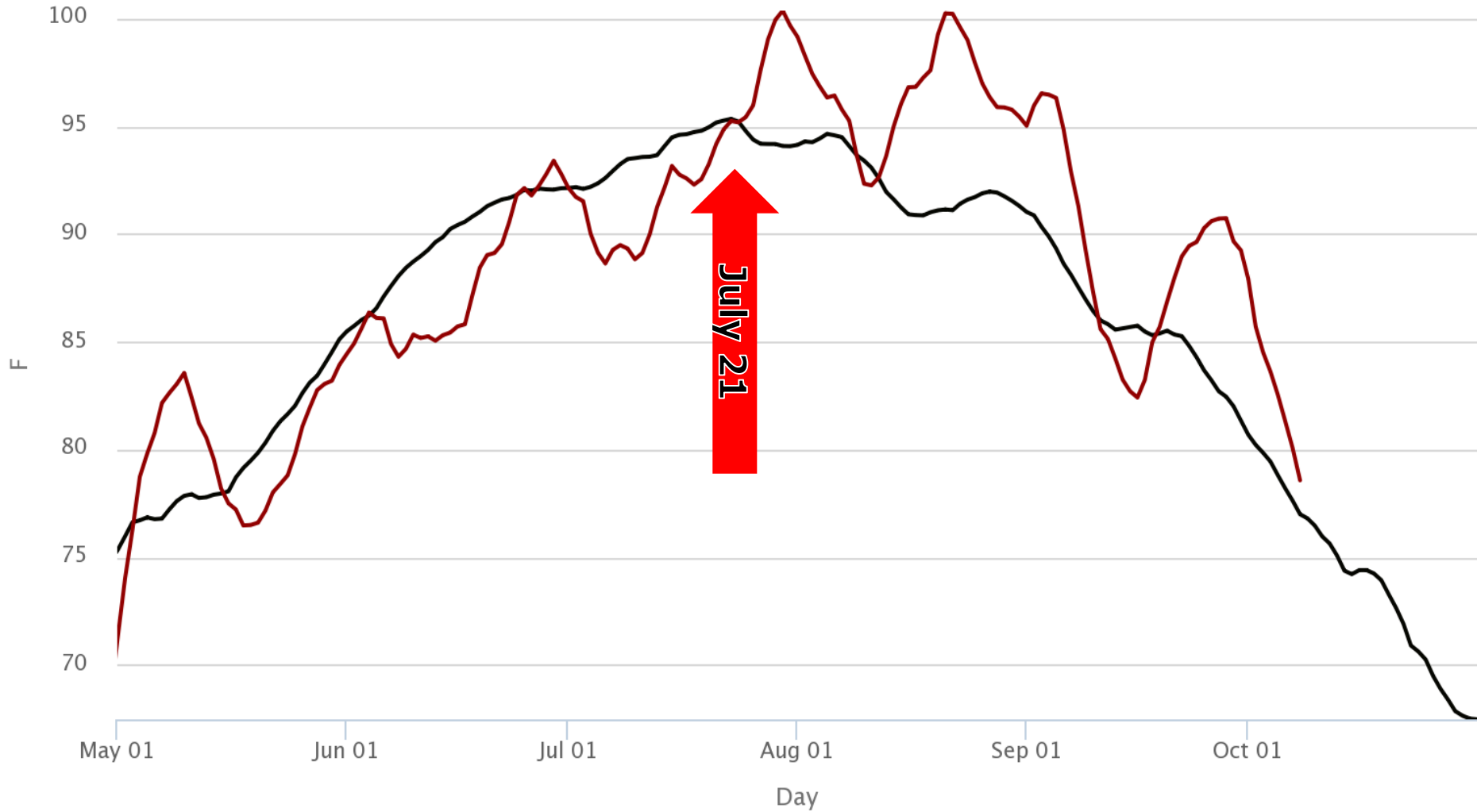
Recent LACK of relief—Last 60 days

Dryness concentrated across SW half of OK

This period is top-25 driest in at least last 100 years for much of southern and western OK



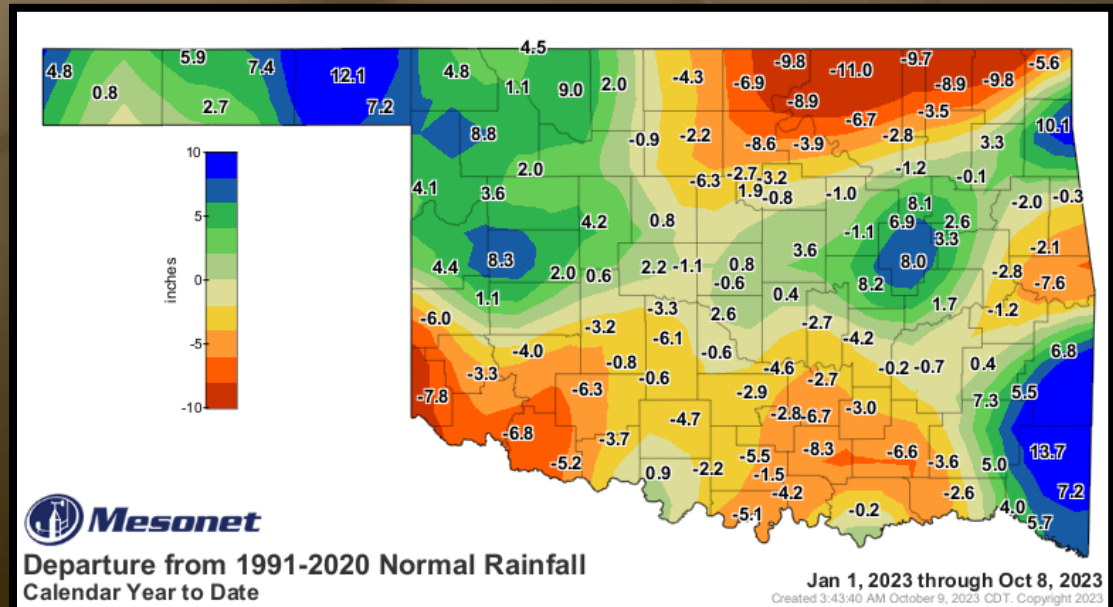
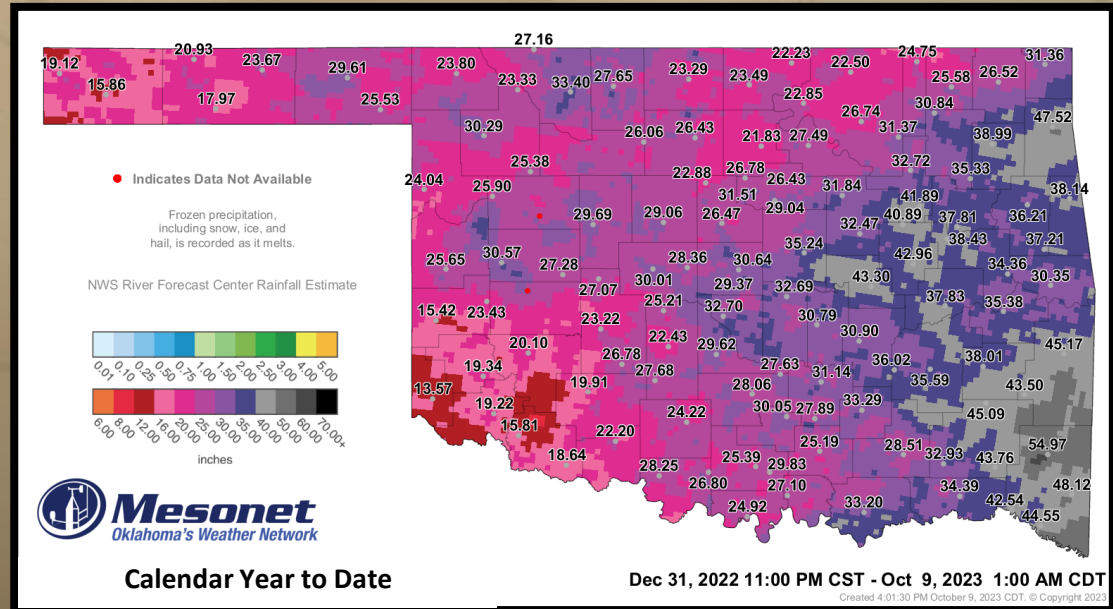
Last 80 days: Lots of extreme heat



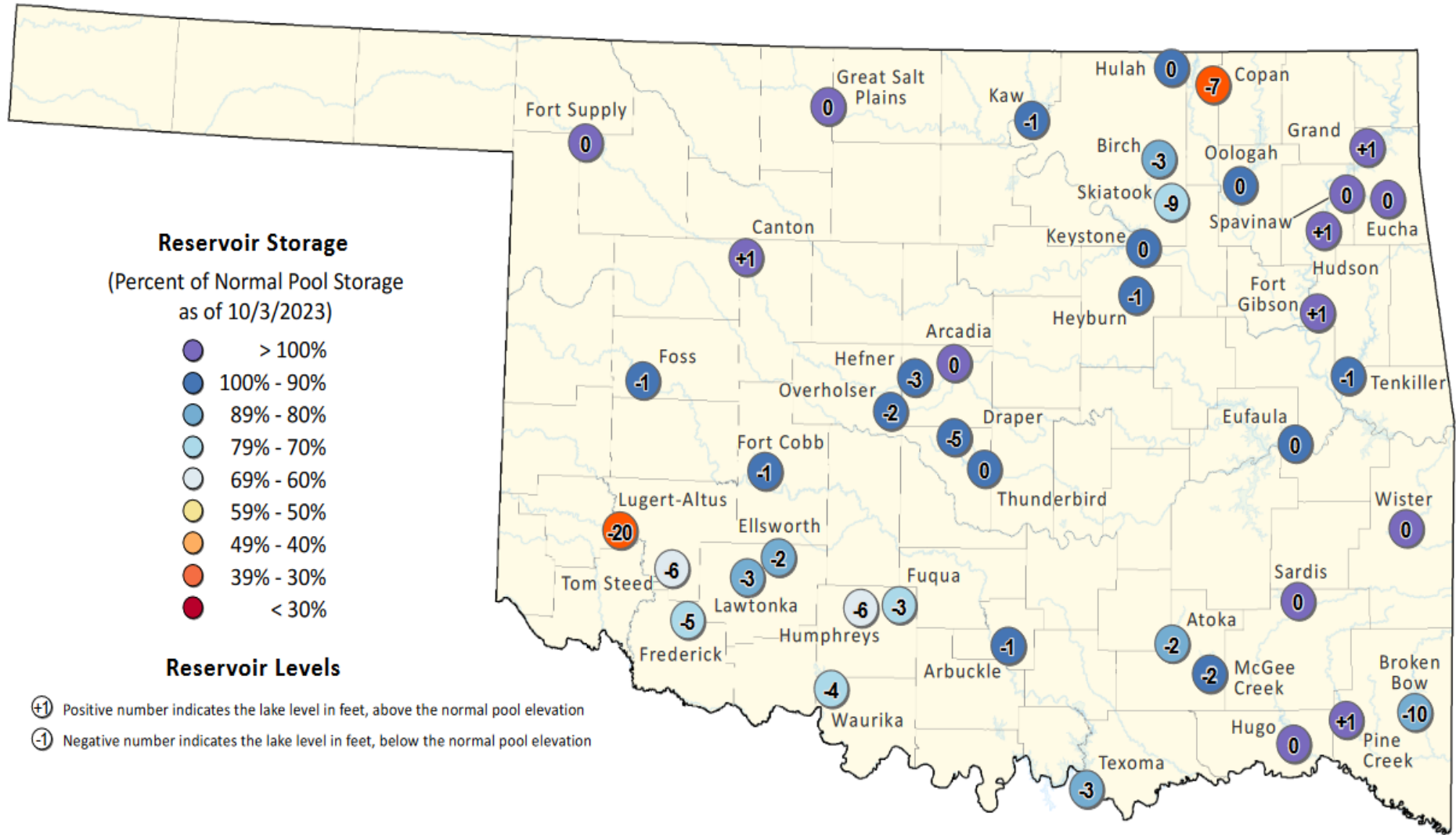
— Statewide Average Maximum Air Temperature, average, smoothed (F)
— Statewide Average Maximum Air Temperature, 2023, smoothed (F)

Long-Term Conditions

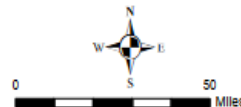
Long-term drought very evident in the calendar year rainfall



Oklahoma Reservoir Levels and Storage as of 10/2/2023

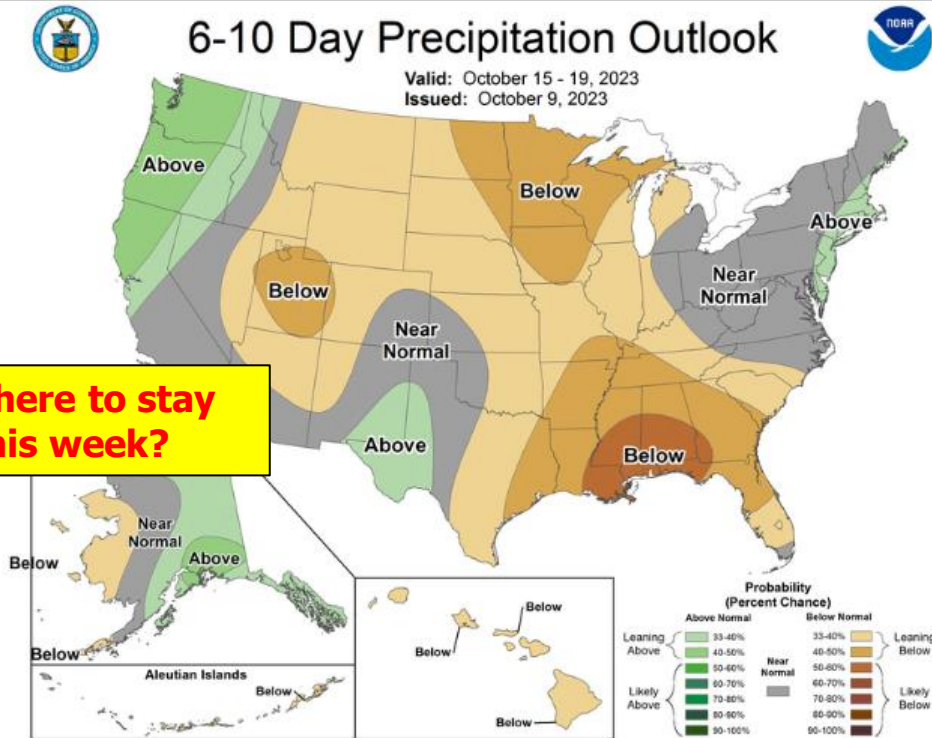
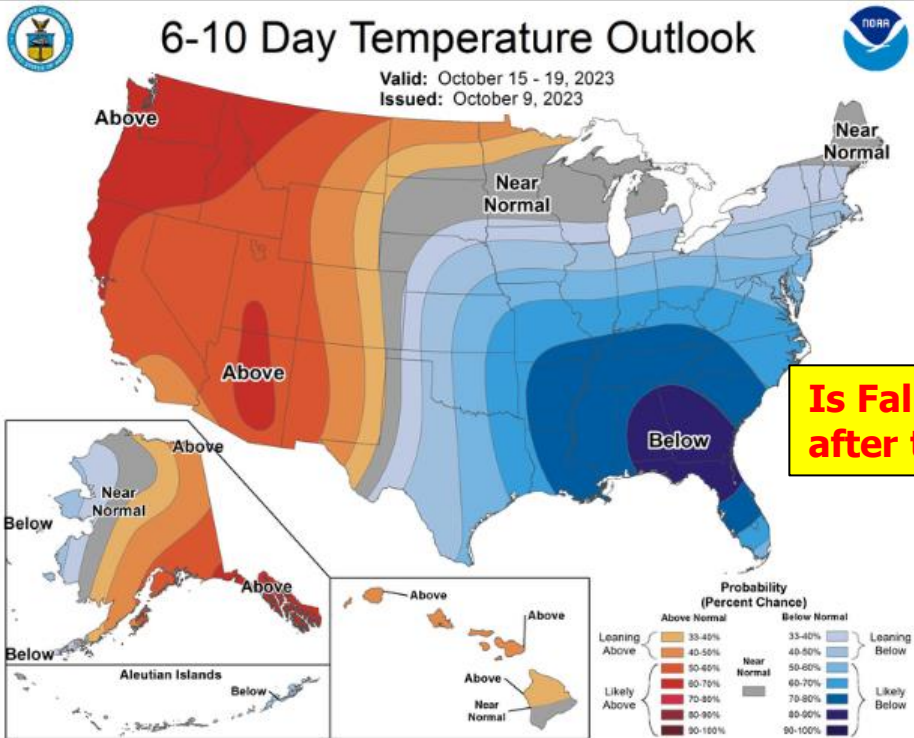
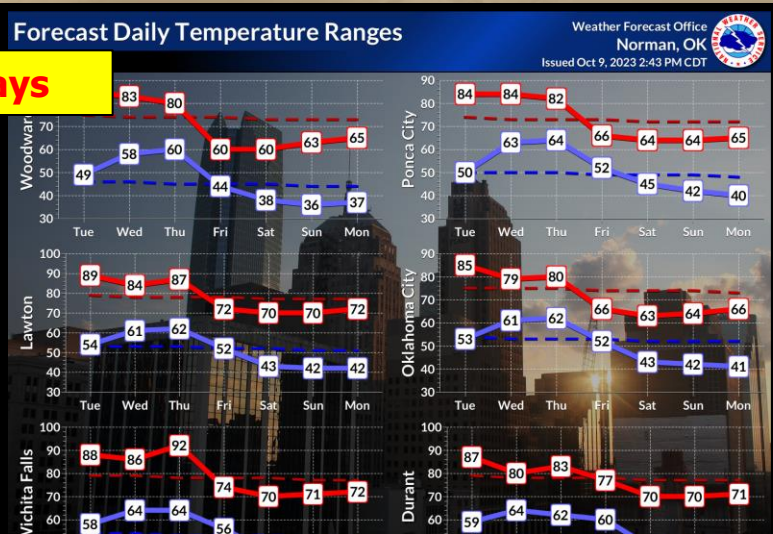
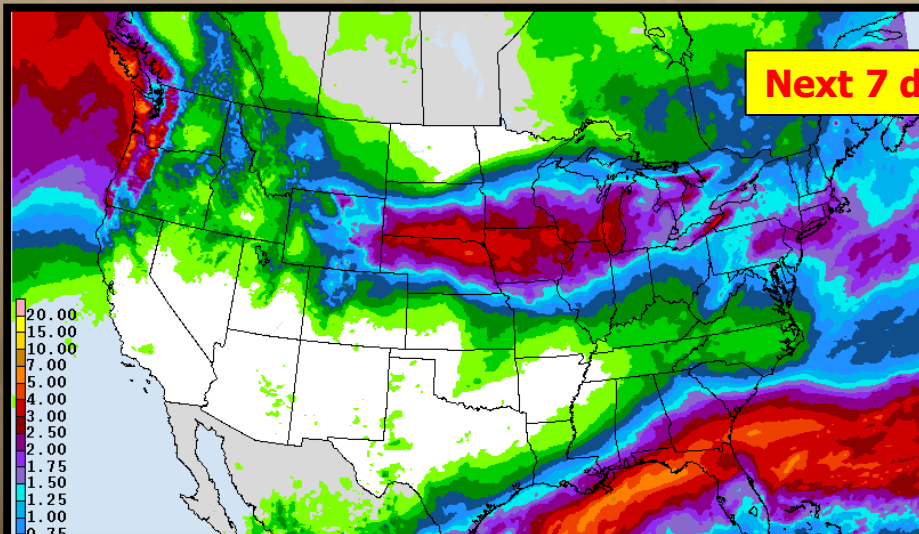


This map shows reservoir storage as a percentage of normal pool storage capacity. The source information was collected from real-time lake gages monitored by the U.S. Army Corps of Engineers (https://www.swf-wc.usace.army.mil/Daily_Morning_Reservoir_Report.pdf), and the U.S. Geological Survey (https://waterdata.usgs.gov/ok/nwis/current/?type=lake&group_key=basin_cd). For more information please visit the OWRB's website: (<https://www.owrb.ok.gov>).



Forecasts and Outlooks

Short/Medium Term Outlook: FALL but DRY

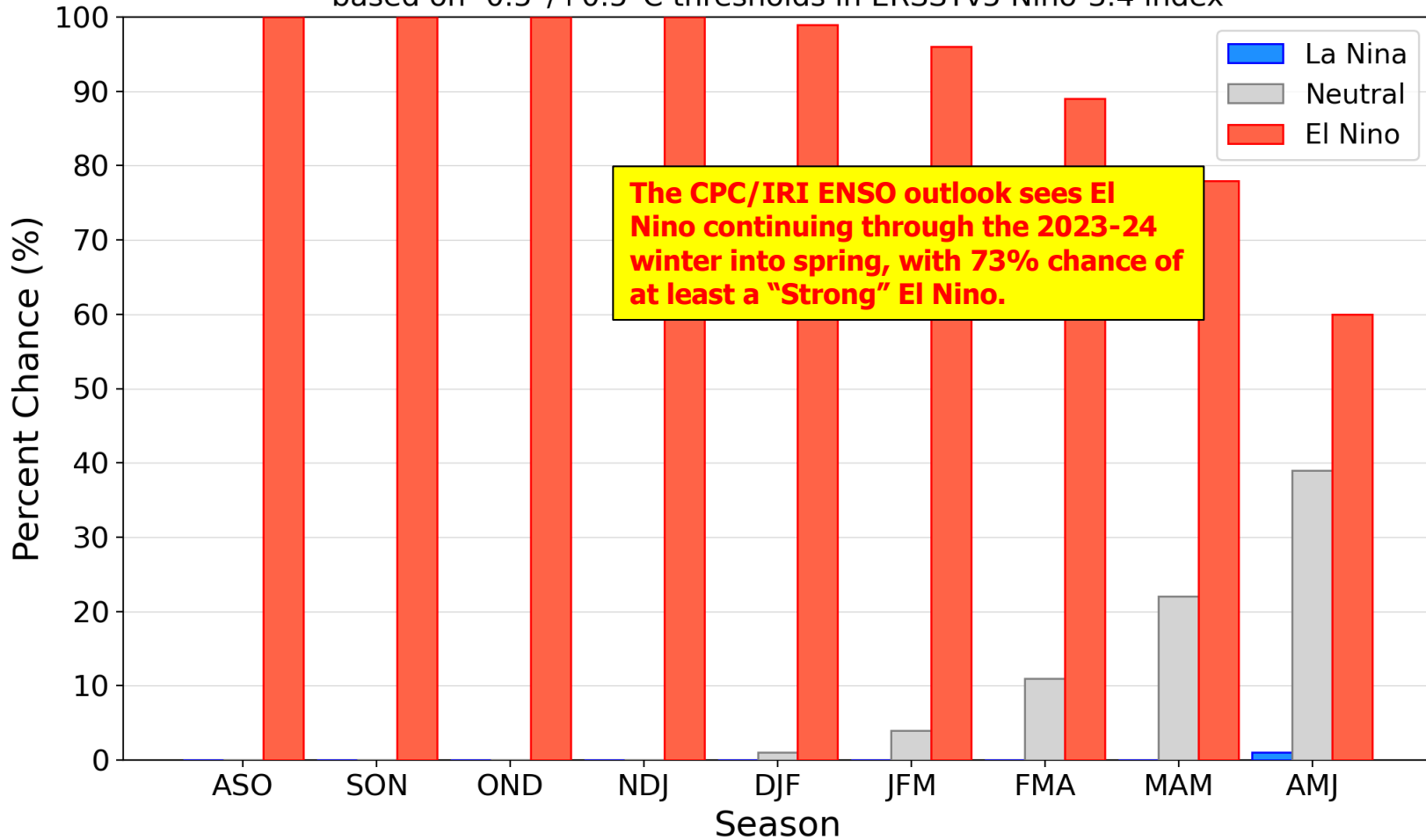


Is Fall here to stay after this week?

More help coming?

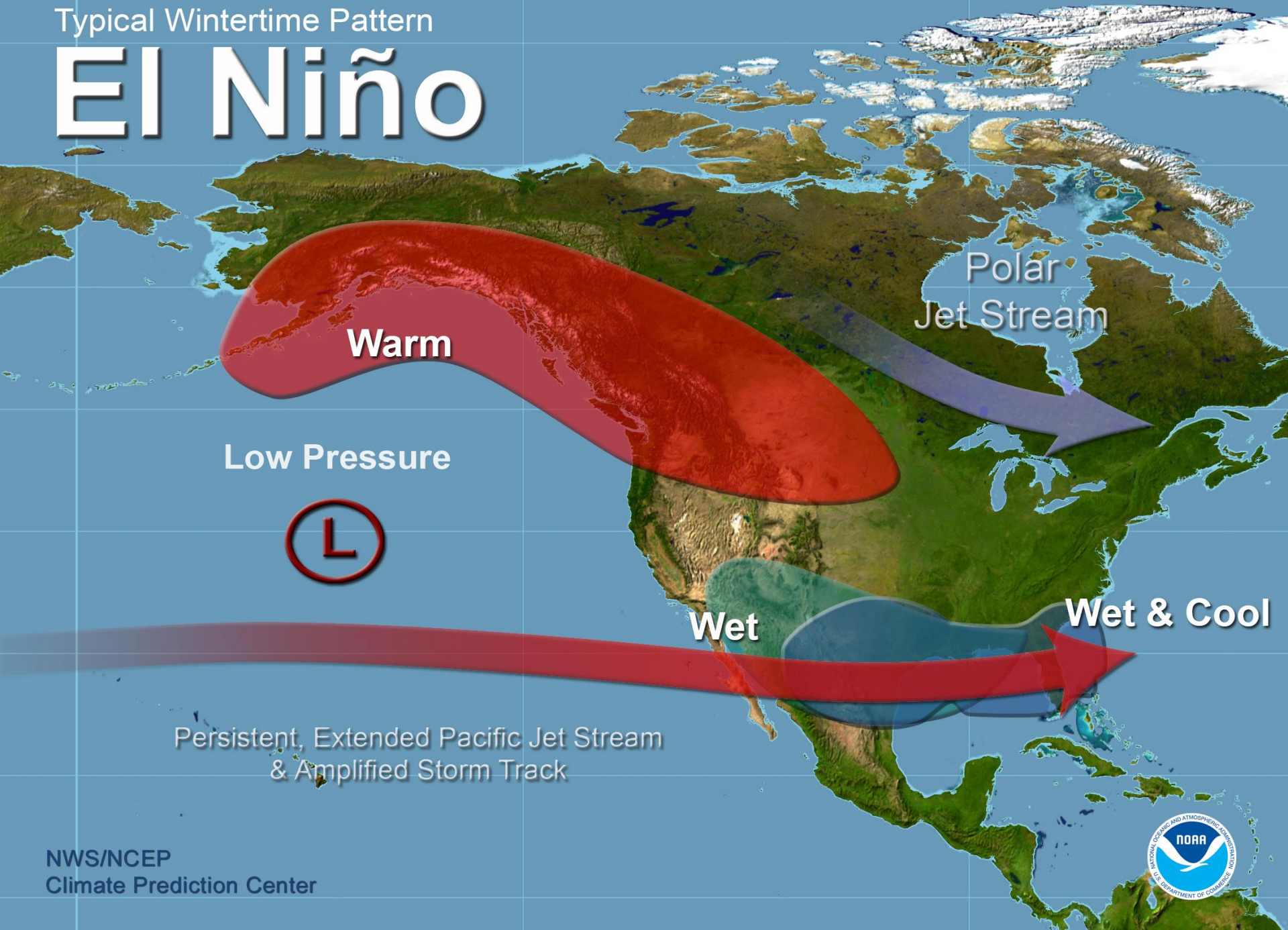
Official NOAA CPC ENSO Probabilities (issued Sep. 2023)

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



Typical Wintertime Pattern

El Niño



Warm

Low Pressure



Polar
Jet Stream

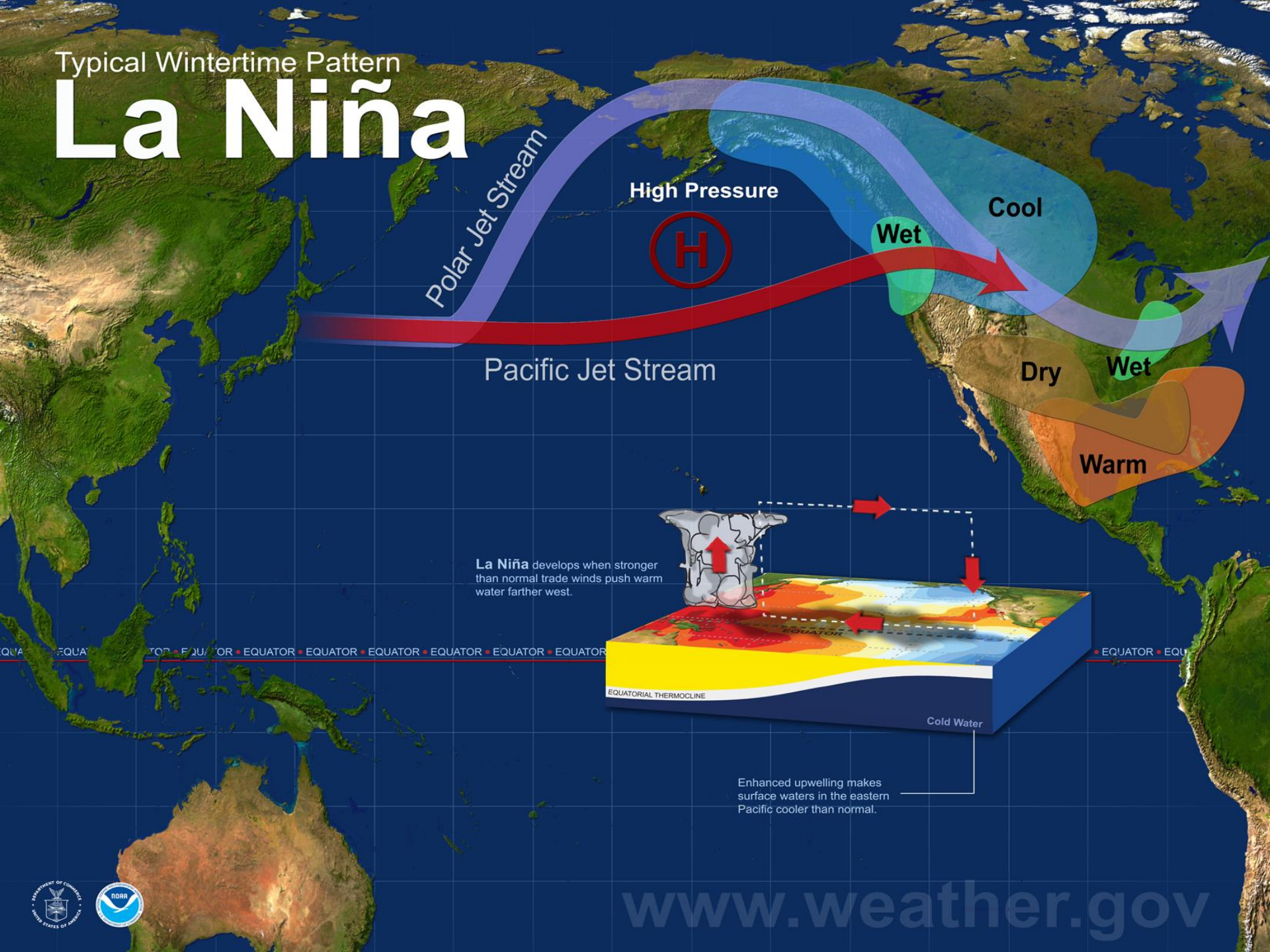
Wet

Wet & Cool

Persistent, Extended Pacific Jet Stream
& Amplified Storm Track

Typical Wintertime Pattern

La Niña



OK Drought 2000-2023

2001-02

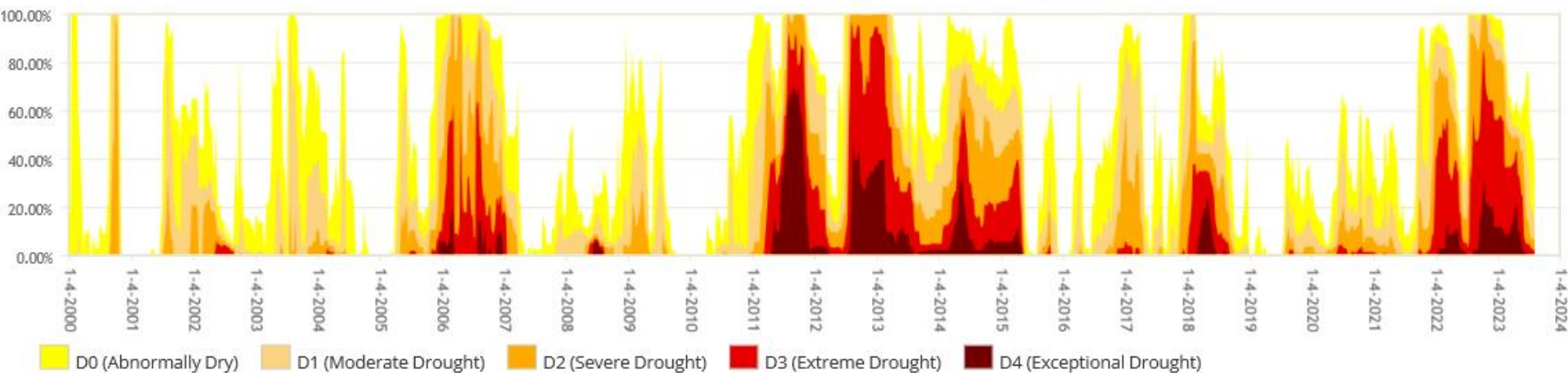
2005-06

2010-15

2017-18

2021-23

Oklahoma Percent Area in U.S. Drought Monitor Categories



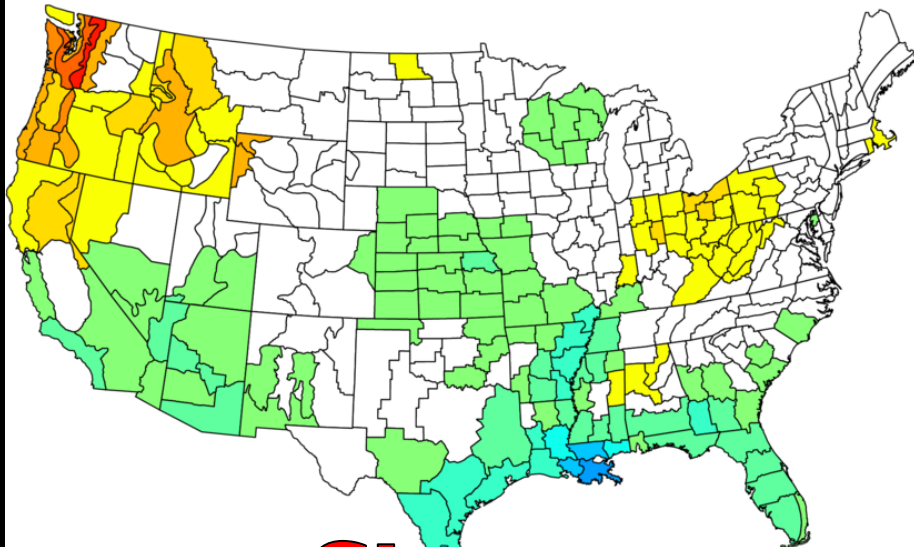
Single-dip Double-dips

Double-dip Triple-dip

La Ninas: can be "drought starters" in Oklahoma

El Nino November-March Precipitation Anomalies Strong-to-Very Strong

NOAA/NCEI Climate Division Composite Precipitation Anomalies (in)
Nov to Mar 1957-58,1965-66,1972-73,1987-88,1991-92
Versus 1981-2010 Longterm Average

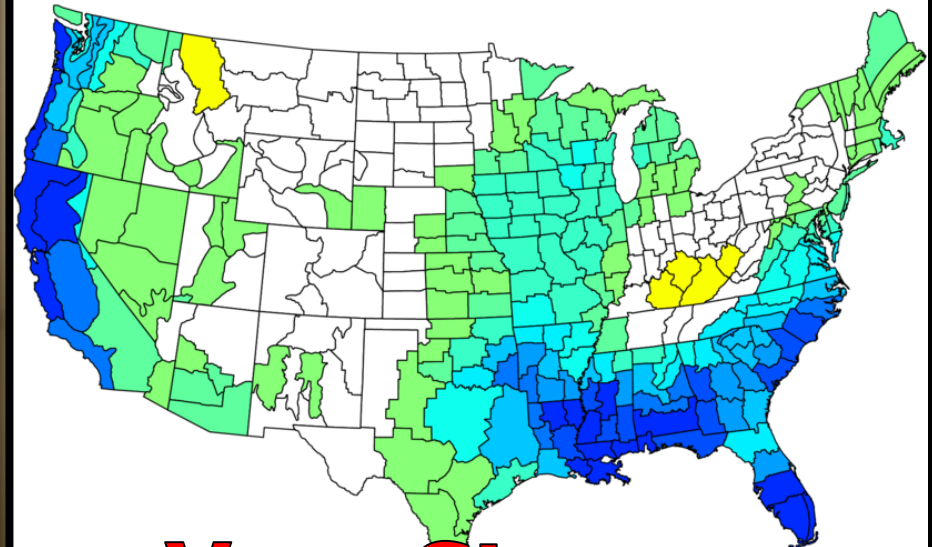


Strong

NOAA/ESRL PSD and CIRES-CU



NOAA/NCEI Climate Division Composite Precipitation Anomalies (in)
Nov to Mar 1982-83,1997-98,2015-16
Versus 1981-2010 Longterm Average



Very Strong

NOAA/ESRL PSD and CIRES-CU



El Nino Winter Precipitation Anomalies Strong-to-Very Strong

Winter Precipitation Anomalies of Strong/Very Strong El Niño Events since 1980

https://ggweather.com/enso2023/us_elnino_precip.html

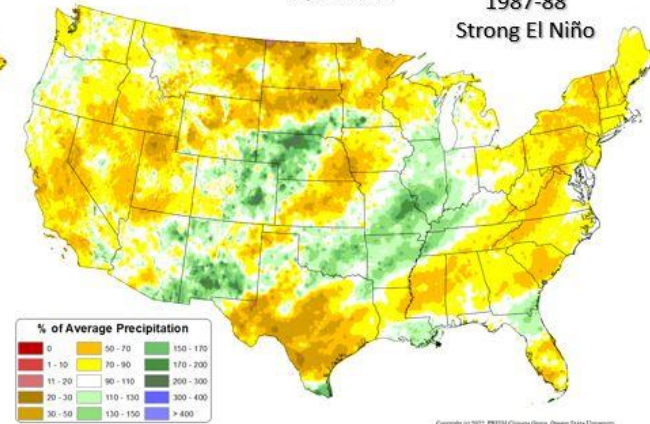
Total Precipitation Anomaly: Dec 1982 - Feb 1983
Period ending 7 AM EST 28 Feb 1983
Base period: 1991-2020
(Map created 30 Nov 2022)

1982-83
Very Strong El Niño



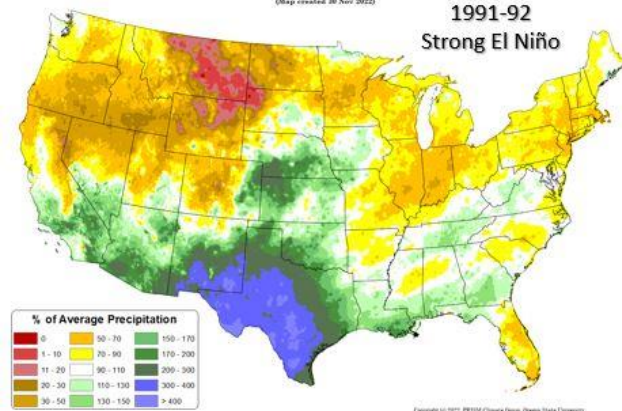
Total Precipitation Anomaly: Dec 1987 - Feb 1988
Period ending 7 AM EST 29 Feb 1988
Base period: 1991-2020
(Map created 30 Nov 2022)

1987-88
Strong El Niño



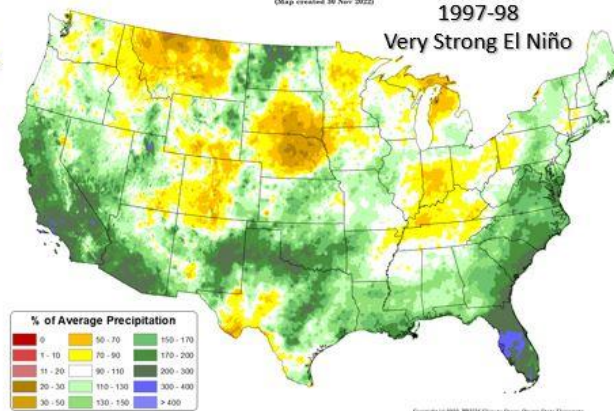
Total Precipitation Anomaly: Dec 1991 - Feb 1992
Period ending 7 AM EST 29 Feb 1992
Base period: 1991-2020
(Map created 30 Nov 2022)

1991-92
Strong El Niño



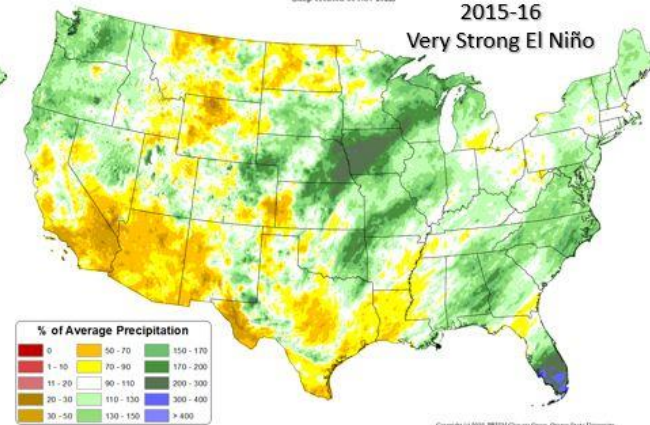
Total Precipitation Anomaly: Dec 1997 - Feb 1998
Period ending 7 AM EST 29 Feb 1998
Base period: 1991-2020
(Map created 30 Nov 2022)

1997-98
Very Strong El Niño



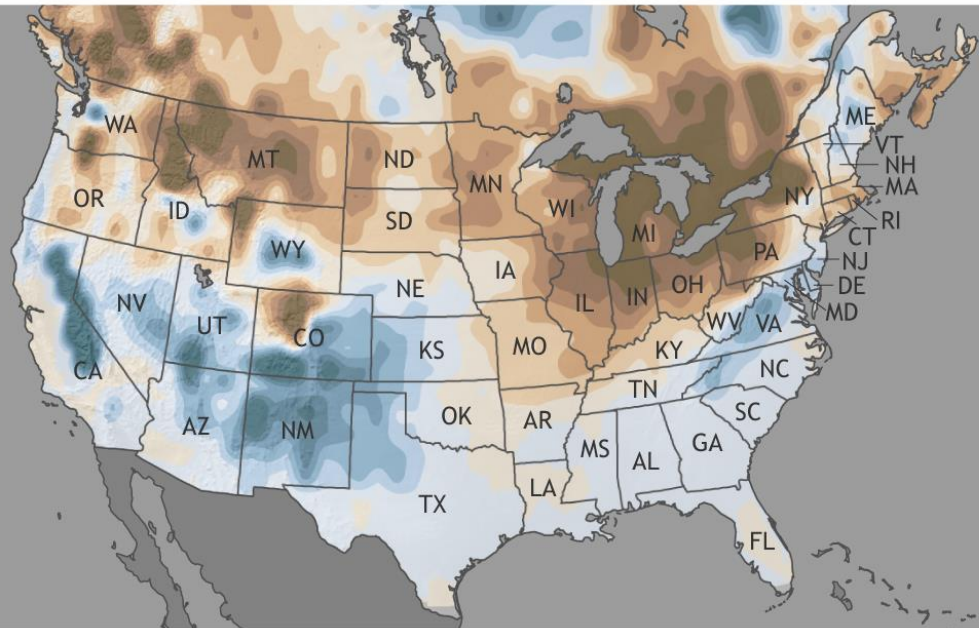
Total Precipitation Anomaly: Dec 2015 - Feb 2016
Period ending 7 AM EST 29 Feb 2016
Base period: 1991-2020
(Map created 30 Nov 2022)

2015-16
Very Strong El Niño

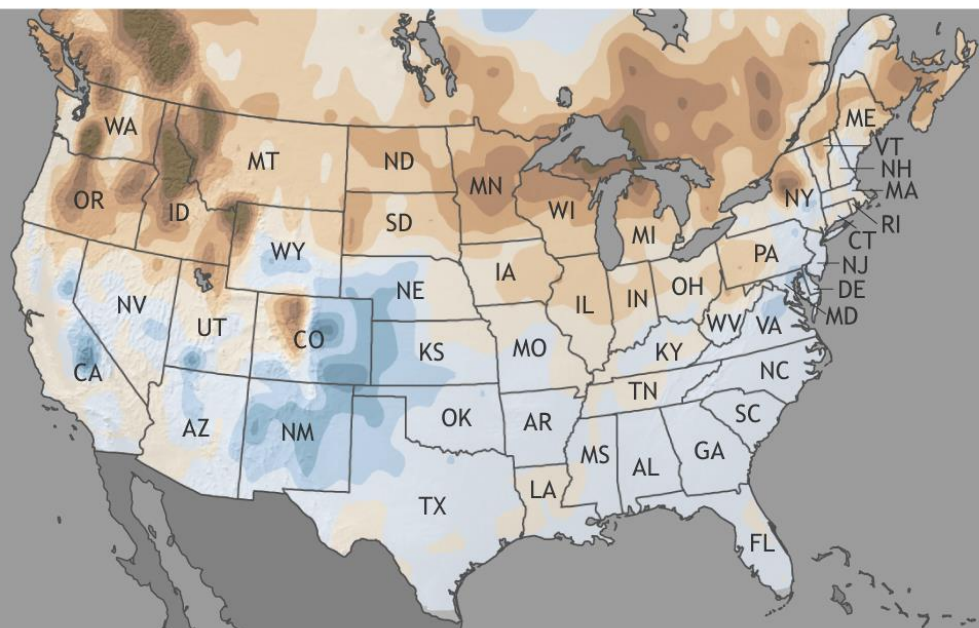


El Nino
Snows: Buy
those sleds??

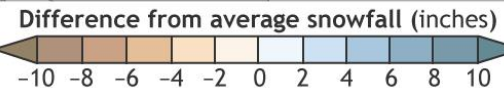
Snow during El Niño winters (1950-2009)
10 strongest events



All events



October–April
compared to 1950–2009



NOAA Climate.gov
Data: Rutgers/CPC

Final Thoughts

- **Parts of Oklahoma still in drought that began in August 2021**
- **This flash drought marks our third intensification within the larger drought period**
- **One dose of relief Monday-Tuesday**
- **Another dose Wednesday-Friday**
- **Relief may be aided by El Nino**
- **Atmospheric portion of El Nino FINALLY starting to match up, warm Atlantic working against us**
- **Colder weather will help**
- **There will still be lots of drought in Oklahoma after this week**

Thank You!