



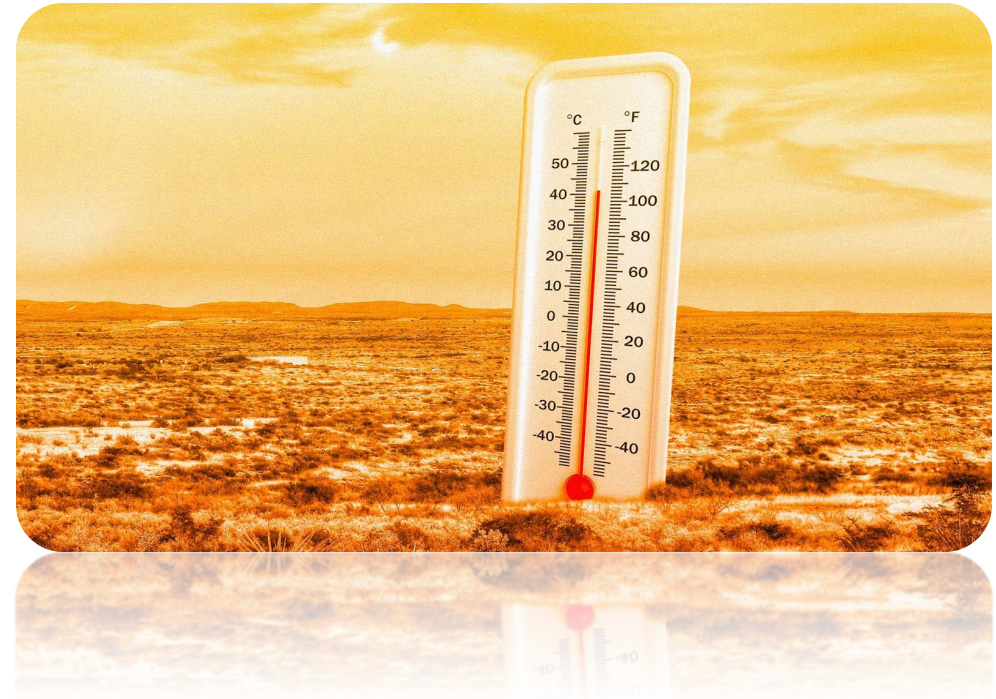
2025 Preliminary Summer Weather Outlook

Chris Coleman
ERCOT Supervisor of Operational Forecasting

Summer Weatherization Workshop
April 17, 2025

Agenda

- Review of 2024 and recent summers
- El Niño/La Niña
- Examining last summer
- Preliminary summer 2025 temperature and precipitation outlooks
- Drought update
- Early hurricane forecast



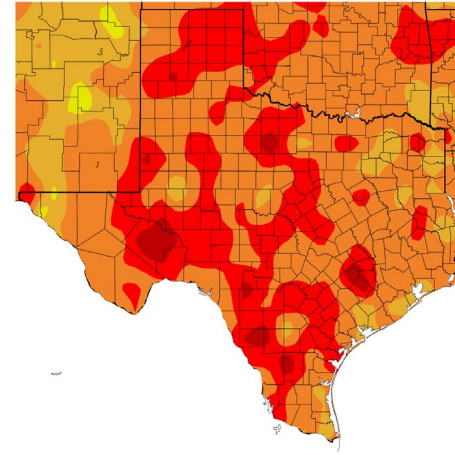
2024 Weather Year Review

2024 was the **warmest** year on record for Texas, dating back to 1895. This broke the record set in 2023

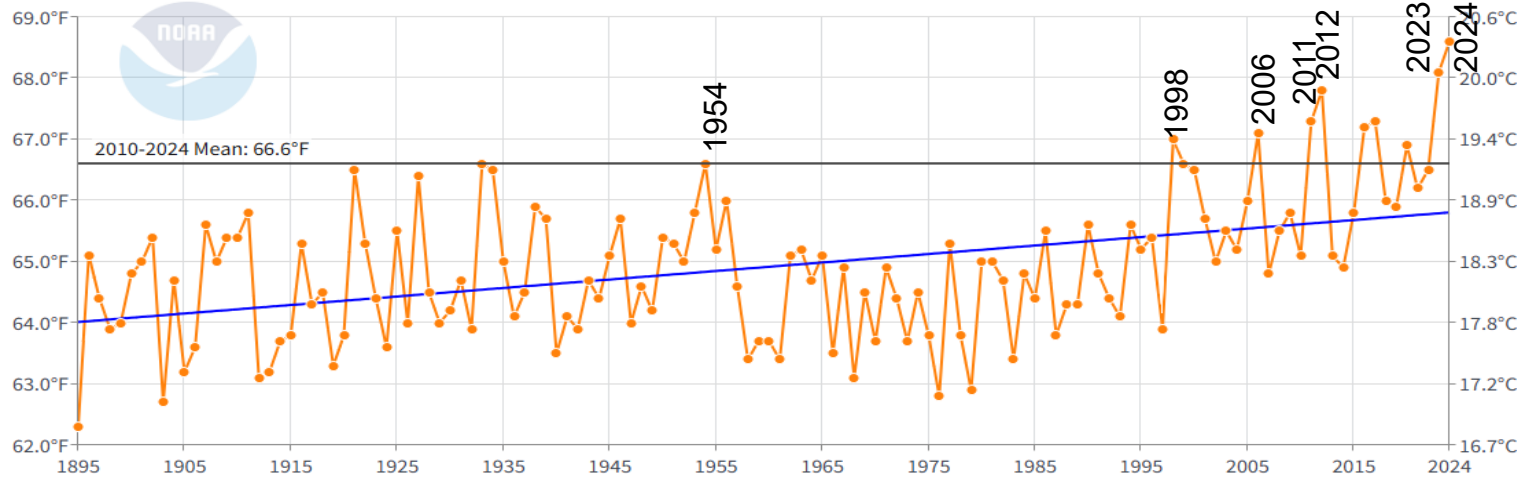
Record ocean temperatures have helped fuel the land temperatures across the globe

El Niño helped make 2024 a relatively wet year – 41st wettest in the past 130 years; however, the precipitation map shows a large disparity between much of North and East Texas versus much of South and West Texas

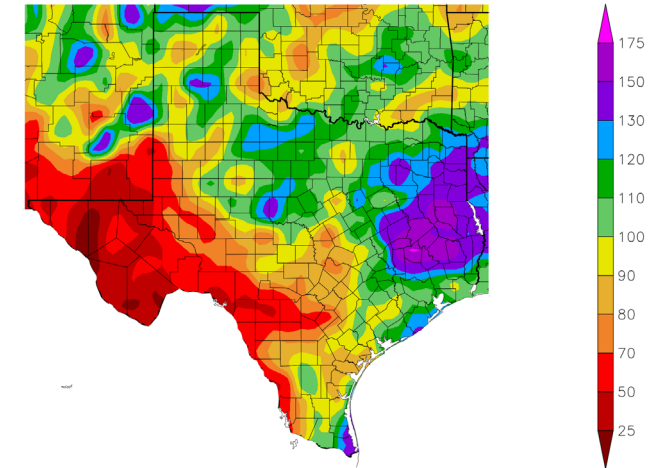
Departure from Normal Temperature (F)
1/1/2024 – 12/31/2024



Texas Average Temperature
January-December



Percent of Normal Precipitation (%)
1/1/2024 – 12/31/2024



Generated 1/20/2025 at HPRCC using provisional data.

NOAA Regional Climate Centers



Labelled years show when a new record was set, starting with 1954
Note that 1954 is now considered a normal year

Mean Temperature Ranking of Recent Texas Summers (1895-current, 130 historical years, Jun-Sep)

| Year | Ranking |
|------|------------|
| 2024 | #6 hottest |
| 2023 | #2 hottest |
| 2022 | #3 hottest |
| 2021 | #56 |
| 2020 | #29 |
| 2019 | #6 hottest |
| 2018 | #11 |
| 2017 | #56 |
| 2016 | #26 |
| 2015 | #22 |
| 2014 | #56 |
| 2013 | #26 |
| 2012 | #17 |
| 2011 | #1 hottest |

3 summers since 2011 have ranked tied for the 56th hottest summer on Record in Texas

All other summers have ranked in the top 29

No recent summers ranked in the coolest half all-time

2007 was the last Texas summer to rank in the coolest half (102nd hottest)

Mean Temperature Ranking of Recent Texas Summers (1895-current, 130 historical years, Jun-Sep)

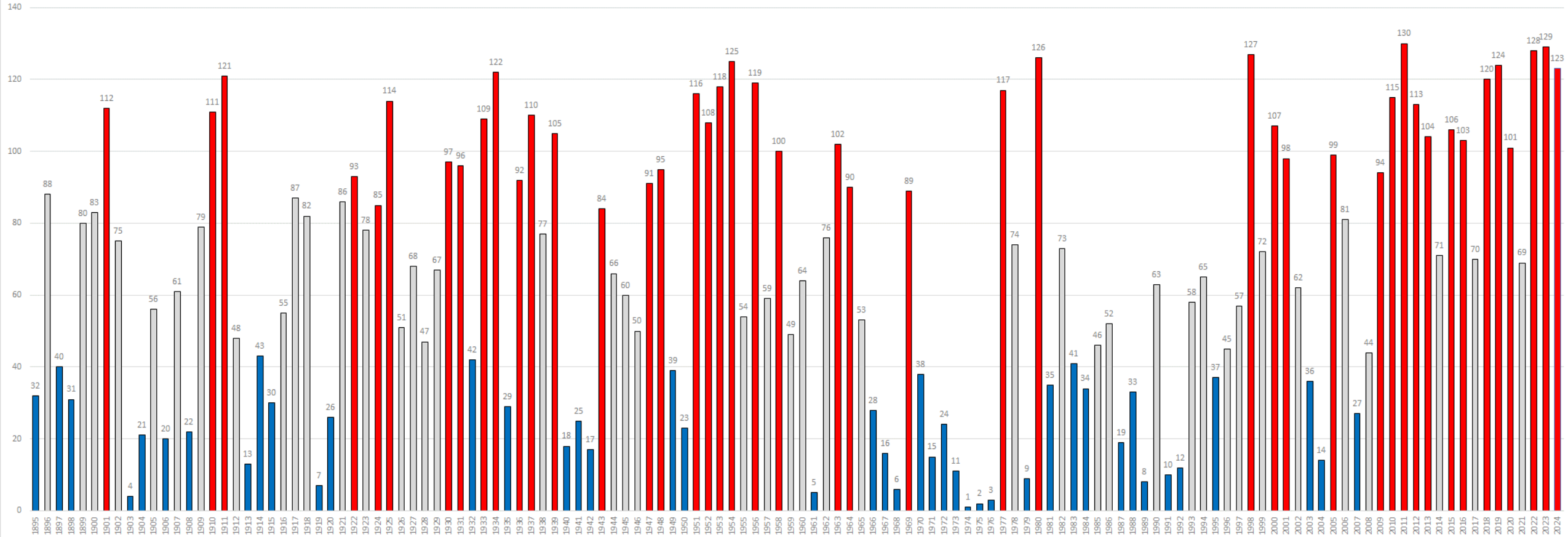
AMO-, 6 of 24 summers in the hottest third

AMO+, 17 of 38 summers in the hottest third

AMO-, 4 of 30 summers in the hottest third

AMO+, 17 of 27 summers in the hottest third

Texas Summer (Jun-Sep) Mean Temperature Rankings
1895-2024, 130 = hottest, 1 = coolest



AMO = Atlantic Multidecadal Oscillation

The AMO is "due" to flip negative within 10 years

2007: last summer in coolest third

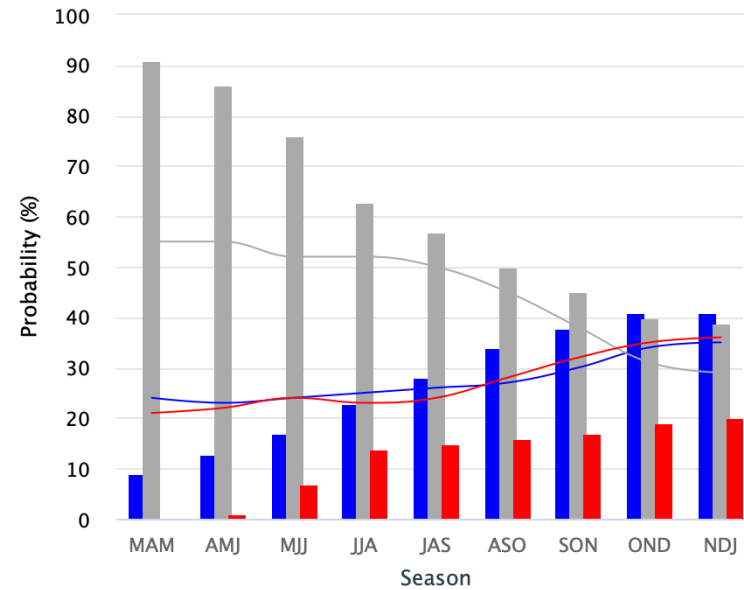


El Niño/La Niña

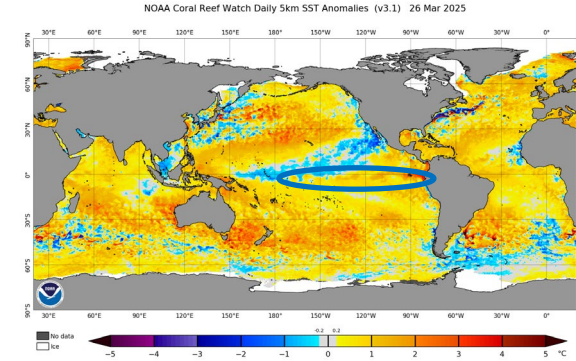
- A weak La Niña (or neutral with La Niña influence) is in place to start 2025
- Most likely scenario is a fade to neutral for the summer season
- A weak La Niña shows less support for dry

Mid-March 2025 IRI Model-Based Probabilistic ENSO Forecasts

ENSO state based on NINO3.4 SST Anomaly Neutral ENSO: -0.5 °C to 0.5 °C



La Niña Forecast Probability
Neutral Forecast Probability
El Niño Forecast Probability



Years this century that began with ENSO similar to 2025:

- 2023:** Weak La Niña became a moderate El Niño by summer (#2 hottest summer, #9 driest)
- 2018:** Weak-to-moderate La Niña became neutral by summer (#11 hottest, #114 driest)
- 2017:** Weak La Niña became neutral by summer (best recent ENSO match?) (#56 hottest, #126 driest)
- 2014:** Negatively neutral became positively neutral by summer (#56 hottest, #71 driest)
- 2013:** Negatively neutral remained negatively neutral (#26 hottest, #70 driest)
- 2012:** Weak to borderline moderate La Niña became neutral by summer (#17 hottest, #56 driest)
- 2009:** Weak La Niña became weak El Niño by summer (#34 hottest, #65 driest)
- 2006:** Weak La Niña became neutral by summer (#48 hottest, #52 driest)
- 2001:** Weak La Niña became neutral by summer (#33 hottest, #56 driest)

2004 was the mildest summer this century

Year began on the positive (warmer) side of neutral and trended to an El Niño (not a match with 2025)

Average Temperature Rank of Years with Similar ENSO: #31
Average Temperature Rank of All Other Years: #42



Seasonal Rankings – What is Normal?

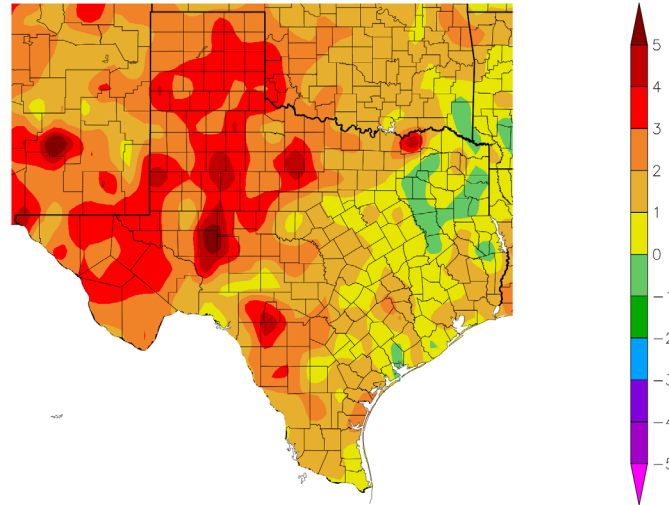
- ❑ “Normal” may no longer be the best way to express seasonal (or monthly, or possibly even daily) temperatures
- ❑ As Texas keeps having many more above normal temperature seasons, it keeps raising the bar for what is “normal”
- ❑ **We commonly use a 15-year normal (2010-2024). Applying that normal to all historical summers (1895-2024) results in only 9 of 129 Texas summers 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”)



Summer 2024 Review

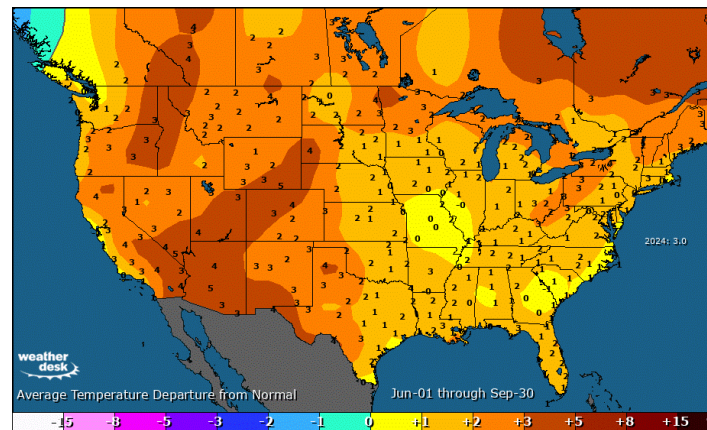
- June-September 2024 was the 6th hottest summer on record for Texas
- 2011: #1, 2023: #2, 2022: #3, 1998: #4, 1980: #5
- **Three of the six hottest summers on record for Texas have happened over the past three summers**
- The Jun-Sep 2024 period was the 63rd driest on record and was the 2nd wettest summer over the past six years (2021 was wetter)
- 100-degree days:
 - **Dallas:** 23 days. While far fewer than 2023 (55 days) and 2022 (47 days), this was the 3rd most over the past 11 years
 - **Houston:** 9 days. Also, well below 2023 (45) and 2022 (22), but the 3rd most over the past 9 years
 - **Austin:** 32 days. Fewest since 2021 (12 days) and 2nd fewest over the past 8 summers
 - **San Antonio:** 25 days. 3rd fewest over the past 7 years

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



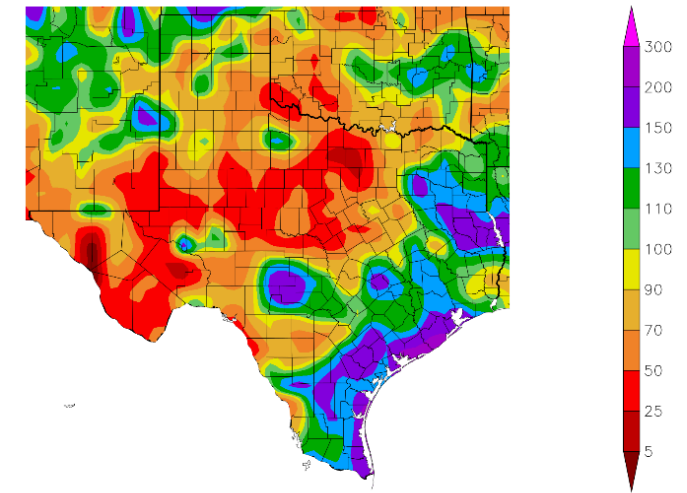
Generated 9/20/2024 at HPRCC using provisional data.

NOAA Regional Climate Centers



- The 6th hottest summer mean was due especially to minimum temperatures
- High minimum temperatures (overnight/morning lows) was driven by high humidity
- Jun-Sep 2024 **minimum** temperatures ranked **5th warmest** all-time
- 2022, 2023, and 2024 are 3 of the 5 hottest summers based on minimum temperatures

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



Generated 9/20/2024 at HPRCC using provisional data.

NOAA Regional Climate Centers

Summer 2024 Review

- Wet summers do not correlate well with hot summers – **last year was an exception**
- **June through August 2024** (meteorological summer) was the hottest recorded for Texas in a summer with above normal precipitation
- In fact, it was the **only of the top 20** hottest summers to record above normal precipitation
- Only 3 other top 50 hottest summers in Texas also recorded above normal precipitation:
 - 2010: 21st hottest, 2016: 33rd hottest, 1899: 47th hottest



| | temperature | precipitation | departure |
|-------------|-------------|---------------|-----------------|
| | rank | rank | from 15-yr norm |
| 2011 | 1 | 1 | -4.94 |
| 2023 | 2 | 7 | -3.19 |
| 2022 | 3 | 46 | -0.63 |
| 1934 | 4 | 4 | -3.59 |
| 1998 | 4 | 29 | -1.37 |
| 1980 | 6 | 8 | -3.07 |
| 2024 | 7 | 76 | 0.44 |
| 2018 | 8 | 49 | -0.59 |
| 1953 | 9 | 39 | -0.92 |
| 2020 | 10 | 24 | -1.65 |
| 1954 | 11 | 6 | -3.23 |
| 1901 | 12 | 16 | -2.49 |
| 1918 | 12 | 15 | -2.59 |
| 2012 | 12 | 36 | -1.00 |
| 1951 | 15 | 22 | -1.73 |
| 1952 | 15 | 3 | -3.61 |
| 1956 | 15 | 2 | -4.11 |
| 2009 | 18 | 40 | -0.82 |
| 1925 | 19 | 23 | -1.68 |
| 2001 | 20 | 57 | -0.28 |

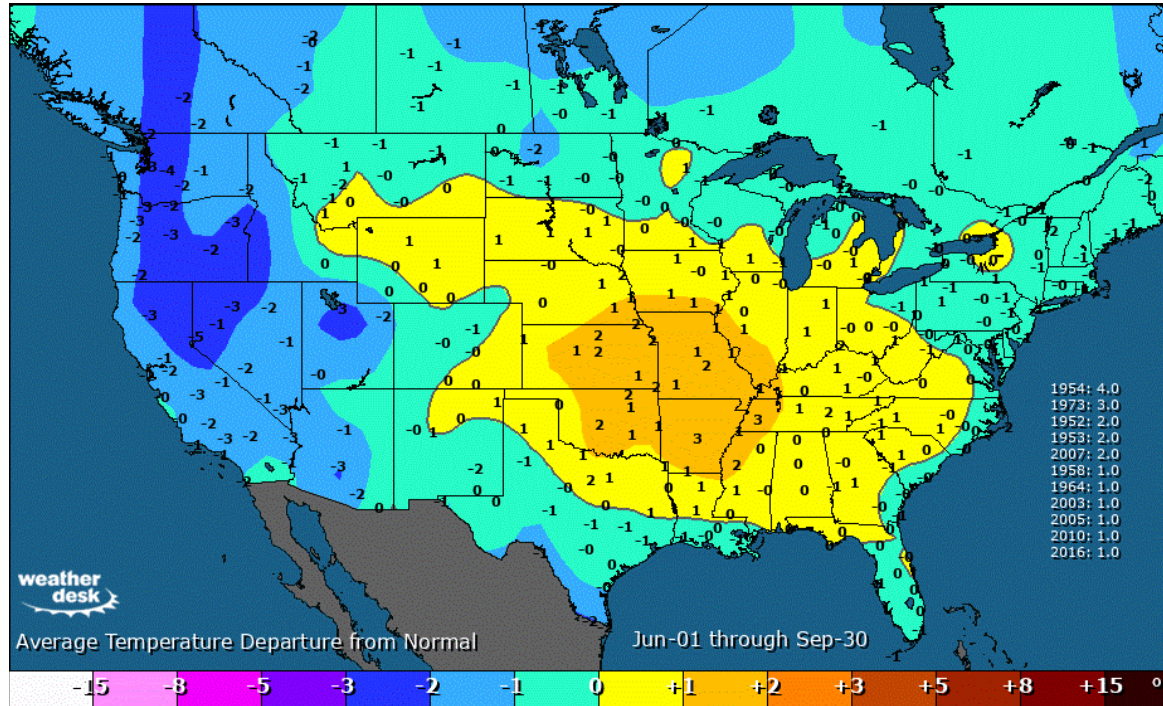
Reviewing Last Summer's Forecast (Analog)

OVERALL (as of 2/26/2024)

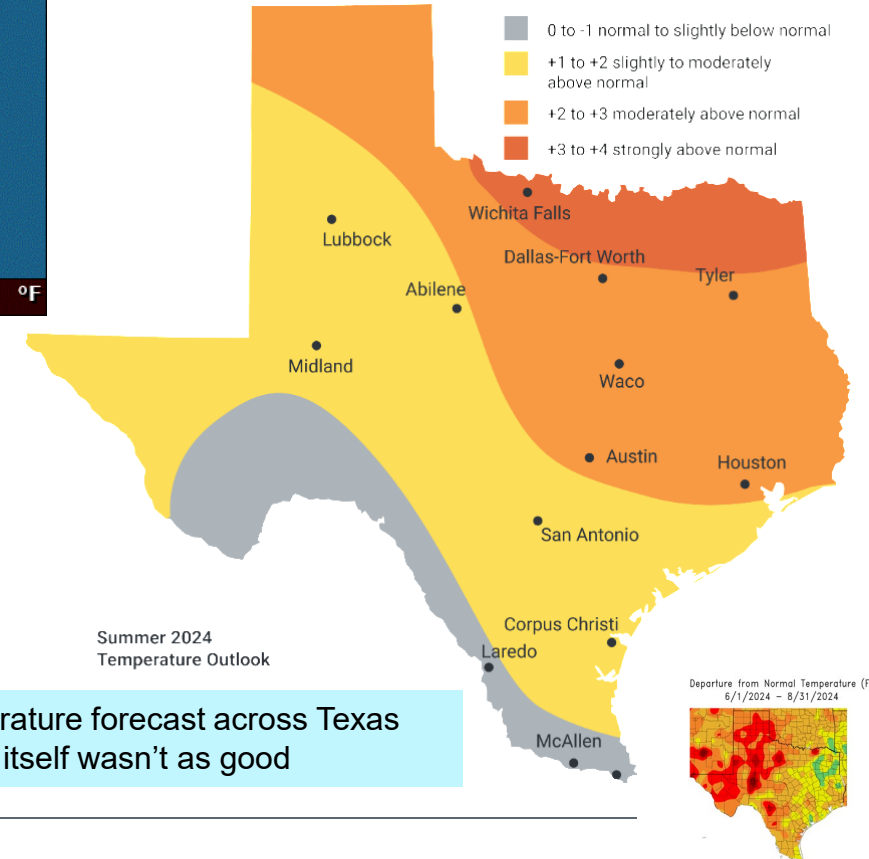
1. 1954
2. 1973
3. 1952
4. 1953
5. 2007
6. 1958
7. 1964
8. 2003
9. 2005
10. 2010
11. 2016 ↑

Analogues are listed in initial priority order

1954 was given as the best analog for summer 2024, which was the **6th hottest** summer on record. Summer 2024 ended up ranking tied with 1954 (both were 6th hottest)



- 1954: 6th hottest summer
- 1973: 119th hottest summer
- 1952: 21st hottest summer
- 1953: 12th hottest summer
- 2007: 101st hottest summer
- 1958: 30th hottest summer
- 1964: 37th hottest summer
- 2003: 91st hottest summer
- 2005: 30th hottest summer
- 2010: 14th hottest summer
- 2016: 25th hottest summer



While the average temperature forecast across Texas was a match, the pattern itself wasn't as good

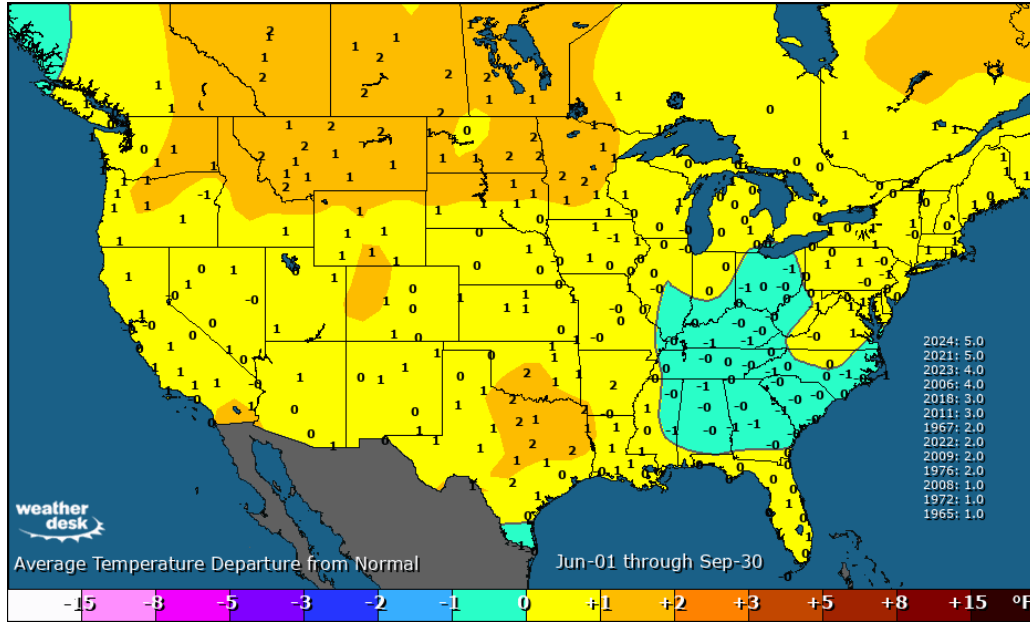


2025 Historical Matches (Analog)

OVERALL (as of 3/28/2025)

1. **2024**
2. 2021
3. 2023
4. 2006
5. 2018
6. 2011
7. 1967
8. 2022
9. 2009
10. 1976

Analogs are listed in initial priority order



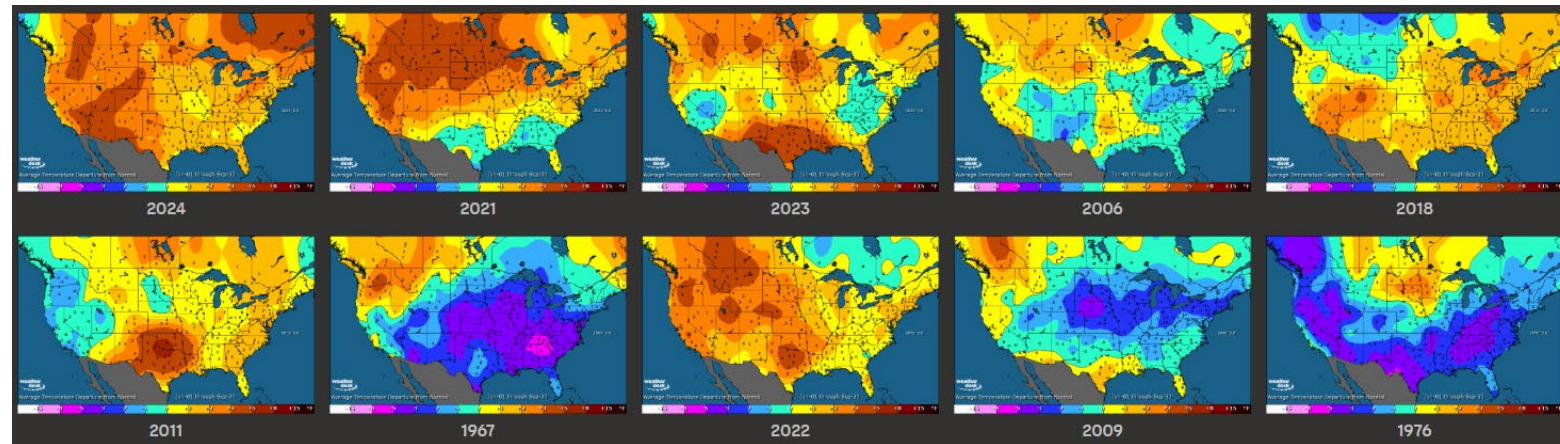
2024: 6th hottest summer
2021: 56th hottest summer

2023: 2nd hottest summer
2006: 48th hottest summer

2018: 11th hottest summer
2011: 1st hottest summer

1967: 110th hottest summer
2022: 3rd hottest summer
2009: 34th hottest summer
1976: 125th hottest summer

5 Top 11 Summers are listed as analogs (similar matches to 2025)

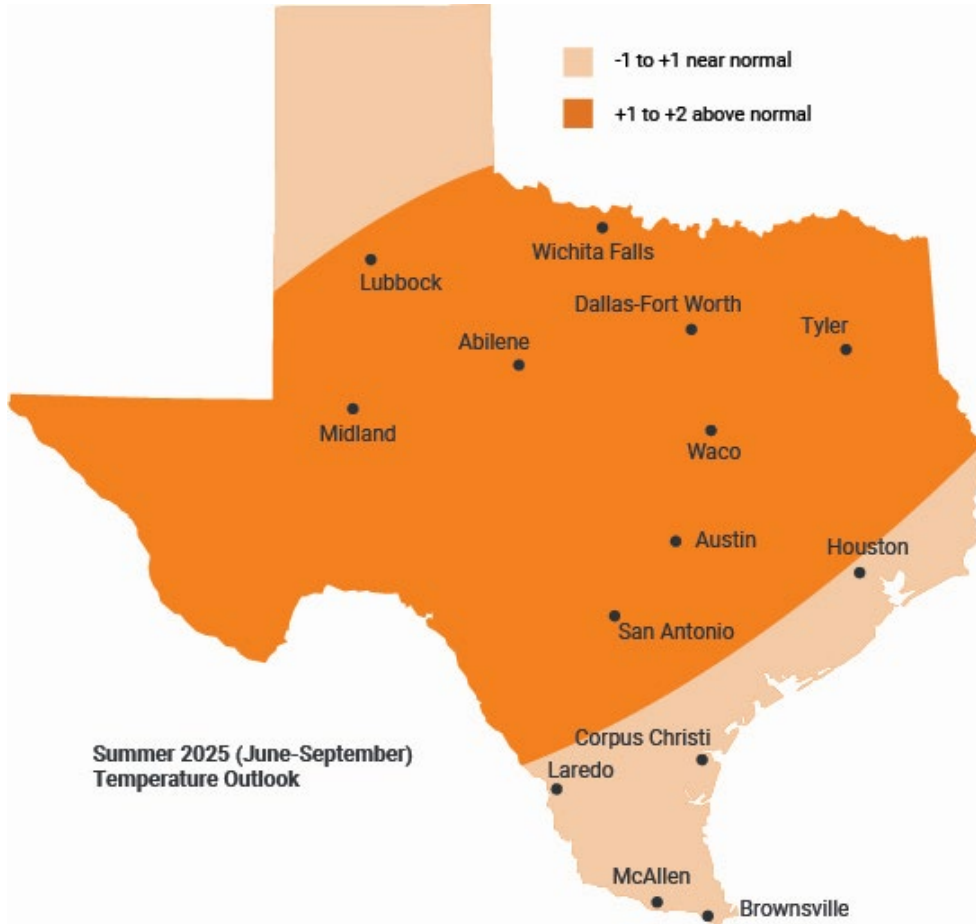


The 2025 analog composite is a hotter pattern than it was for the 2024 preliminary summer outlook

2021 has shown good similarities to recent months and supports a significantly different pattern than the composite



Preliminary 2025 Summer Temperature Outlook



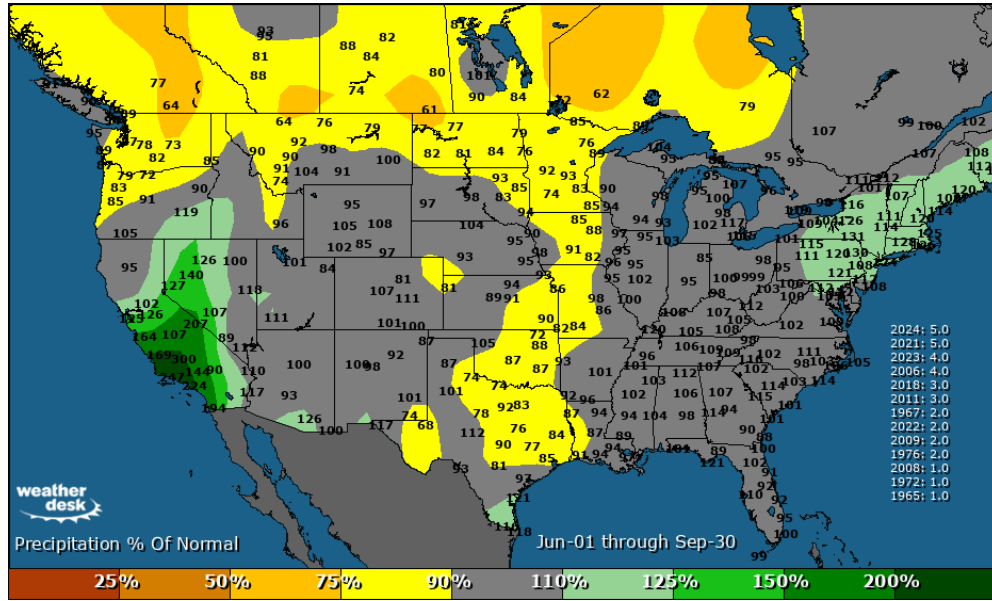
This summer's temperature outlook is mostly above normal across Texas

Above normal temperatures equates to top 9 hottest since 1895

There is a cooler solution with the 2021 analog especially; will need to monitor the spring to see if any adjustments are needed for the final summer outlook

2025 Summer Historical Matches (Analog)

- OVERALL (as of 3/28/2025)
1. 2024
 2. 2021
 3. 2023
 4. 2006
 5. 2018
 6. 2011
 7. 1967
 8. 2022
 9. 2009
 10. 1976

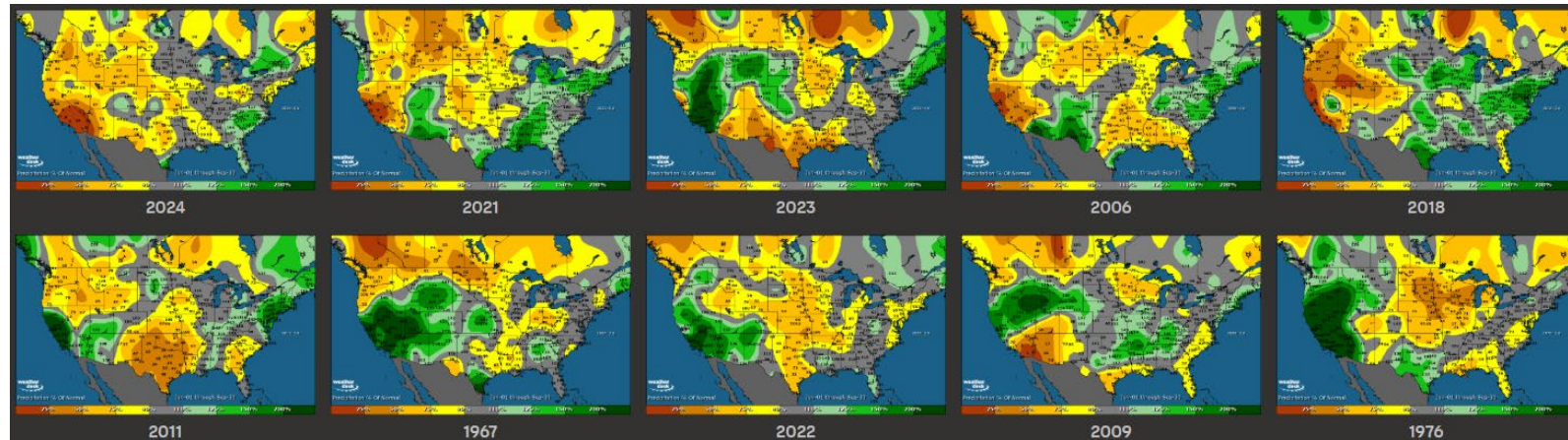


- 2024: 63rd driest
- 2021: 95th driest summer
- 2023: 8th driest summer
- 2006: 52nd driest summer
- 2018: 114th driest summer
- 2011: 1st driest summer
- 1967: 96th driest
- 2022: 26th driest
- 2009: 65th driest
- 1976: 108th driest

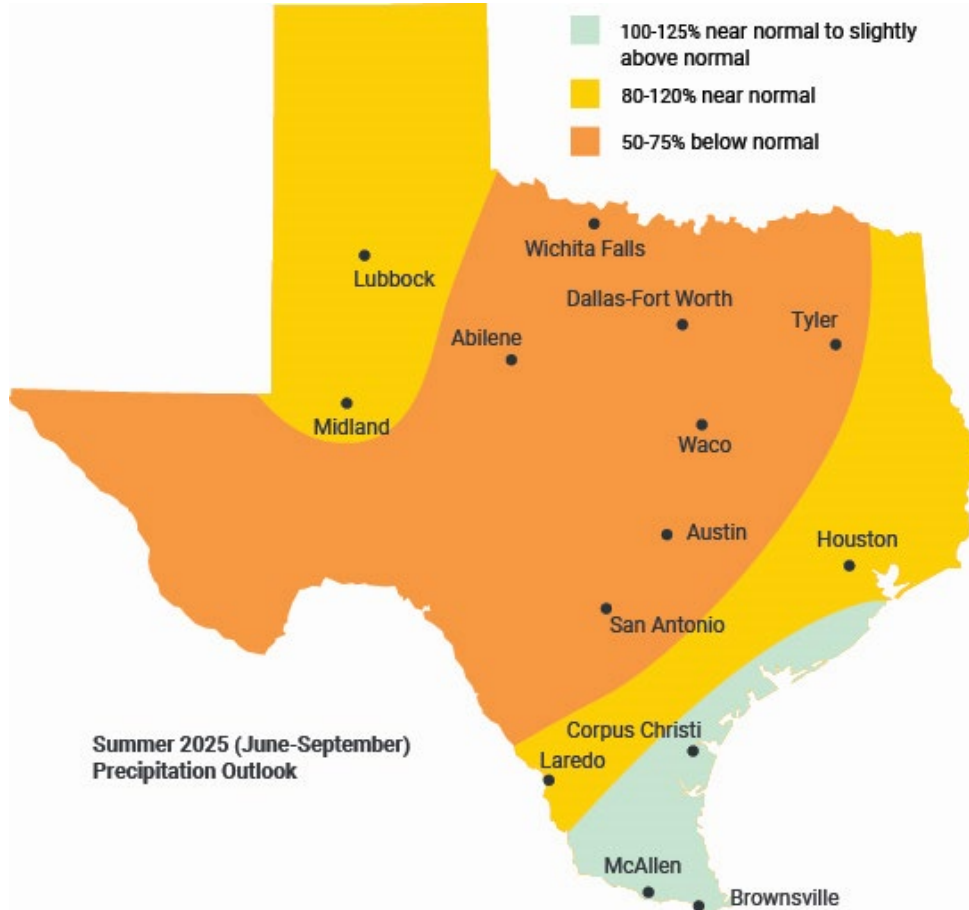
Although the analogs offer a mixed bag of solutions, the consensus leans dry

La Niña also supports dry, but not always; 2021 lurks as a wetter solution

Precipitation can have large regional differences (like last year)



Preliminary 2025 Summer Precipitation Outlook



This summer's precipitation outlook shows a mixed bag Across Texas

Parts of Northwest and Southeast Texas may benefit from rainfall more than the rest of the state

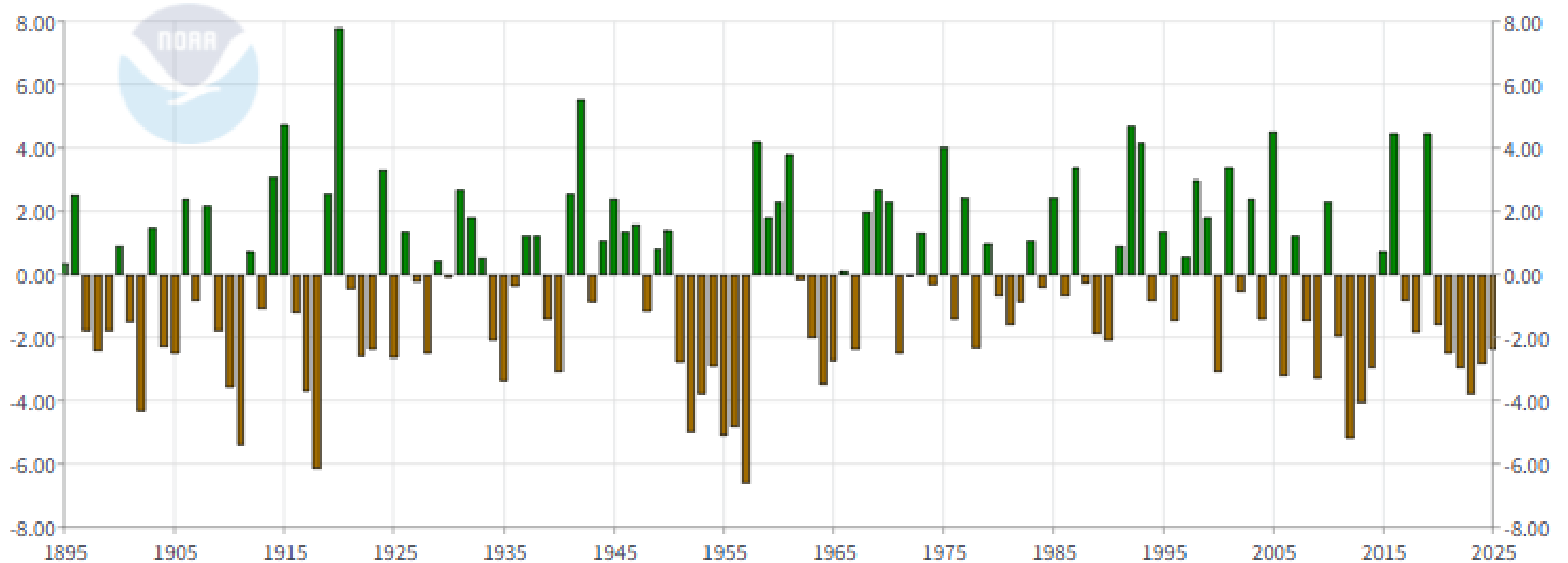
Analogues are less conclusive for precipitation than temperatures

A wetter trend is possible

Drought Update

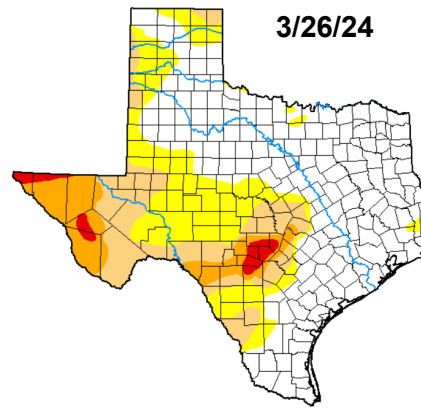
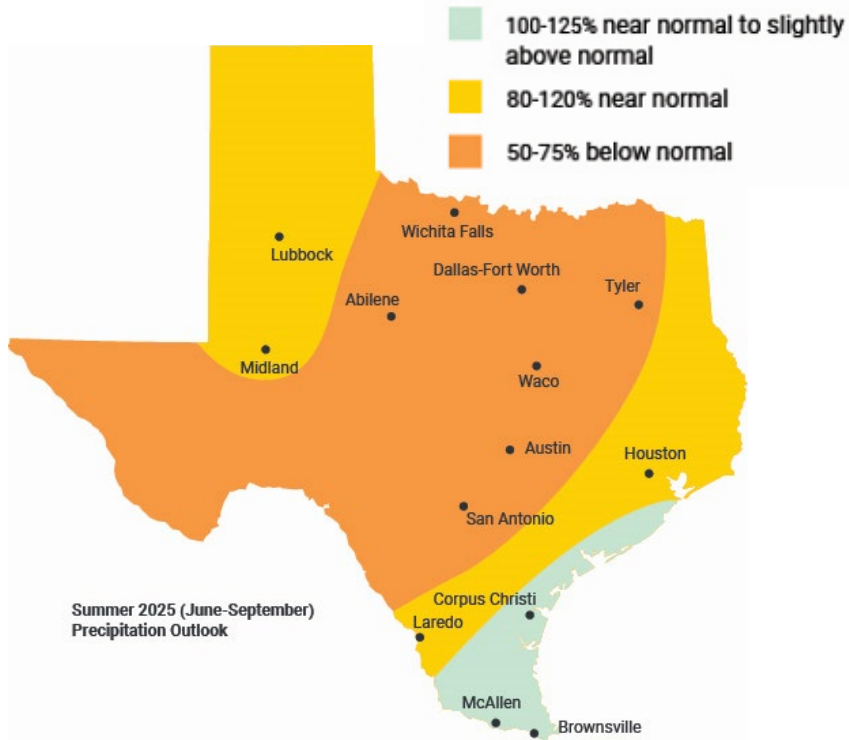
Texas Palmer Drought Severity Index (PDSI)

January

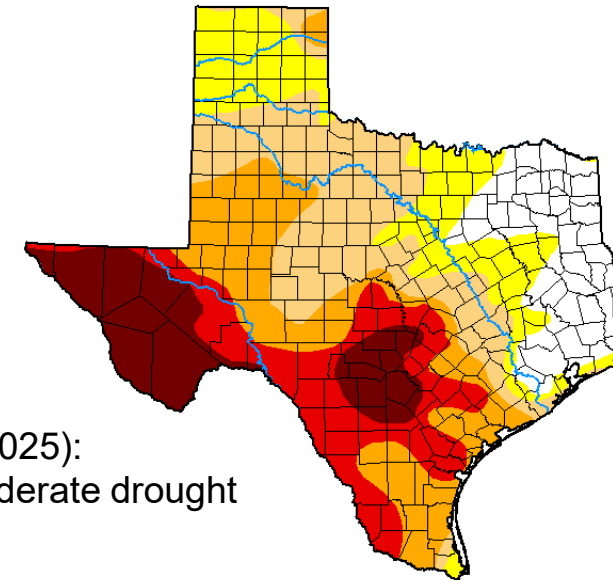


8 of the past 9 years and 12 of 15 have been at drought level

Drought Update



U.S. Drought Monitor Texas



Current Drought (as of 3/25/2025):
70% of the state's area in moderate drought
or worse (24% a year ago)

March 25, 2025
(Released Thursday, Mar. 27, 2025)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

| | None | D0-D4 | D1-D4 | D2-D4 | D3-D4 | D4 |
|--------------------------------------|-------|-------|-------|-------|-------|-------|
| Current | 13.85 | 86.15 | 69.66 | 47.72 | 28.69 | 13.76 |
| Last Week 03-18-2025 | 14.56 | 85.44 | 62.46 | 43.44 | 26.05 | 13.76 |
| 3 Months Ago 12-24-2024 | 32.90 | 67.10 | 53.89 | 24.83 | 12.99 | 6.30 |
| Start of Calendar Year 01-07-2025 | 36.81 | 63.19 | 43.63 | 21.45 | 13.26 | 6.30 |
| Start of Water Year 10-01-2024 | 26.09 | 73.91 | 34.39 | 16.62 | 8.91 | 3.36 |
| One Year Ago 03-26-2024 | 55.21 | 44.79 | 24.48 | 9.85 | 1.97 | 0.00 |

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:
Brad Rippey
U.S. Department of Agriculture



droughtmonitor.unl.edu

The Palmer Drought Severity Index ranks the drought as the 29th worst at this point in the year (1895-current, 130 years) – worse than the same point in 2011 though not quite as bad as a year ago (close though)

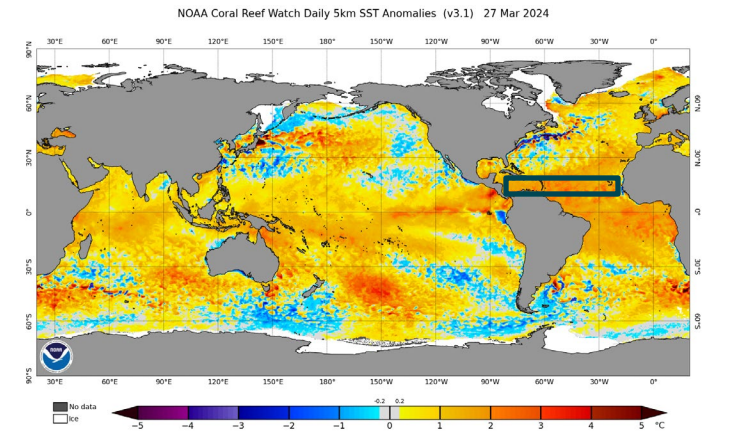
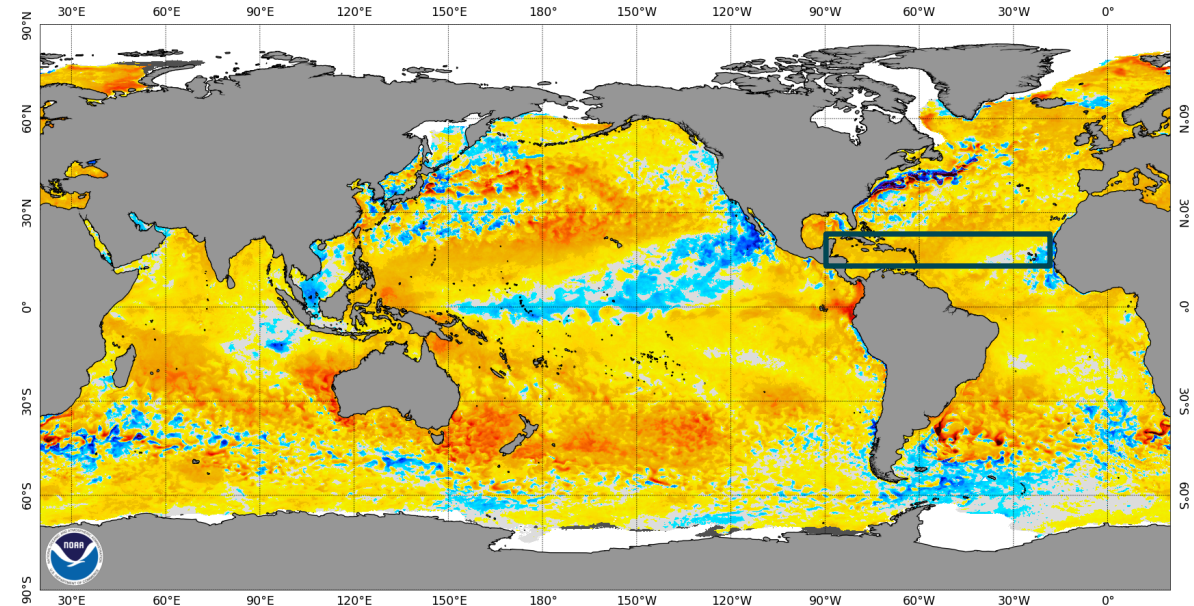
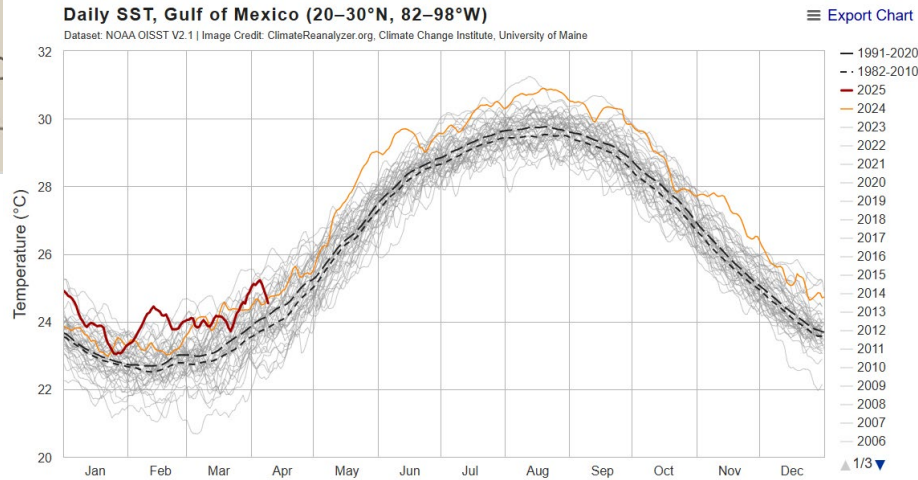
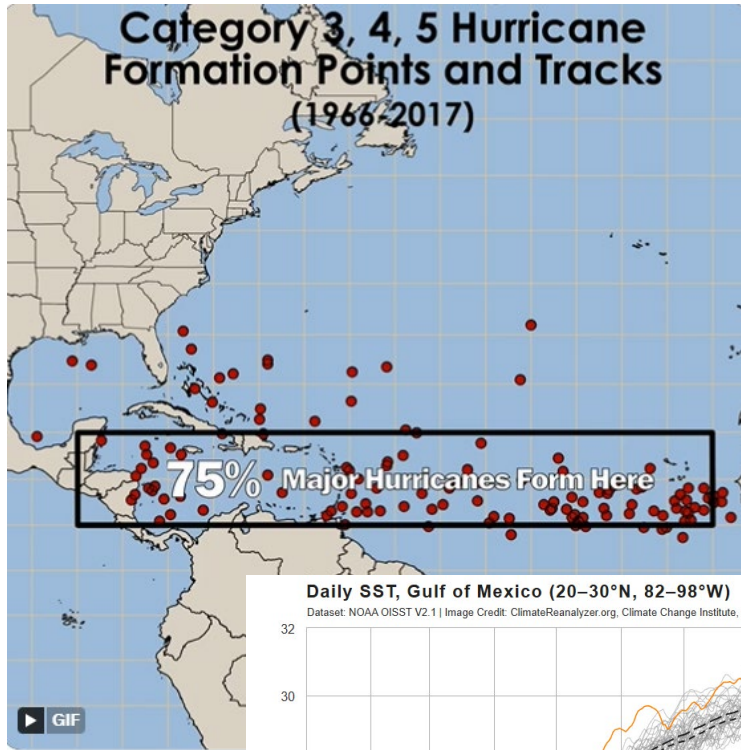
This summer no longer has the support of an El Niño (like last summer)

Expect at least some regions of drought to continue this summer (may not be widespread)



Preliminary 2025 Hurricane Season Forecast

NOAA Coral Reef Watch Daily 5km SST Anomalies (v3.1) 27 Mar 2025



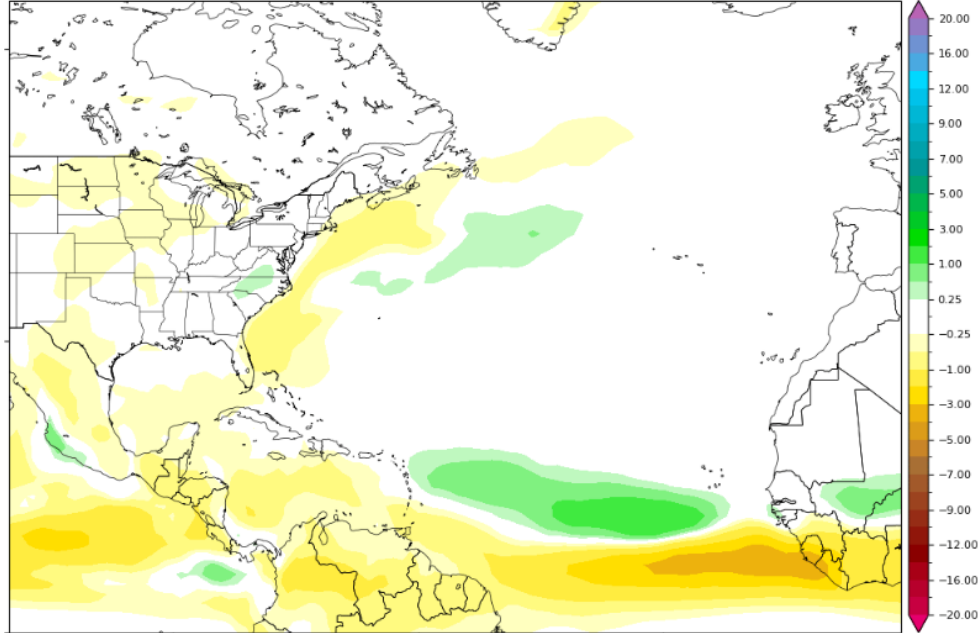
The Main Development Region (box) is not as warm as a year ago but the Gulf has been tracking as warm



Preliminary 2025 Hurricane Season Forecast

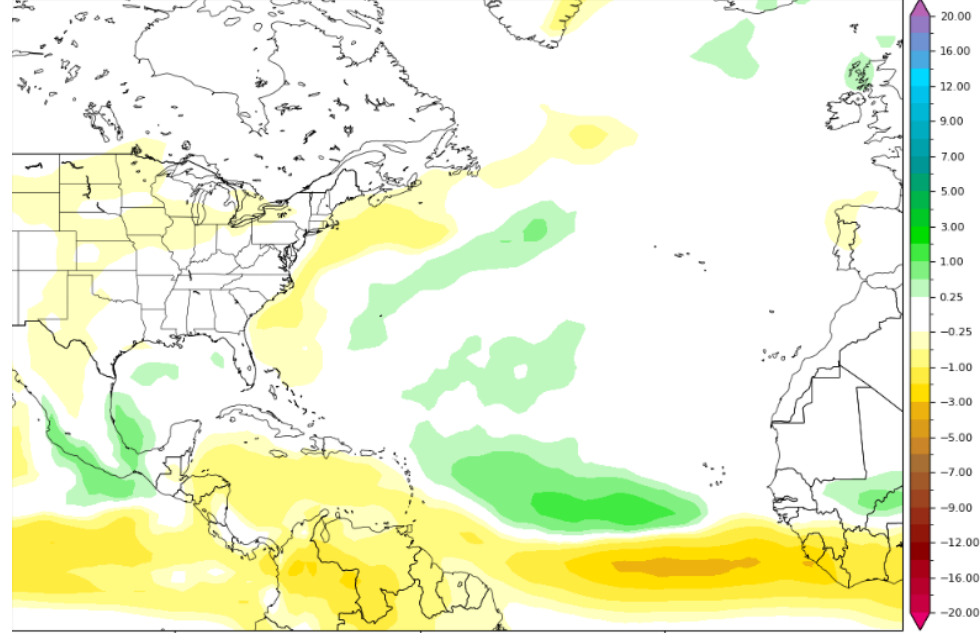
North American Multi-Model Ensemble

NMME Total Accumulated Precipitation Anomaly (inches)
Init: 00z Apr 08 2025 Valid for: Jul-Aug-Sep 2025



July-September

NMME Total Accumulated Precipitation Anomaly (inches)
Init: 00z Apr 08 2025 Valid for: Aug-Sep-Oct 2025

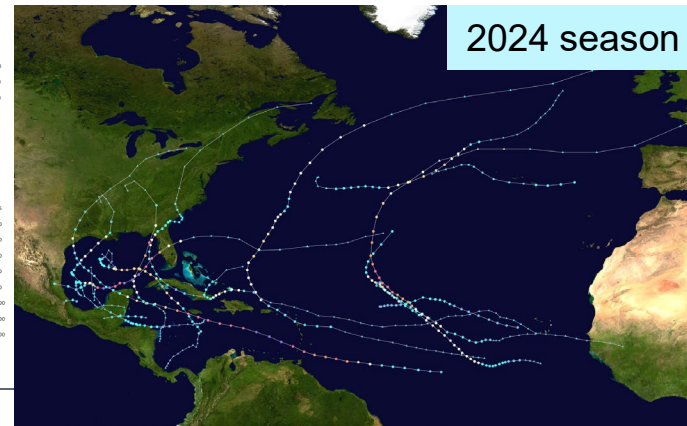
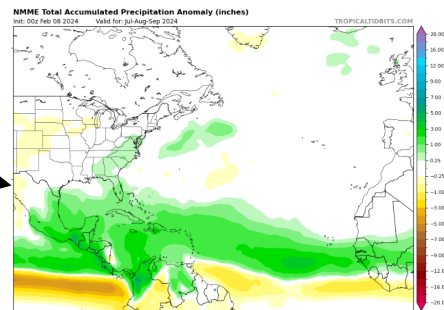


August-October

I'm concerned this model may be too aggressively dry; A lot of support for an active season remains in place – but the general trend may mean Something

Note: the Gulf trends wetter later in the season

Last year, this ensemble forecast projected a much wetter pattern



Preliminary 2025 Hurricane Season Forecast

| | # named storms | # hurricanes | # of major hurricanes |
|--------------------------|----------------|--------------|-----------------------|
| 2024 | 18 | 11 | 5 |
| 2021 | 21 | 7 | 4 |
| 2023 | 20 | 7 | 3 |
| 2006 | 10 | 5 | 2 |
| 2018 | 15 | 8 | 2 |
| 2011 | 19 | 7 | 4 |
| 1967 | 13 | 6 | 1 |
| 2022 | 14 | 8 | 2 |
| 2009 | 9 | 3 | 2 |
| 1976 | 10 | 6 | 2 |
| 2008 | 16 | 8 | 5 |
| 1972 | 7 | 3 | 0 |
| 1955 | 13 | 9 | 4 |
| | below normal | above normal | |
| Analog avg | 14.33 | 6.58 | 2.67 |
| 30-year normal 1991-2020 | 14 | 7 | 3 |

| gulf | texas |
|--------------|--------------|
| named storms | named storms |
| 7 | 1 |
| 8 | 1 |
| 3 | 1 |
| 0 | 0 |
| 3 | 0 |
| 5 | 0 |
| 2 | 0 |
| 5 | 0 |
| 2 | 0 |
| 2 | 0 |
| 5 | 0 |
| 2 | 0 |
| 5 | 0 |

Forecast:

- 12-20 named storms
- 5-10 hurricanes
- 2-5 major hurricanes
- 2-6 named storms in the Gulf
- 0-1 named storms with Texas landfall



Last Year Forecast vs Actual:

- 14-20 named storms ... 18
- 6-11 hurricanes ... 11
- 2-6 major hurricanes ... 5
- 4-6 named storms in the Gulf ... 11
- Better-than-average chance for a Texas landfall ... yes, Hurricane Beryl

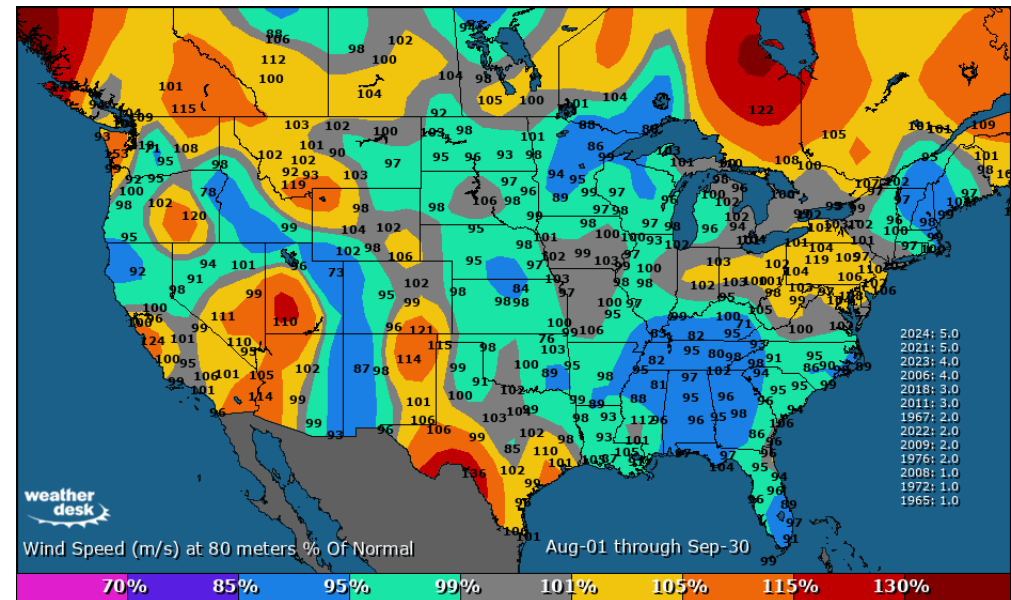
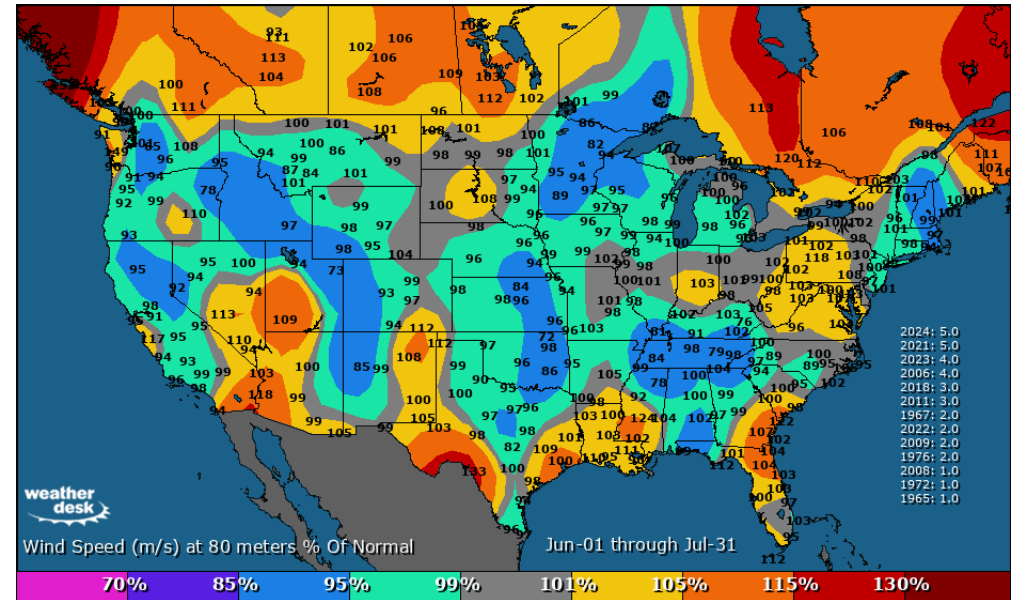
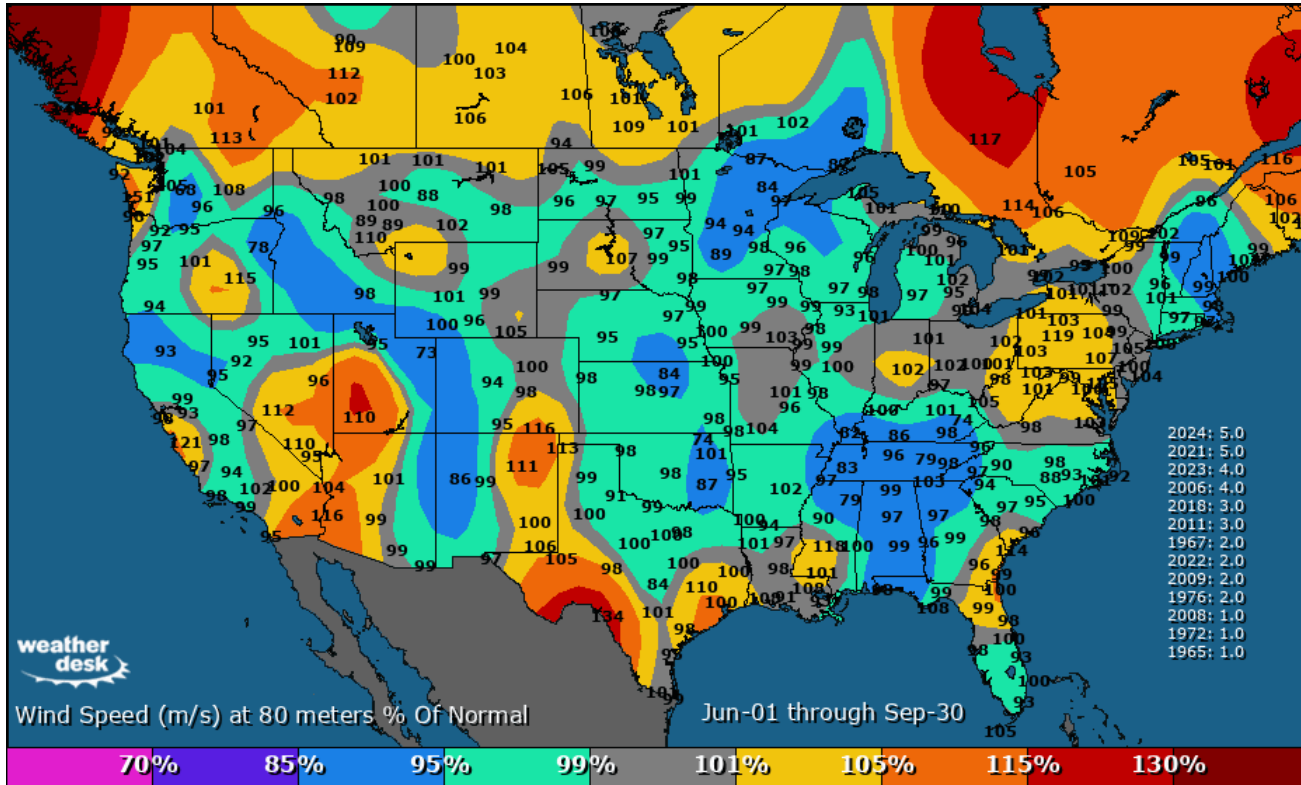
Medium confidence in another above average hurricane season (last year was high)

Analogous suggest it may be a bit quieter than the past couple of years

The Gulf temperatures are running well above normal



Summer Wind Outlook



Wind may be a bit more favorable for the back half of the summer

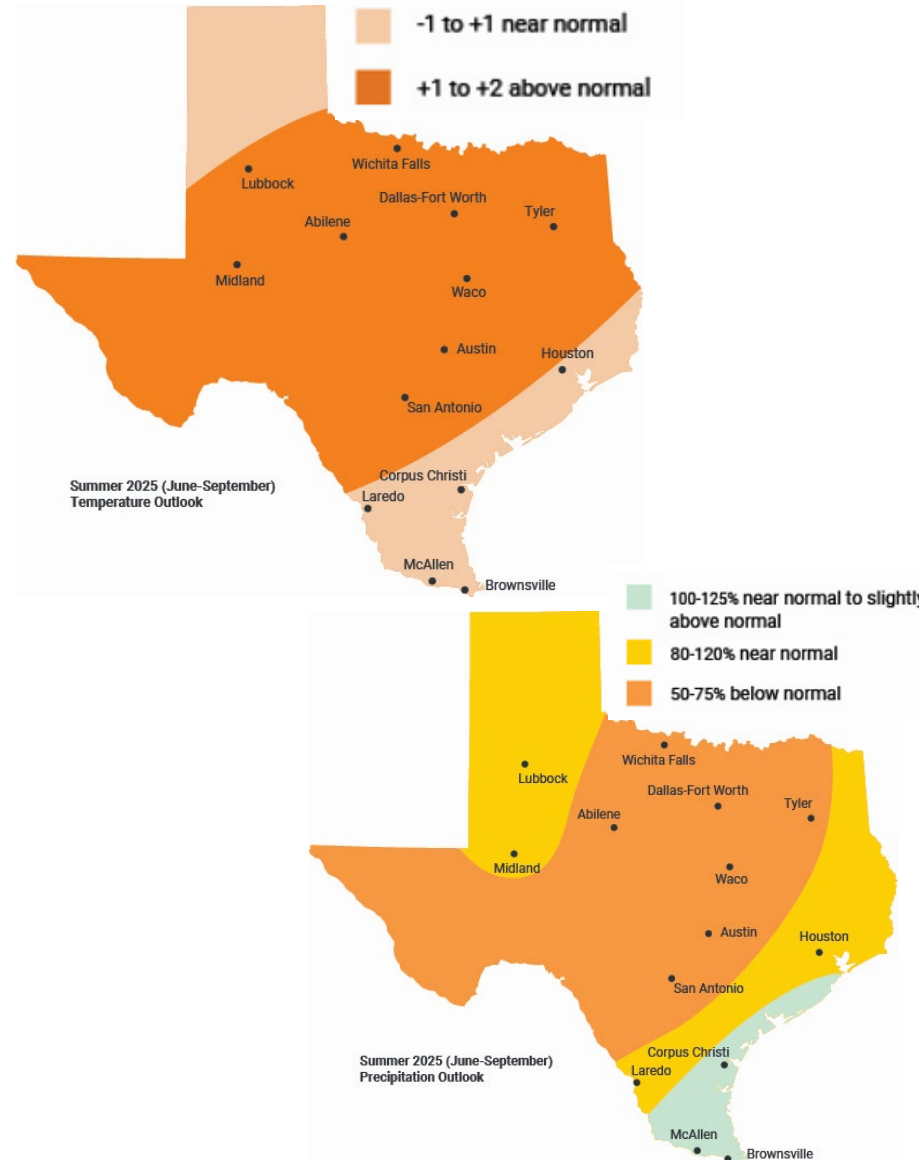
Applying the analogs used for temperatures and precipitation suggest summer 2025 will have above average wind over much of the southern half of Texas, with below normal wind more common to the north

Understand this is a broad brush; what matters is how much wind is available on the hottest days



2025 Summer Weather Outlook Summary

- The preliminary summer weather outlook calls for mostly above normal temperatures and normal to below normal rainfall
- The past 3 summers have ranked in the top 6 hottest summers since 1895. Much of what drove those summers to extremes is still in place (solar max, drought, warm oceans)
- 2025 could easily bring another top 10 hottest summer to Texas
- Drought may continue through the summer – at least regionally, potentially worsening
- The 2025 Atlantic Basic hurricane season should again be active
 - Though it could be slightly less active than last year



This forecast is preliminary. It will be finalized in May and be available on the ERCOT website

→ <https://www.ercot.com/gridmktinfo/dashboards/weatherforecast>

Weather Forecast Details

General Discussion:
 Most of the ERCOT region will continue to see highs in the mid-80s to low-90s over the next seven days; however, cooler temperatures on Saturday. This will be felt mostly in North and West Texas. And a cooler scenario for most this period will be brief as temperatures will return warmer Sunday and into early next week. Beginning next Wednesday there's still quite a bit of disagreement among the computer models, however, so more time is needed to determine.

Today:
 Scattered to isolated showers and thunderstorms will again impact the Panhandle and portions of the Far West; thunderstorms will spread into the Rio Grande Valley late tonight, mostly after midnight. The rest of the state will have large metropolitan areas should top out around 90 this afternoon. High will near 90 in Abilene as well. Low-90s will range from the mid-70s north to the mid-80s south.

Tomorrow:
 A cold front will move into North and West Texas during the day on Friday. This will result in those regions being cooler today. 91 in Houston tomorrow afternoon. The Rio Grande Valley will see more clouds and scattered rain opportunities.

[7-Day Temperature Forecast by City](#)
 Low and high temperatures forecast for the next seven days for major cities within the ERCOT system.

[Forecast Variability Report](#)
 ERCOT's assessment of the potential for load, wind, and solar conditions to vary between forecasts and actuals.

[Weather Seasonal Updates](#)
 A seasonal forecast for the ERCOT region

While the preliminary forecast shows hot and dry conditions this summer, the 2021 analog is being closely watched for similarities to this year. This could bring a milder, wetter summer. At this point – 30% chance of occurrence



Questions?

I'm all ears

