



2024-25 Preliminary Winter Weather Outlook

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Transmission Service Provider (TSP) Winter Weather Preparedness Workshop
October 28, 2024

Agenda

- Reviewing the summer
- Quick look at fall
- Review of last winter (and other recent winters)
- Expectations for the upcoming winter



Updating Summer 2024

Texas **Average** Temperature
June-August

• Period	• Average Temperature	Rank (out of 130)	Anomaly 1901-2000 Mean: 81.3°F
June-August 2011	86.8°F	130	5.5°F
June-August 2023	85.3°F	129	4.0°F
June-August 2022	84.8°F	128	3.5°F
June-August 1934	84.2°F	127	2.9°F
June-August 1998	84.2°F	127	2.9°F
June-August 1980	84.0°F	125	2.7°F
June-August 2024	84.0°F	125	2.7°F
June-August 2018	83.8°F	123	2.5°F
June-August 1953	83.5°F	122	2.2°F
June-August 2020	83.4°F	121	2.1°F

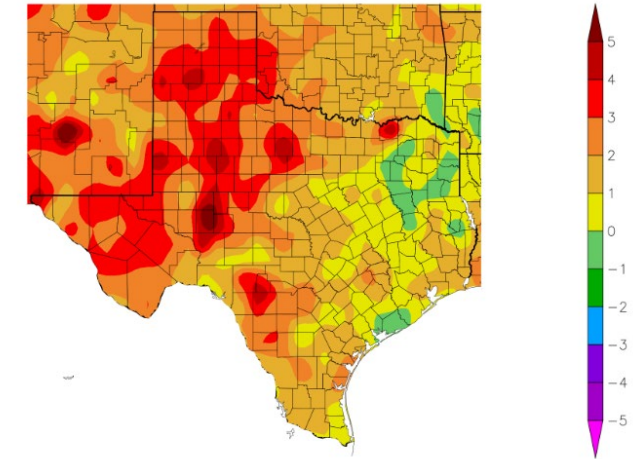
Texas **Minimum** Temperature
June-August

• Period	• Minimum Temperature	Rank (out of 130)	Anomaly 1901-2000 Mean: 69.1°F
June-August 2011	73.4°F	130	4.3°F
June-August 2022	72.6°F	129	3.5°F
June-August 2023	72.5°F	128	3.4°F
June-August 2024	72.3°F	127	3.2°F
June-August 1998	71.7°F	126	2.6°F
June-August 2018	71.7°F	126	2.6°F
June-August 2010	71.5°F	124	2.4°F
June-August 1980	71.2°F	123	2.1°F
June-August 2016	71.1°F	122	2.0°F
June-August 2020	71.1°F	122	2.0°F

- **June-August 2024** was the **6th hottest** on record for Texas (since 1895, based on **mean** temperatures); however, it was significantly cooler than the previous two years

- The 6th hottest Jun-Aug mean was due especially to minimum temperatures. Jun-Aug 2024 **minimum** temperatures ranked **4th warmest** all-time (and close to the past two summers)

Departure from Normal Temperature (F)
6/1/2024 – 8/31/2024



- 100-degree days (through 9/11/24):
 - Dallas: **23** days. (2023: 55)
 - Houston: **9** days. (2023: 22)
 - Austin: **30** days. (2023: 80)
 - San Antonio: **25** days. (2023: 58)
 - Abilene: **40** days (2023: 66)
 - McAllen: **54** days (2023: 97)

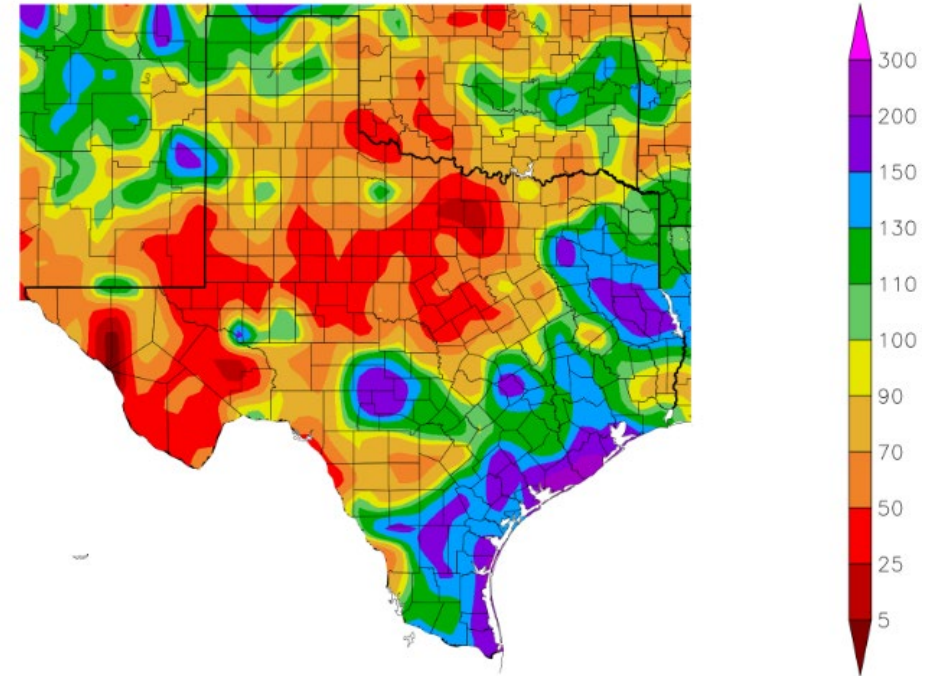
All locations listed – except McAllen (2022) – have recorded their fewest 100-degree days since 2021

Updating Summer 2024

- **June-August 2024** was the **75th driest** on record for Texas, which was not nearly as dry as last year's June through August period which ranked 7th

↕ Period	↕ Precipitation	Rank (out of 130)	Anomaly ↕ 2009-2023 Mean: 7.31in
June-August 1935	8.48"	81	1.17"
June-August 1997	8.24"	79	0.93"
June-August 1949	8.23"	78	0.92"
June-August 1927	7.85"	77	0.54"
June-August 1995	7.83"	76	0.52"
June-August 2024	7.77"	75	0.46"
June-August 1962	7.75"	74	0.44"
June-August 2005	7.67"	73	0.36"
June-August 1938	7.55"	72	0.24"
June-August 1909	7.48"	71	0.17"
June-August 1990	7.47"	70	0.16"

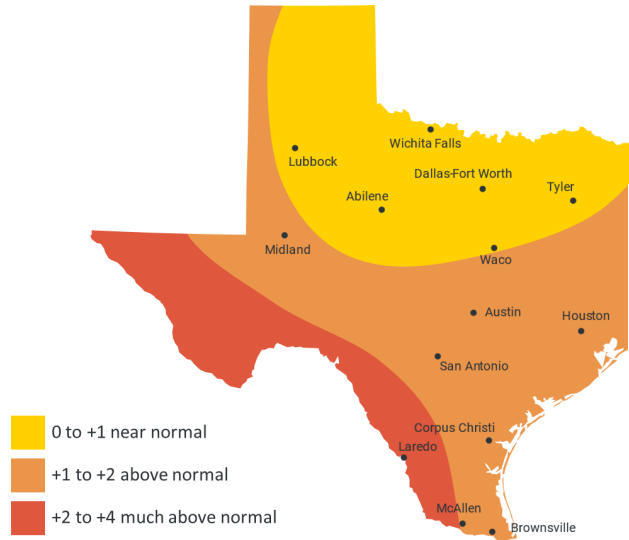
Percent of Normal Precipitation (%)
6/1/2024 – 8/31/2024



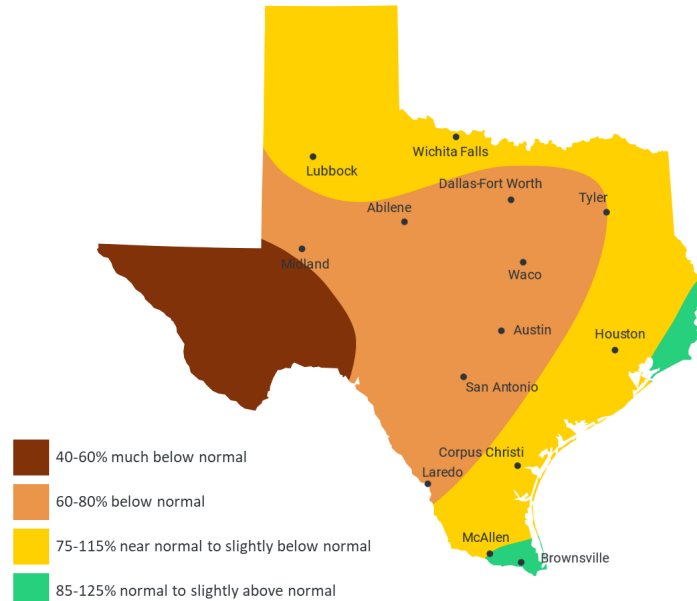
- June through August 2024 was the hottest recorded for Texas in a summer with above normal precipitation
- It was the only of the top 20 hottest Jun-Aug periods to record above normal rainfall
- Only 3 other top 50 hottest summers in Texas also recorded above normal precipitation: 2024: 6th hottest, 2010: 21st hottest, 2016: 33rd hottest, 1899: 47th hottest

Quick Look at Fall Weather

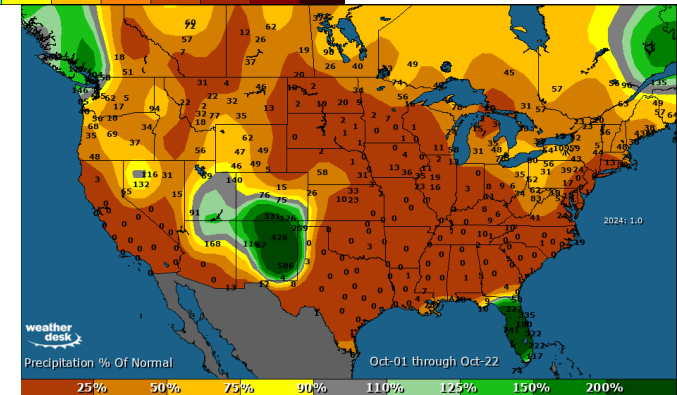
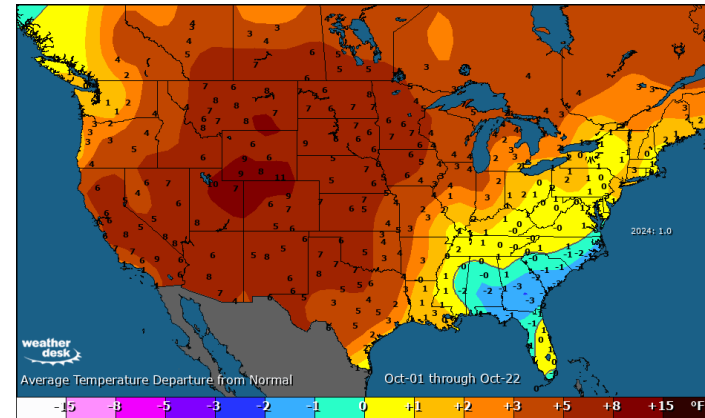
ERCOT Temperature Outlook
Fall 2024



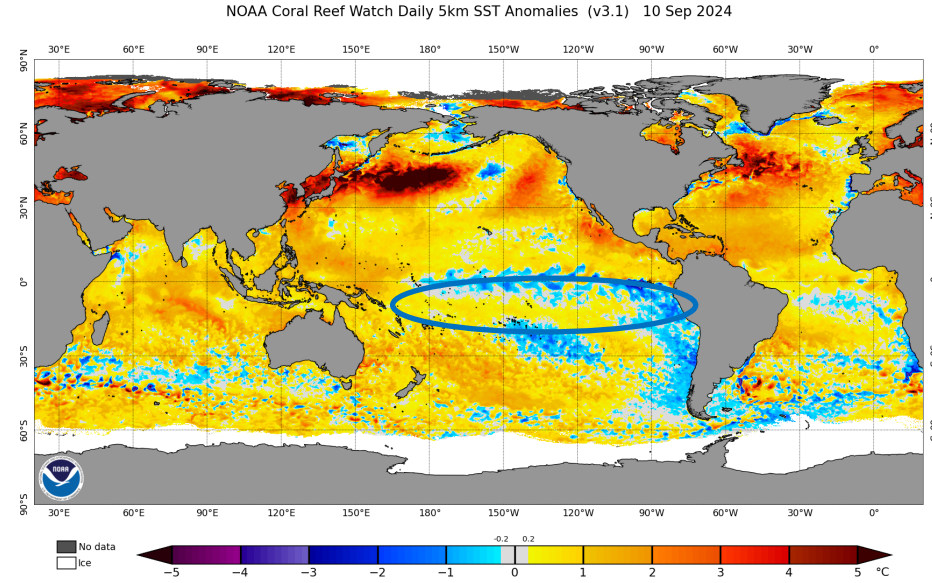
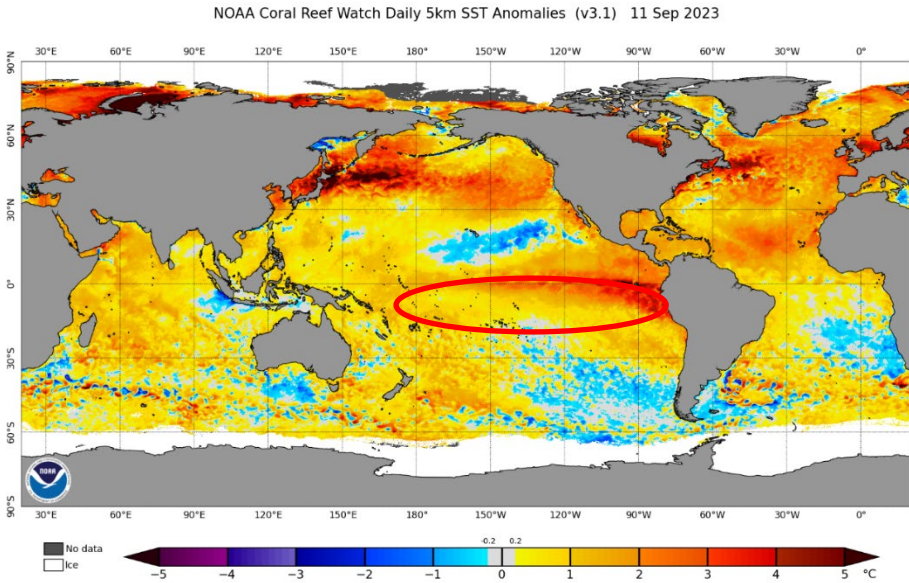
ERCOT Precipitation Outlook
Fall 2024



- The forecast for this fall (Oct-Nov) is mostly above normal temperatures and below normal precipitation
- No current signs of a significant, long-term pattern change colder in November
- This fall is on track to come in hotter than forecasted, and may be one of the hottest falls on record for the state when complete
- The dry trend will continue

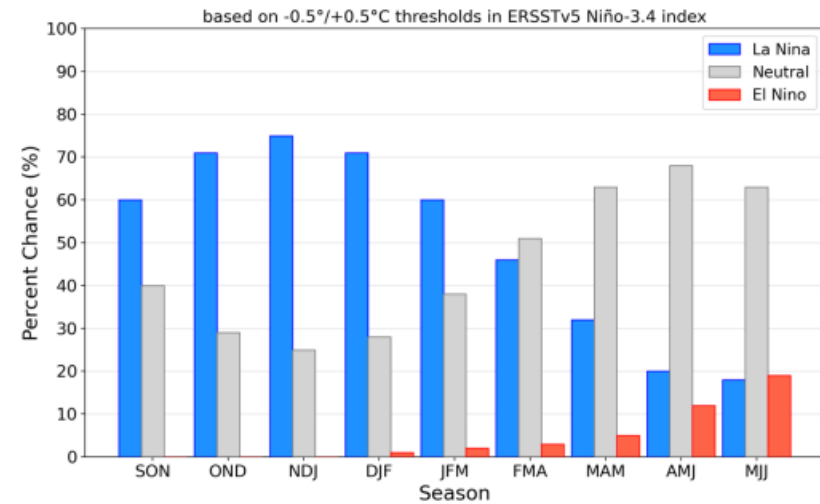


La Niña



- La Niña is slowly trying to develop; however, it is unlikely to be more than a weak La Niña. There are an increasing number of forecasts for this cycle to remain neutral this winter
- This would mark 4 of 5 winters under the influence of La Niña

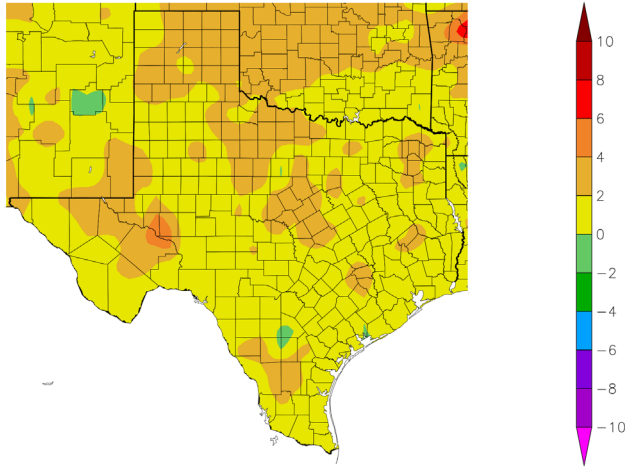
Official NOAA CPC ENSO Probabilities (issued October 2024)



Reviewing Last Winter

ERCOT winter (Dec 1 – Feb 28)

Departure from Normal Temperature (F)
12/1/2023 – 2/29/2024



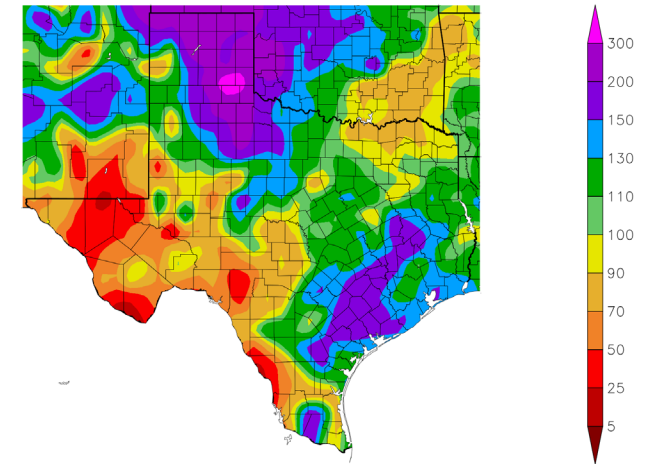
Generated 3/20/2024 at HPRCC using provisional data.

NOAA Regional Climate Centers

Temperature anomaly

- Last winter was the **12^h warmest** on record (129 historical winters)
- However, it featured a period of extreme cold in mid-January (Winter Storm Heather)
- ERCOT's new winter peak record was set on 1/16/24. DFW fell to 12°, Houston was 18°, Austin was 17°, while San Antonio recorded a low of 19°. The LRGV saw lows in the upper 20s, while Lubbock dropped to 5°
- This emphasizes the point made annually – mild (above normal) winters can and do have periods of extreme cold
- Last winter was the 30th wettest on record (129 historical winters). It was the wettest winter since 2011-12, with El Niño likely playing a role

Percent of Normal Precipitation (%)
12/1/2023 – 2/29/2024



Generated 3/20/2024 at HPRCC using provisional data.

NOAA Regional Climate Centers

Precipitation anomaly

Mean Temperature Ranking of Recent Texas Winters (129 historical winters)

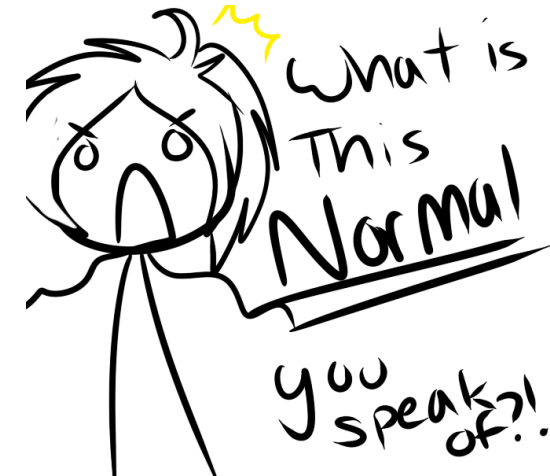
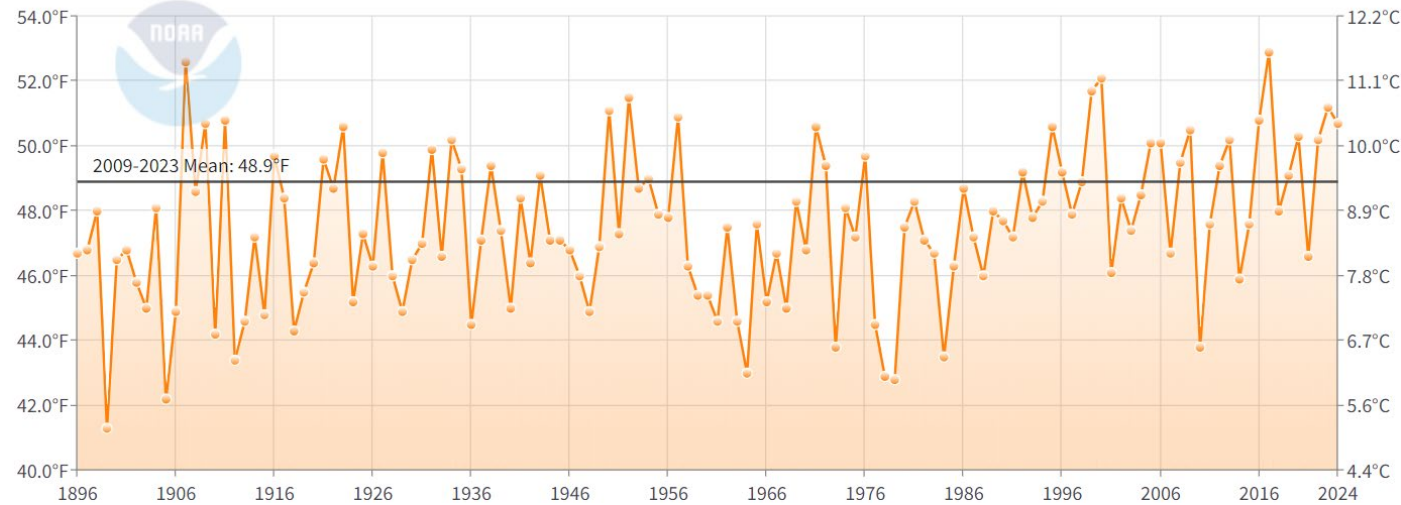
2023-24	118th coldest (12th warmest)
2022-23	124th
2021-22	110th
2020-21	42 nd
2019-20	113th
2018-19	94 th
2017-18	76 th
2016-17	129th coldest (warmest winter on record)
2015-16	120th
2014-15	68 th
2013-14	30 th
2012-13	110th
2011-12	99 th

Since 2001, only 3 winters have ranked in the coldest third (1-43) of historical winters (2020-21, 2013-14, and 2009-10)

Seasonal Rankings – what is normal?

- ❑ “Normal” may no longer be the best way to express seasonal (or monthly, or possibly even daily) temperatures
- ❑ As Texas keeps having many more above normal temperature seasons, it keeps raising the bar for what is “normal”
- ❑ **We commonly use a 15-year normal (2009-2023). Applying that normal to all historical winters (1895-2024) results in only 37 of 129 winters coming in above normal**
- ❑ This is why I’ll oftentimes give all-time rankings and comparisons with recent years (in addition to or instead of “normal”)

Texas Average Temperature
December-February



Extreme Cold Occurrences

ENSO phase during winters with extreme cold:

	la nina	neutral	el nino
since 1950	12	8	9
since 83-84	9	4	2
since 16-17	4	0	1

5 of the most recent 8 winters
Have brought extreme cold to
Texas

2023-24
2022-23
2020-21
2017-18
2016-17

Extreme cold has impacted ERCOT more frequently in recent winters – even though the winters as a whole have been frequently mild

This winter should be approached with the potential for an extreme cold event; in fact, recent trends suggest a greater-than-average chance of occurrence

In those 5 winters, Dallas has recorded 14° or colder, Houston has recorded 21° or colder, and Austin has recorded 19° or colder

In the previous 25 winters (1991-92 through 2015-16), only 4 of the winters met that criteria for Dallas, 5 for Houston, and 3 for Austin

It's not unusual for a period of extreme cold to occur in an otherwise mild-to-warm winter

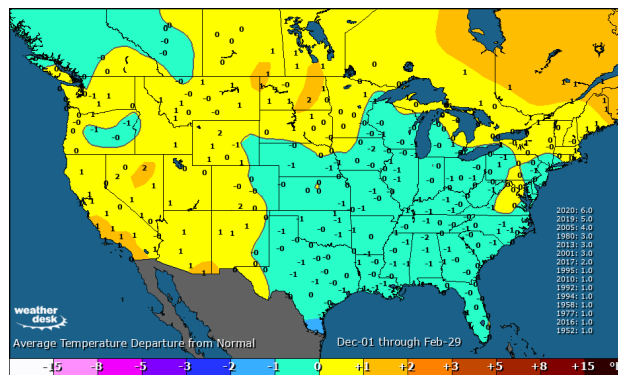
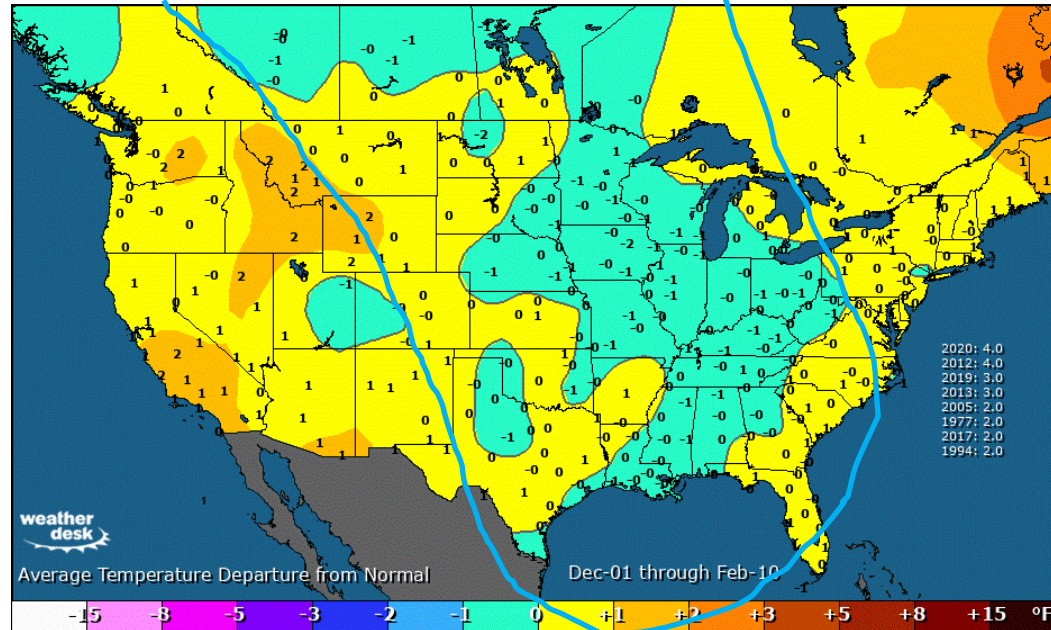
3 of the past 5 winters meeting
The cold extreme criteria have
Ranked in the top 12 warmest
Winters of all-time (129 historical)

2016-17, 2022-23, and 2023-24

Since 1988-89, 10 of 14 winters
with cold extremes have ranked
in the warmest half of all winters

Preliminary Winter 2024-25 Temperature Outlook

Analog weighted consensus: 2020-21, 2012-13, 2019-20, 2013-14, 2005-06, 1977-78, 2017-18, 1994-95



Coldest temps for DFW

The all-time historical average coldest day is 14° at DFW; this century alone, 17°

2020-21: -2° (27° thru 2/10)

2012-13: 22°

2019-20: 25°

2013-14: 15°

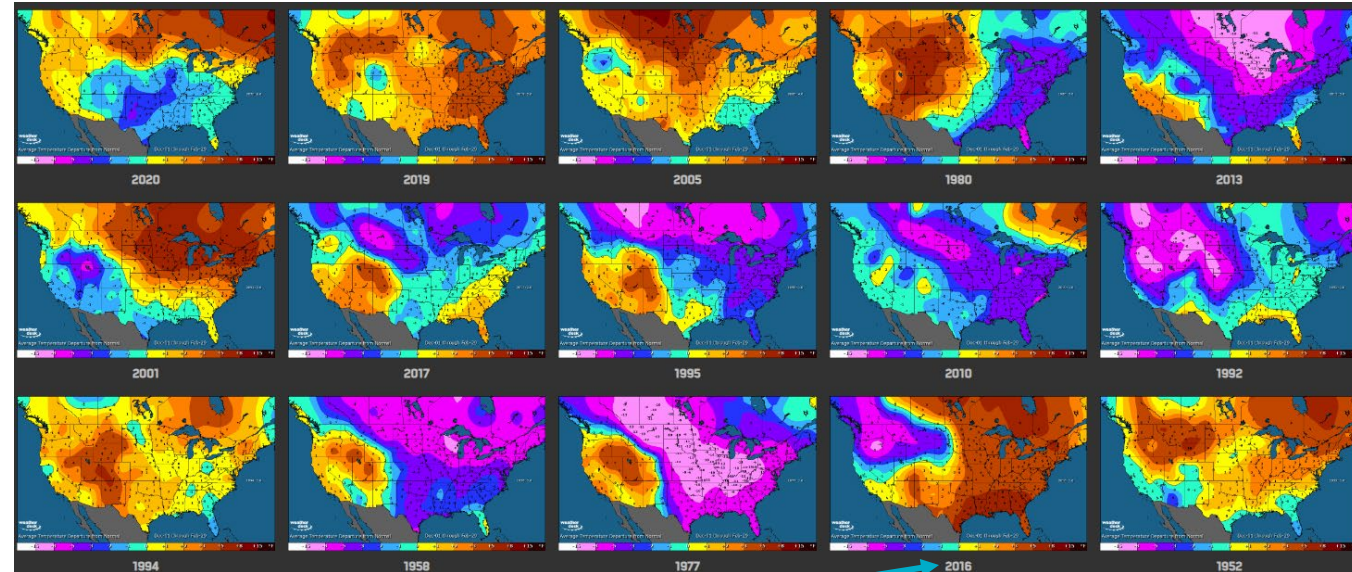
2005-06: 15°

1977-78: 9°

2017-18: 13°

1994-95: 25°

1980-81: 10°

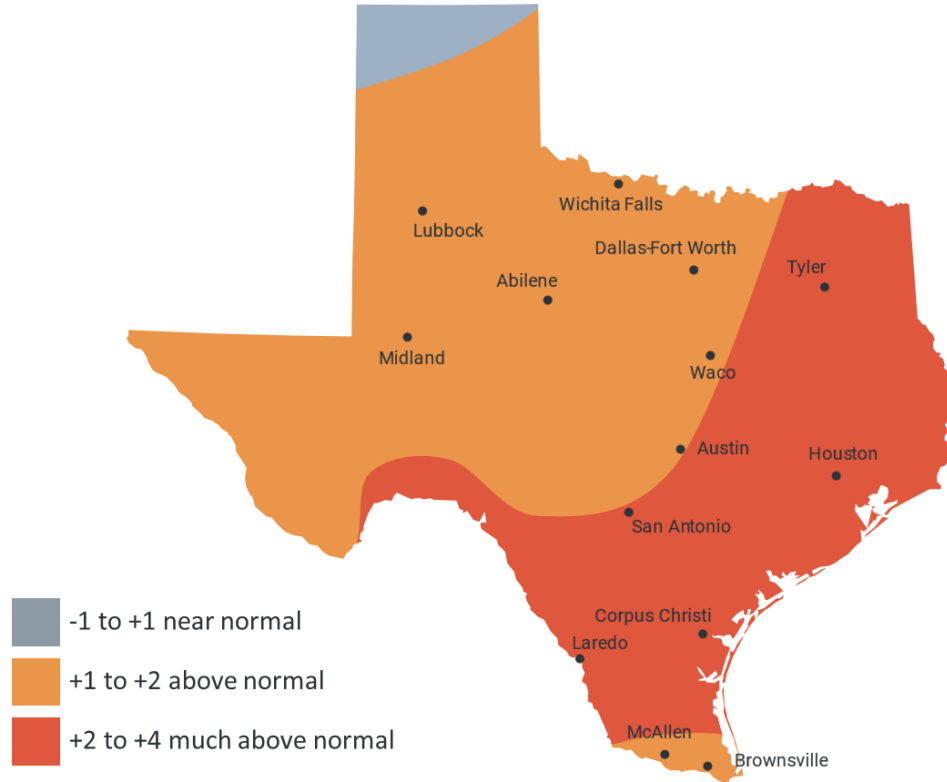


Note: the late-summer/early-fall period has been tracking best with 2016

Very little agreement with the analogs. 2020-21 is weighted most but that does not mean there will be another Uri (it could indicate a cold outbreak risk)

Preliminary Winter 2024-25 Temperature Outlook

ERCOT Temperature Outlook Preliminary Winter 2024-2025



The winter is forecasted to see above normal temperatures across almost all of Texas

This is an average across three months and doesn't dismiss the potential for a period of extreme cold

Recent winters have had similar patterns and drivers that yielded a significant polar outbreak impacting Texas

10/23/24 update: recent input data has suggested a colder trend to the forecast. While it's unlikely I'll change the forecast to below normal, I may consider changing it less warm. I do think the overall winter will be above normal but concerns for cold outbreaks are valid

Precipitation Ranking of Recent Texas Winters (129 historical winters)

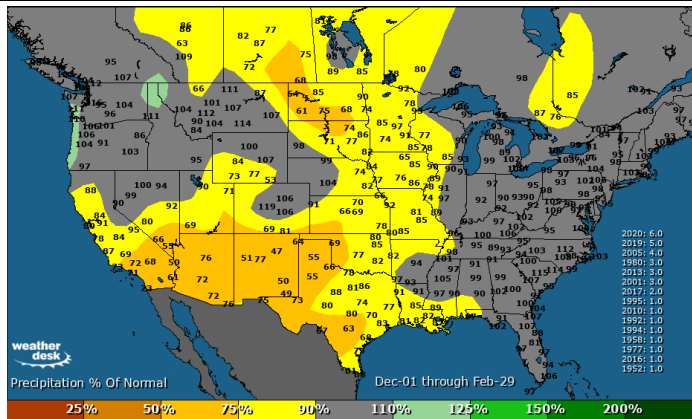
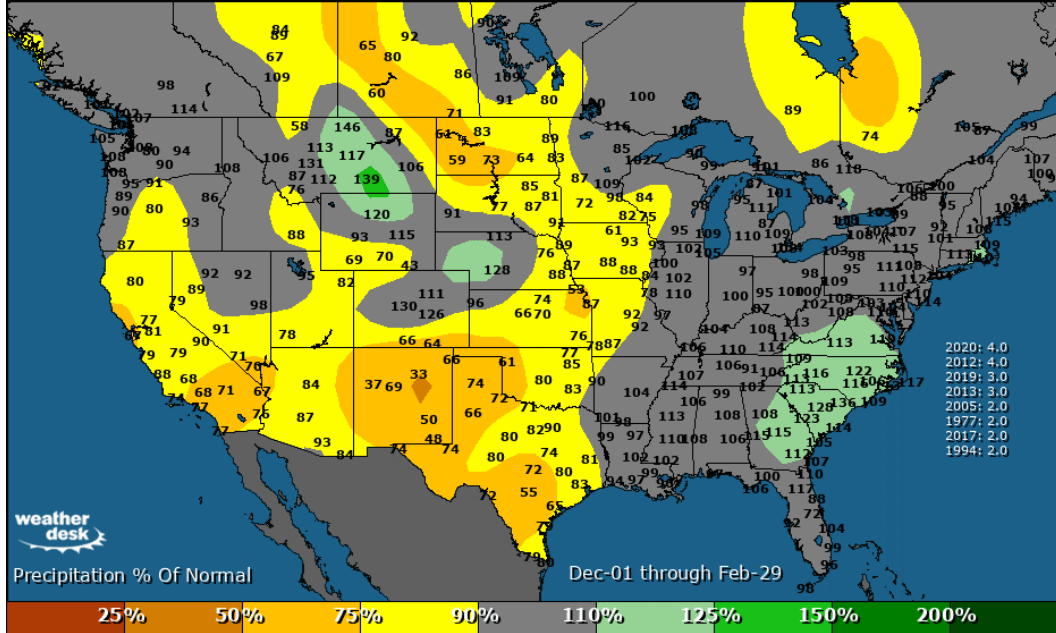
2023-24	104th driest (E)
2022-23	45 th (L)
2021-22	10th (L)
2020-21	58 th (L)
2019-20	66 th (E)
2018-19	91 st (E)
2017-18	75 th (L)
2016-17	98th (L)
2015-16	59 th (E)
2014-15	74 th (E)
2013-14	12th (N)
2012-13	63 rd (N)
2011-12	120th (L)

Over the past 6 winters, La Niña has resulted in the 3 driest winters and El Niño in the 3 wettest (the upcoming winter will be a La Niña)

(E) = El Niño, (L) = La Niña, (N) = neutral

Preliminary Winter 2024-25 Precipitation Outlook

Analog weighted consensus: 2020-21, 2012-13, 2019-20, 2013-14, 2005-06, 1977-78, 2017-18, 1994-95

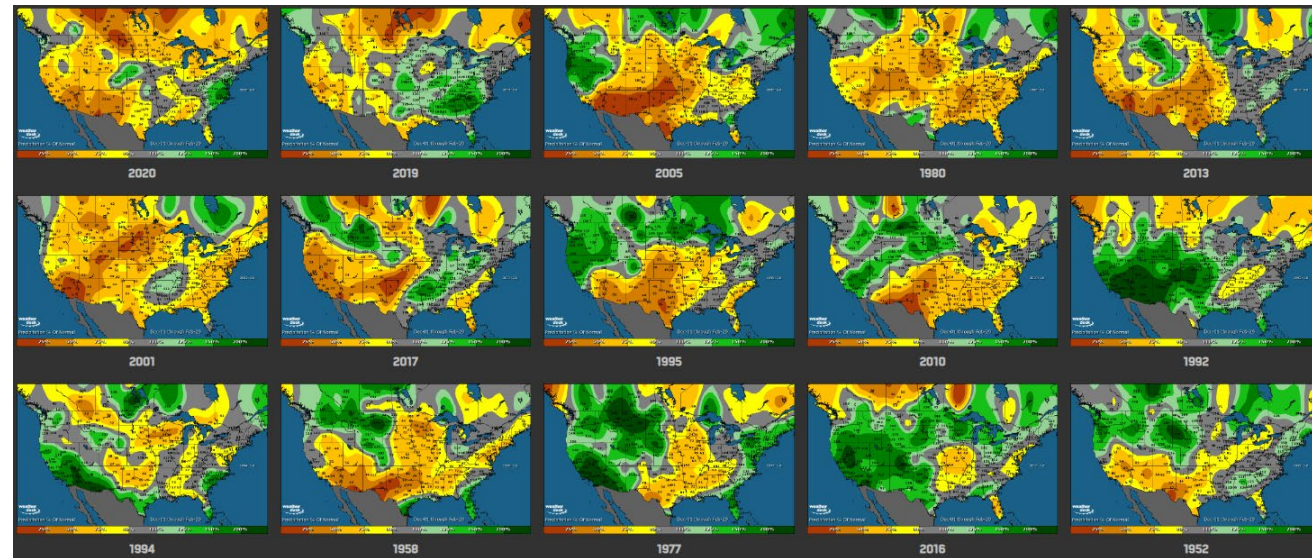


Snowfall for Dallas-Fort Worth

- 2020-21: 5.0"
- 2012-13: 0.8"
- 2019-20: 0.2"
- 2013-14: 2.9"
- 2005-06: trace
- 1977-78: 17.6"
- 2017-18: trace
- 1994-95: trace

The analogs point more heavily toward a dry winter than a warm winter

There isn't enough consistency with the analogs, however, to predict snow potential this winter



Much more yellow and brown (drier than normal) compared to green (wetter)



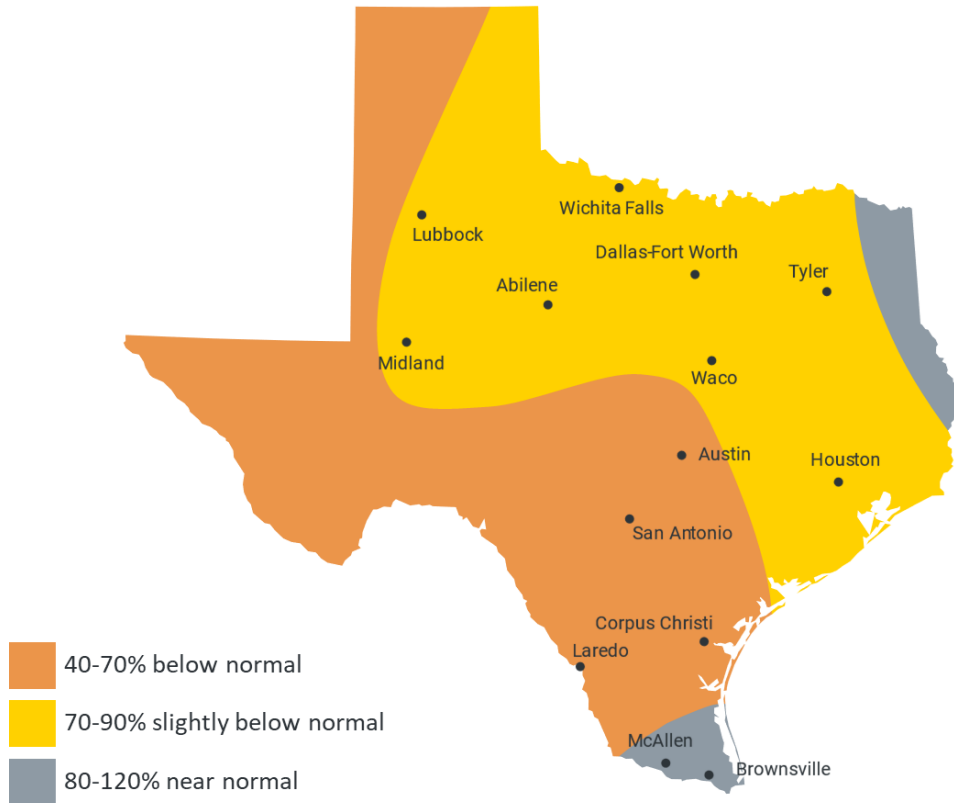
Preliminary Winter 2024-25 Precipitation Outlook

ERCOT Precipitation Outlook Preliminary Winter 2024-2025

The winter is forecasted to see below normal precipitation across almost all of Texas

This winter is very likely to be drier than last winter (which was the wettest in over a decade)

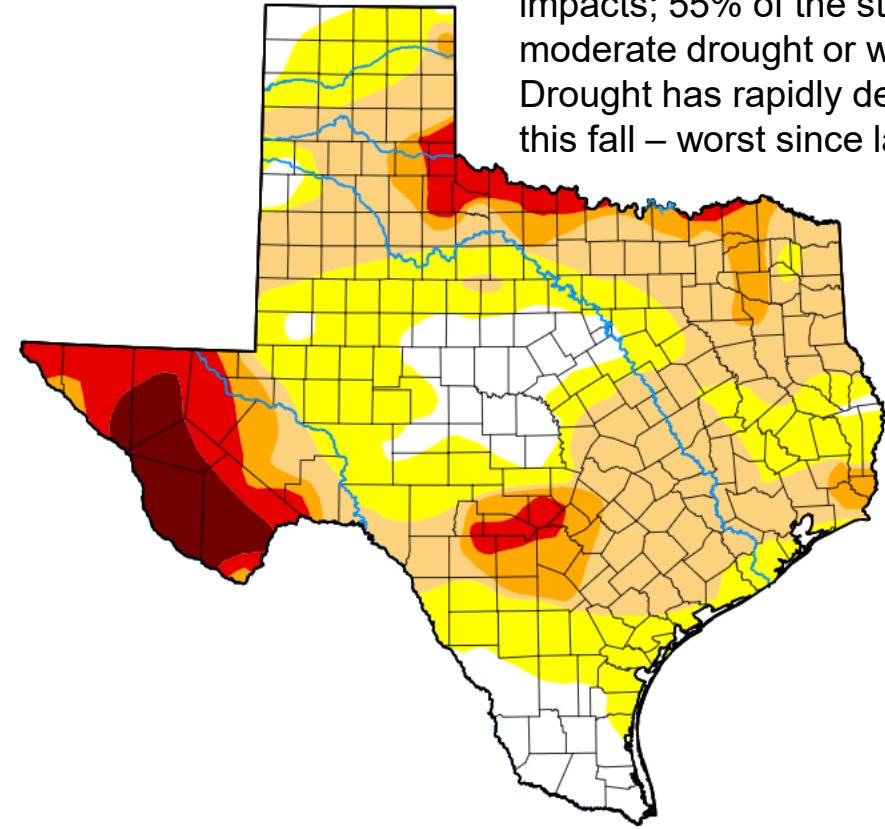
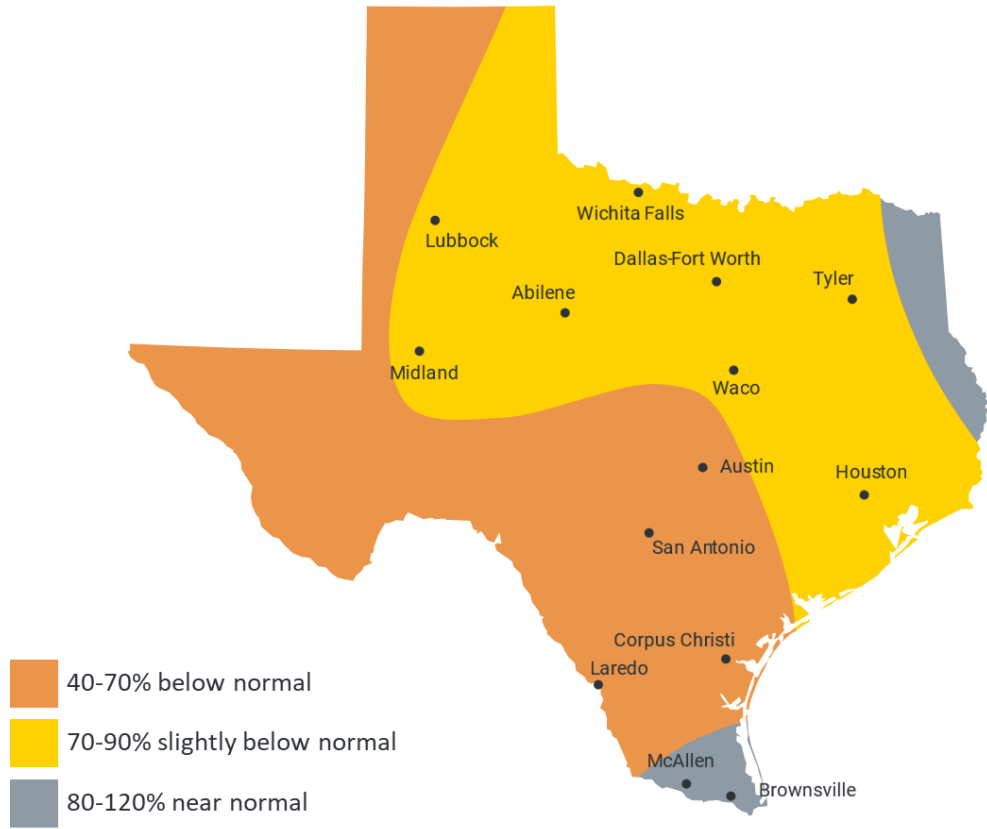
10/23/24 update: recent input data has done little to change the dry forecast. As of today, the only change I would consider from the preliminary map on the left would be to drop the Valley a category drier



Winter 2024-25 Precipitation Outlook vs Drought

ERCOT Precipitation Outlook Preliminary Winter 2024-2025

Drought as of 10/17/24:
86% of the state with drought impacts; 55% of the state with moderate drought or worse.
Drought has rapidly developed this fall – worst since last November



The winter precipitation outlook suggests increasing drought



Preliminary Winter Weather Outlook Summary

- The preliminary winter forecast suggests a mostly mild and dry winter in Texas
- Recent winter trends suggest a cold outbreak impacting Texas is possible again this winter
 - La Niña tends to support this better than El Niño
 - This does not mean a period of extreme cold is being predicted for Texas this winter but rather, many of the conditions that supported recent polar outbreaks are still in play
- Drought could be a greater concern going into next spring than last (only 23% of the state was impacted by drought heading into last spring)

- There is not a strong correlation between the winter temperature anomaly and period(s) of extreme cold
- **Each and every winter should be accompanied by a mindset for a period of extreme cold**



The final winter forecast will be published in November