



Item 7.1: 2022 Summer Weather Update

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Board of Directors Meeting

ERCOT Public

June 21, 2022

Extreme Temperatures

Over the past 18 months, ERCOT has experienced...

- The coldest winter period since the 1980s (Feb 2021)
- The warmest December ever recorded (2021)
- One of the hottest springs ever recorded (2022, more details to follow)
- Numerous record high temperatures in May and early-June 2022

US National Weather Service Austin-San Antonio Texas June 7 at 12:32 PM ·

Yesterday evening's 00Z sounding from Del Rio showed a temperature at 850 mb of 29.8 C. This is, as far as we can tell, the 2nd highest value ever recorded there out of 50,000 soundings dating back to January 1954.

Translation: It's hot! 850 mb is a common pressure level for meteorological information. It's several thousand feet up, but on hot summer days the atmosphere at the surface often mixes well with air that high. 29.8C translates to about 85.6F.

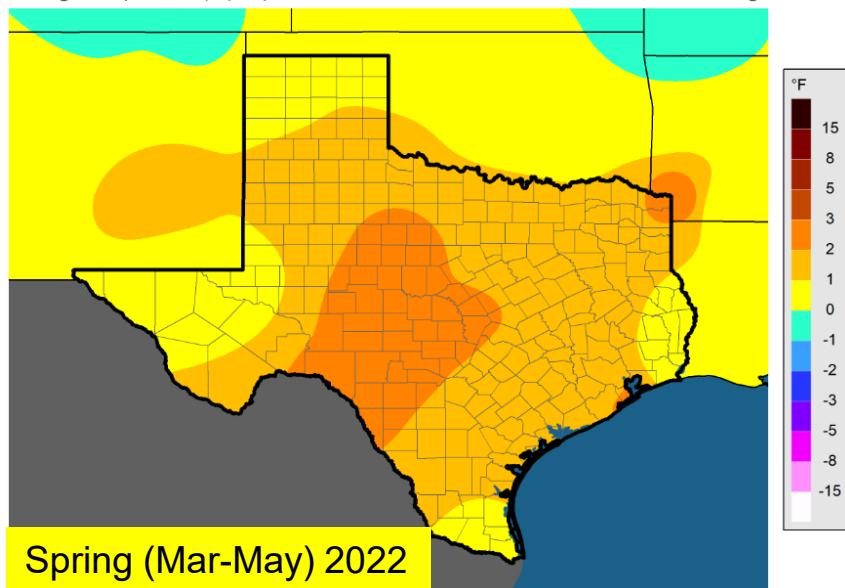
Summer 2022 Weather Outlook – Topics Covered

- Spring 2022
- La Niña (and other drivers) update
- Examining recent summers – focused on 2011, as a reference
- Summer 2021 temperature outlook
- Summer 2021 precipitation outlook
- Drought update
- Wind outlook
- Hurricane outlook

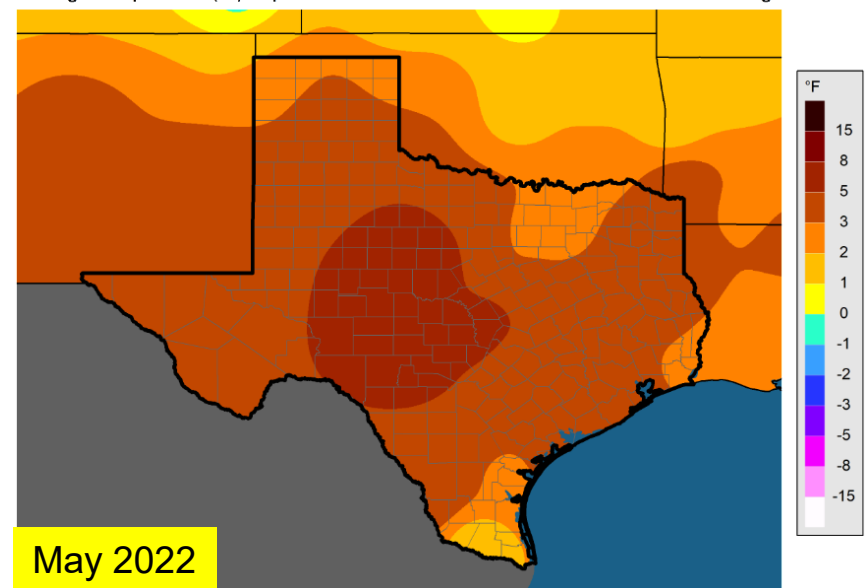
Spring Season

- 2022 was the 7th warmest spring for Texas (128 historical springs)
- It was the #1 warmest April-May and 2nd warmest May on record for Texas
 - For Austin, Abilene, and Del Rio, it was the hottest May ever recorded

Average Temperature (°F) Departure from 20220301 to 20220531 - Fifteen Year Average



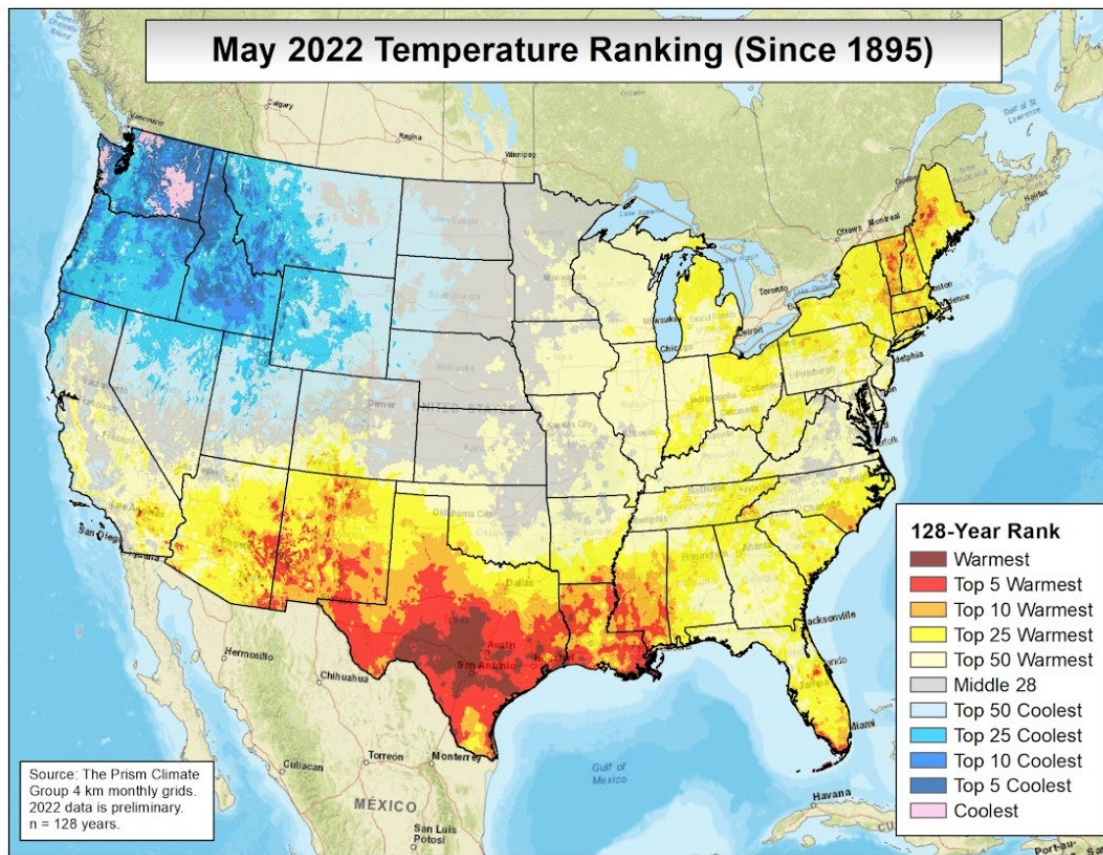
Average Temperature (°F) Departure from 20220501 to 20220531 - Fifteen Year Average



- Based on only max temperature (daytime highs), 2022 was the 3rd warmest spring and 1st warmest May for Texas

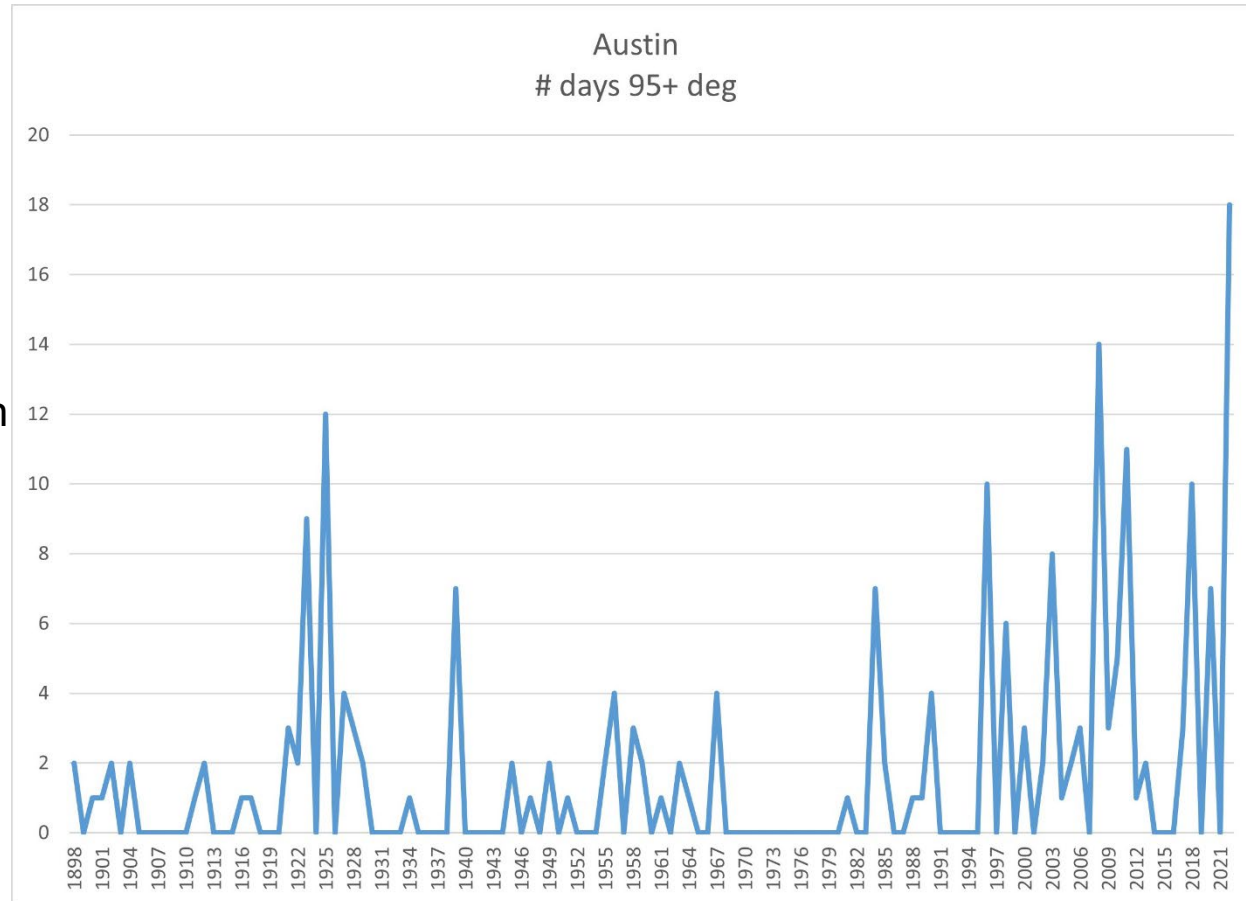
Spring 2022 Review

- For most of Texas, May 2022 ranked in the top 5 hottest
- The areas in the brown (red-brown) shade recorded their hottest May on record



Spring 2022 Review

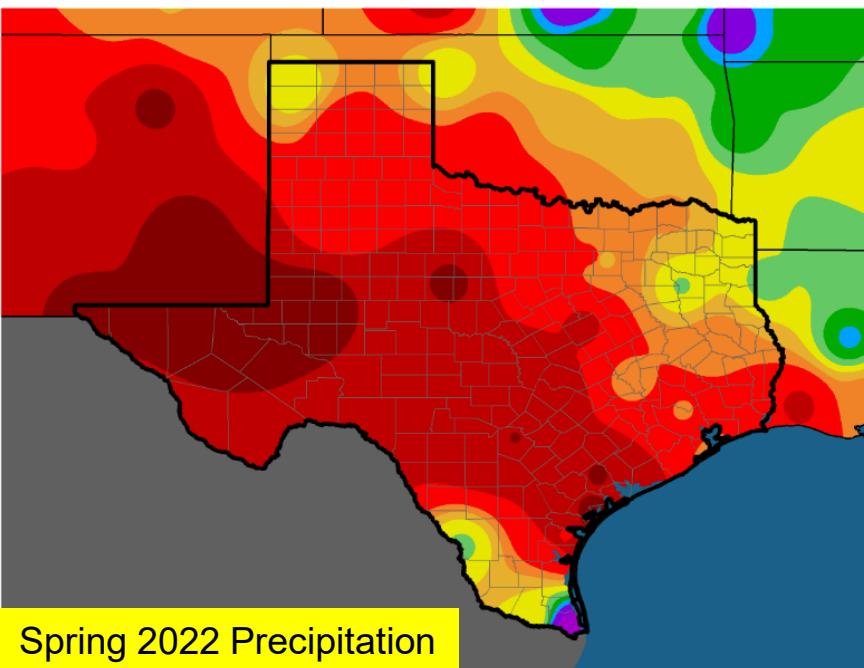
- Austin recorded 18 days of 95 degrees or greater this May. Most ever recorded
- Austin hit 103° on June 3 – hotter than any day recorded last year
- Historical years with fewer than 15 days of 90+ deg through May 1 averaged 9 days of 100° or greater
- Historical years with 15 or more days of 90 through May 5 averaged 29 days of 100° or greater



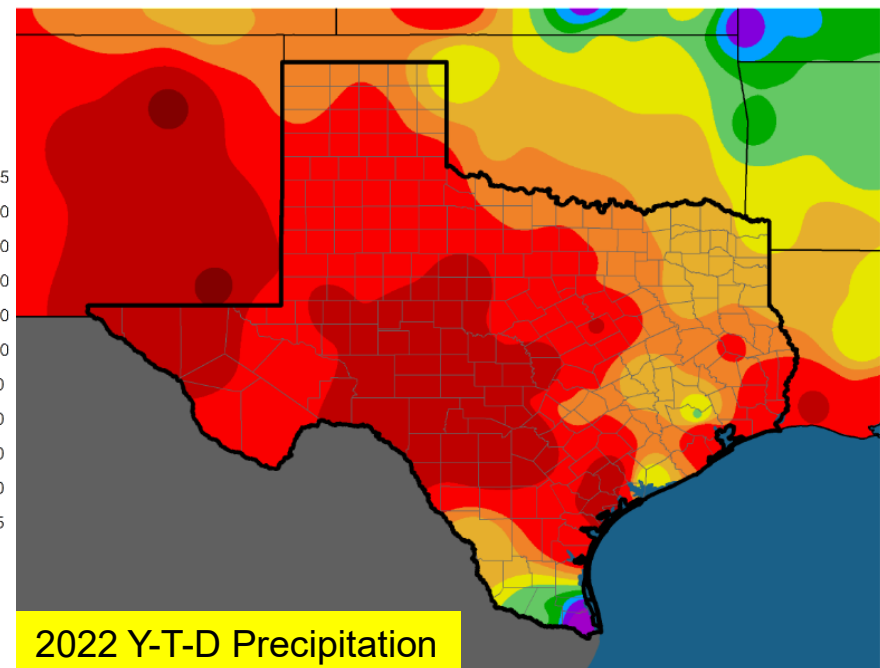
Spring 2022 Review

- Most of Texas has experienced rainfall well below normal in 2022

Percent of Normal Precipitation (%) from 20220301 to 20220531 - Fifteen Year Average



Percent of Normal Precipitation (%) from 20220101 to 20220606 - Fifteen Year Average



La Niña Update

- The current La Niña is the strongest since 2010-11

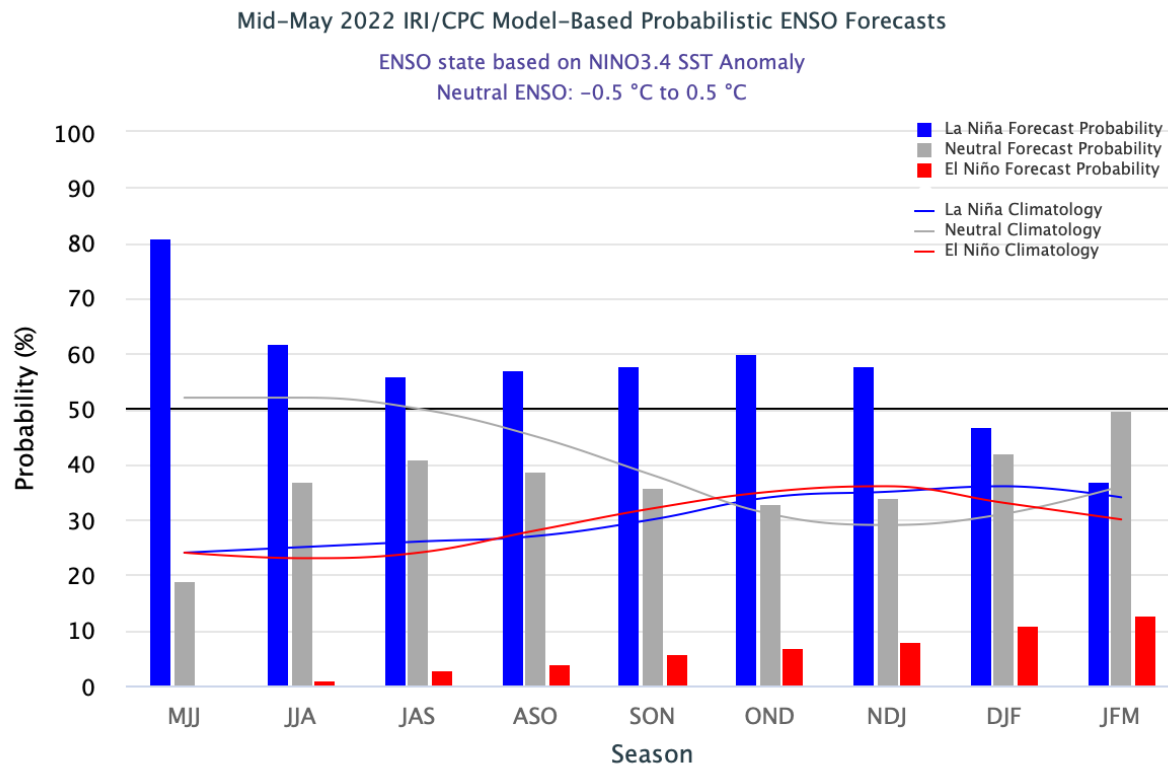
Negative values = La Niña
Positive values = El Niño

2010		1.6	1.3	1	0.6	0.1	-0.4	-0.9	-1.2	-1.4	-1.5	-1.5	-1.5
2011		-1.4	-1.2	-0.9	-0.6	-0.3	-0.2	-0.2	-0.4	-0.6	-0.8	-1	-1
2012		-0.7	-0.5	-0.4	-0.4	-0.3	-0.1	0.1	0.3	0.3	0.3	0.1	-0.2
2013		-0.4	-0.4	-0.3	-0.2	-0.2	-0.2	-0.3	-0.3	-0.2	-0.3	-0.3	-0.3
2014		-0.4	-0.4	-0.2	0.1	0.3	0.2	0.1	0.0	0.2	0.4	0.6	0.7
2015		0.6	0.6	0.6	0.8	1.0	1.2	1.5	1.8	2.1	2.4	2.5	2.6
2016		2.5	2.2	1.7	1.0	0.5	0.0	-0.3	-0.6	-0.7	-0.7	-0.7	-0.6
2017		-0.3	-0.1	0.1	0.3	0.4	0.4	0.2	-0.1	-0.4	-0.7	-0.9	-1
2018		-0.9	-0.8	-0.6	-0.4	-0.1	0.1	0.1	0.2	0.4	0.7	0.9	0.8
2019		0.8	0.8	0.8	0.8	0.7	0.5	0.3	0.1	0.1	0.3	0.5	0.5
2020		0.5	0.6	0.5	0.3	0.0	-0.2	-0.4	-0.6	-0.9	-1.2	-1.3	-1.2
2021		-1.1	-0.9	-0.8	-0.7	-0.5	-0.4	-0.4	-0.5	-0.7	-0.8	-1.0	-1.0
2022		-1.0	-0.9	-1.0	-1.1								
		DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ

- The current La Niña is into its third year. This last happened in 2012 but faded by late-spring
- The last time a La Niña maintained through the entire third year was 2000. This also happened in 1956 (drought of record). Both of these summers were hotter-than-normal

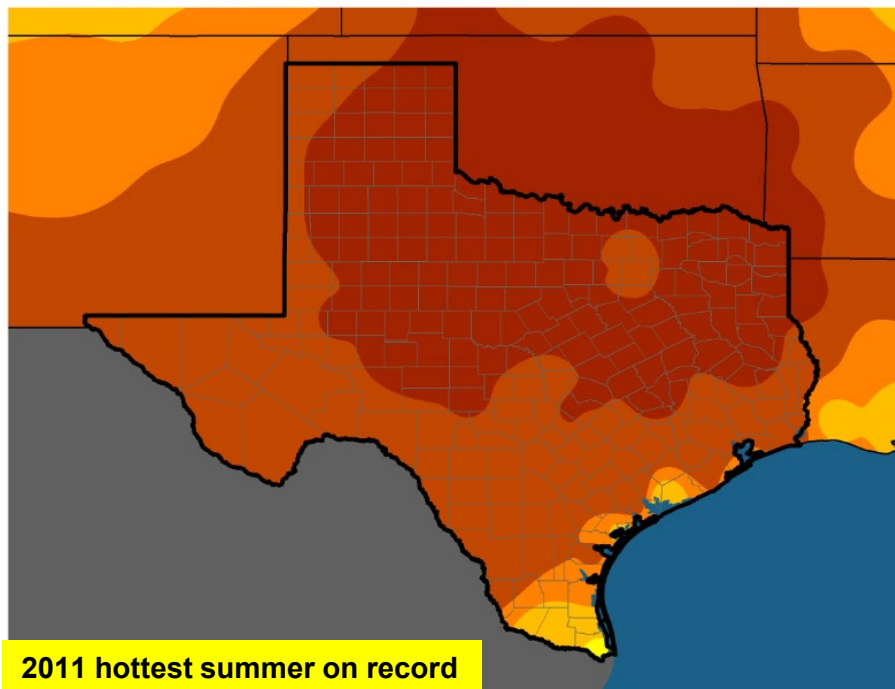
La Niña Update

- Forecast is for La Niña to continue this summer and extend through at least the fall season
- La Niña is commonly associated with drought in Texas



2011 Review

Fifteen Year Max Temperature Anomaly in °F from 20110601 to 20110930

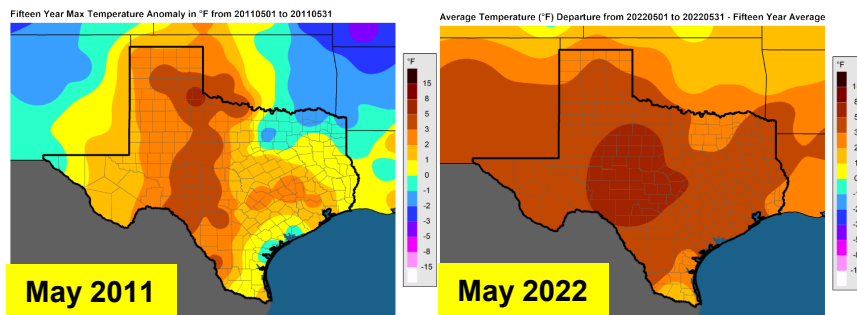


100° days

Dallas: 71 (all-time record)
Houston: 46 (all-time record)
Austin: 90 (all-time record)
San Antonio: 57 (2nd behind 2009)
McAllen: 63 (several have had more)
Abilene: 81 (all-time record)
Wichita Falls: 100 (all-time record)

2011 was a statistical outlier

The difference between the hottest summer (2011) and the second hottest summer (1998) was 1.6° -- the same difference as the second hottest summer and the 16th hottest. For June-August only, the difference between #1 (2011) and #2 (1934) was 2.6° -- same delta as #2 to #58

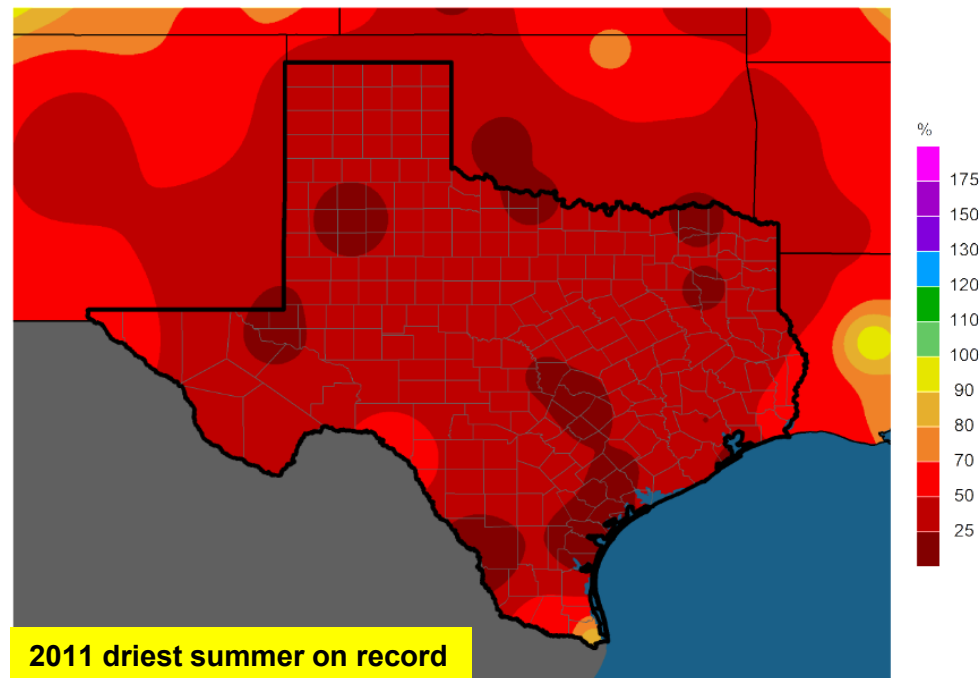


May 2011 was not as hot as May 2022

2011 Review

- The summer of 2011 was the driest on record for Texas
- Drought worsened rapidly during the summer of 2011 (little to no rain, high evaporation rate)

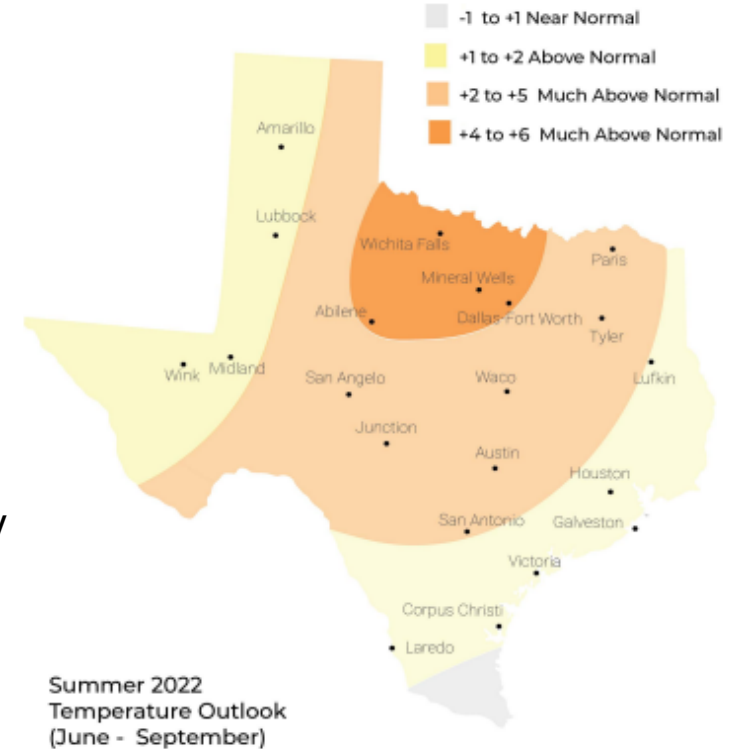
Percent of Normal Precipitation (%) from 20110601 to 20110930 - Fifteen Year Average



Summer 2022 Temperature Outlook

Ranks from 1895-2021 (127 years)

- Top matches, recent years: 2018, 2013, **2011**, 1996
- Top matches, distant years: 1971, 1967, 1963, **1956**, 1951
- 2011 and 1956 are the two best matches.
- 2011 was the hottest summer on record for Texas
- 1956 was the 9th hottest
- This summer will very likely (close to a lock) be hotter than last summer, which was the 53rd hottest on record
- The core of the hottest anomalies may shift south from the initial forecast, as shown on the map.
Waco, Austin, Abilene, San Angelo, and the Hill Country show increasing hot potential

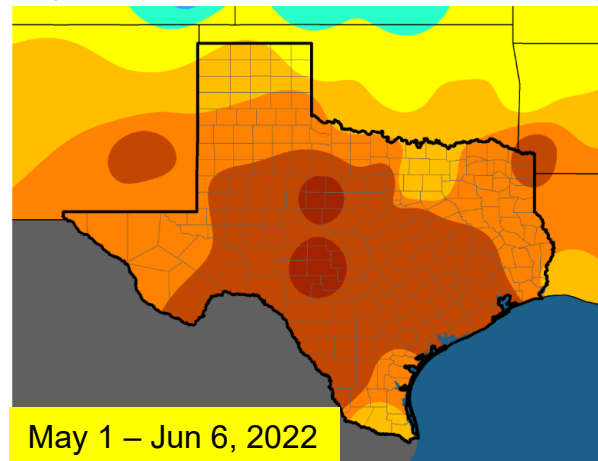


Will Summer 2022 be as Hot as Summer 2011?

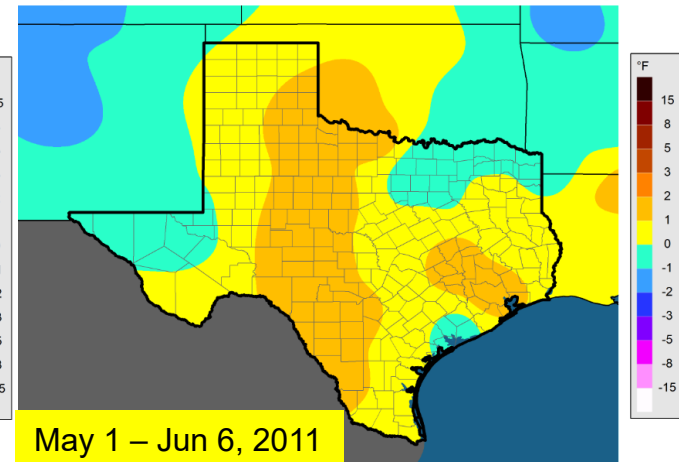
- 2011 was a statistical outlier
- It's challenging to forecast records, especially long-range
- However, 2022 is currently trending hotter than 2011
- If the next three months continue with very limited rainfall (and no significant impacts from hurricanes) there's support for the summer of 2022 to at least approach the summer 2011 extremes
- In addition to any potential tropical impacts, the Southwest monsoon will need to be monitored for mid-summer rain and cloud potential in West Texas (currently not expected to be significant)
- 105+ degree highs should be frequent this summer, unlike last year
- Yes, 2011 levels are possible, dependent on maintaining/increasing the drought

Summer 2022 is likely to rank within the top 10 hottest summers

Average Temperature (°F) Departure from 20220501 to 20220606 - Fifteen Year Average

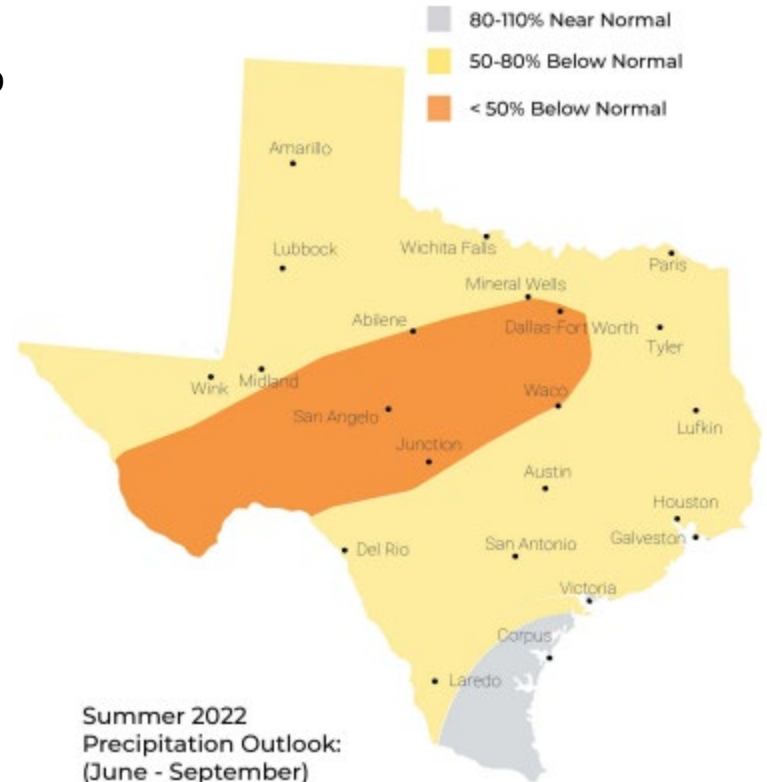


Average Temperature (°F) Departure from 20110501 to 20110606 - Fifteen Year Average



Summer 2021 Precipitation Outlook

- Most of the state is forecasted to experience a drier-than-normal summer
- The exception being parts of South Texas, including the Rio Grande Valley
- Texas experienced its 10th driest winter and 13th driest spring (127 historical). Last fall was also drier than normal, but less extreme than winter and spring
- The expected dry summer ahead would make for four consecutive drier than normal seasons



Drought Outlook

- Over 78% of the state's land area is in a moderate drought or worse
- 44% are experiencing extreme to exceptional drought
- Lake Travis is at its lowest level since just prior to the Memorial Day floods of 2015

U.S. Drought Monitor Texas

May 31, 2022

(Released Thursday, Jun. 2, 2022)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	14.11	85.89	78.44	66.35	44.07	17.91
Last Week 05-24-2022	12.92	87.08	79.11	66.94	46.05	22.08
3 Months Ago 03-01-2022	6.66	93.34	80.71	56.71	24.47	0.00
Start of Calendar Year 01-04-2022	7.58	92.42	79.83	54.25	16.69	0.00
Start of Water Year 09-28-2021	45.57	54.43	7.26	0.27	0.00	0.00
One Year Ago 06-01-2021	69.83	30.17	19.48	10.82	6.44	2.51

Intensity:

None	D2 Severe Drought
D0 Abnormally Dry	D3 Extreme Drought
D1 Moderate 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>

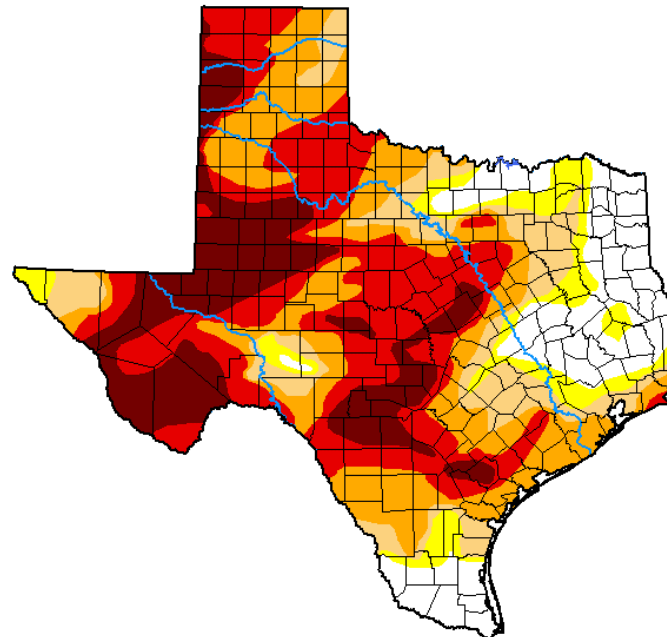
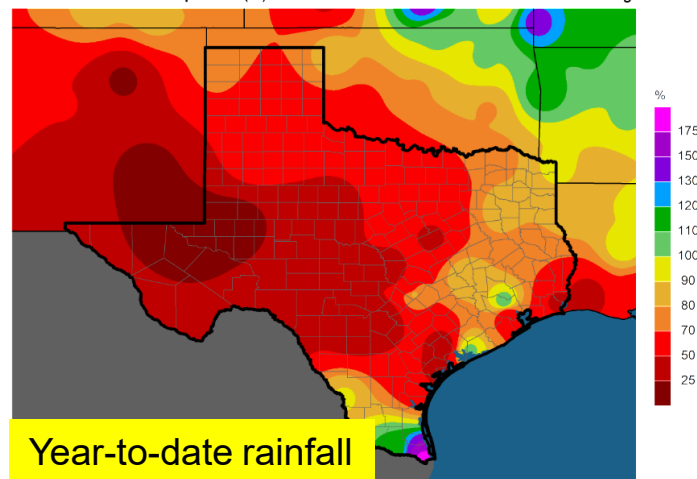
Author:

Curtis Riganti
National Drought Mitigation Center



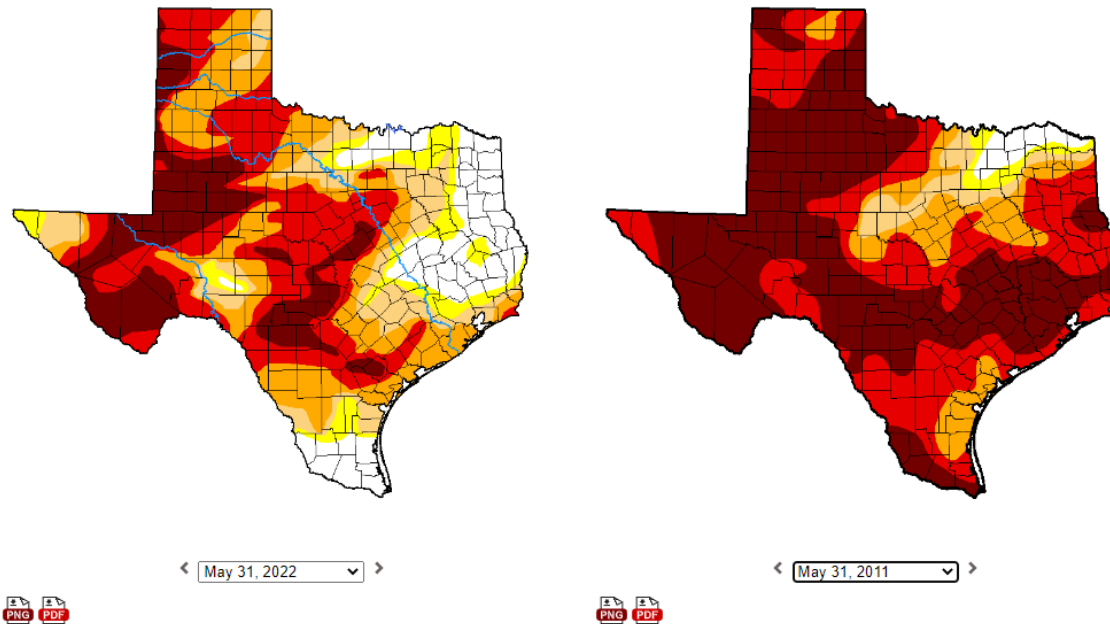
droughtmonitor.unl.edu

Percent of Normal Precipitation (%) from 20220101 to 20220531 - Fifteen Year Average



Drought Outlook

- Currently, drought is not to the extreme of 2011 – though 2011's drought started earlier than the 2022 drought
- Current drought is the worst (largest % of area) as of the end of May since 2013
- Current drought has the largest area impacted by extreme to exceptional drought as of the end of May since 2011

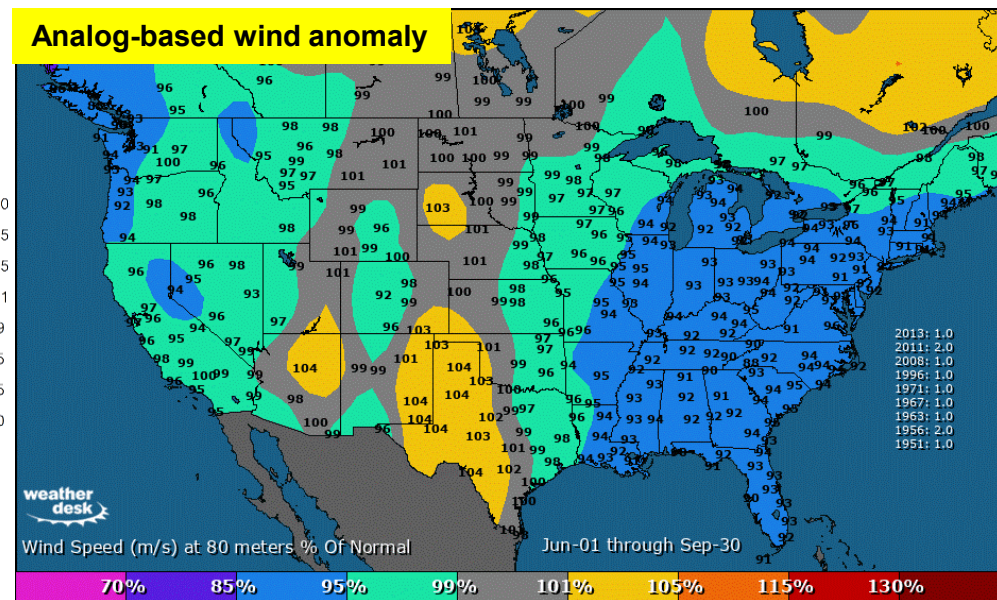
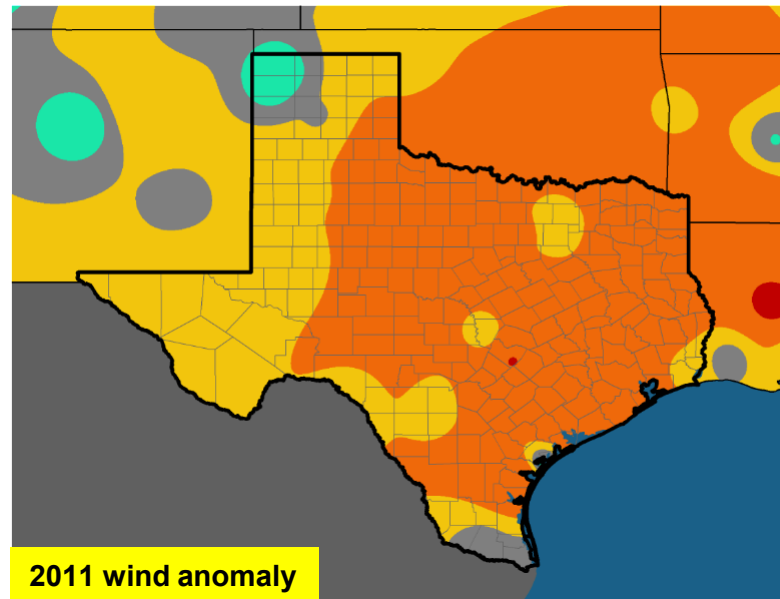


Statistics Comparison

Week	None	D0-D4	D1-D4	D2-D4	D3-D4	D4	DSCI
2022-05-31	14.11	85.89	78.44	66.35	44.07	17.91	293
2011-05-31	2.25	97.75	96.07	91.89	81.09	50.65	417
Change	-11.86	11.86	17.63	25.54	37.02	32.74	124

Wind

Percent of Average Sfc Wind (%) from 20110601 to 20110930 - Fifteen Year Average



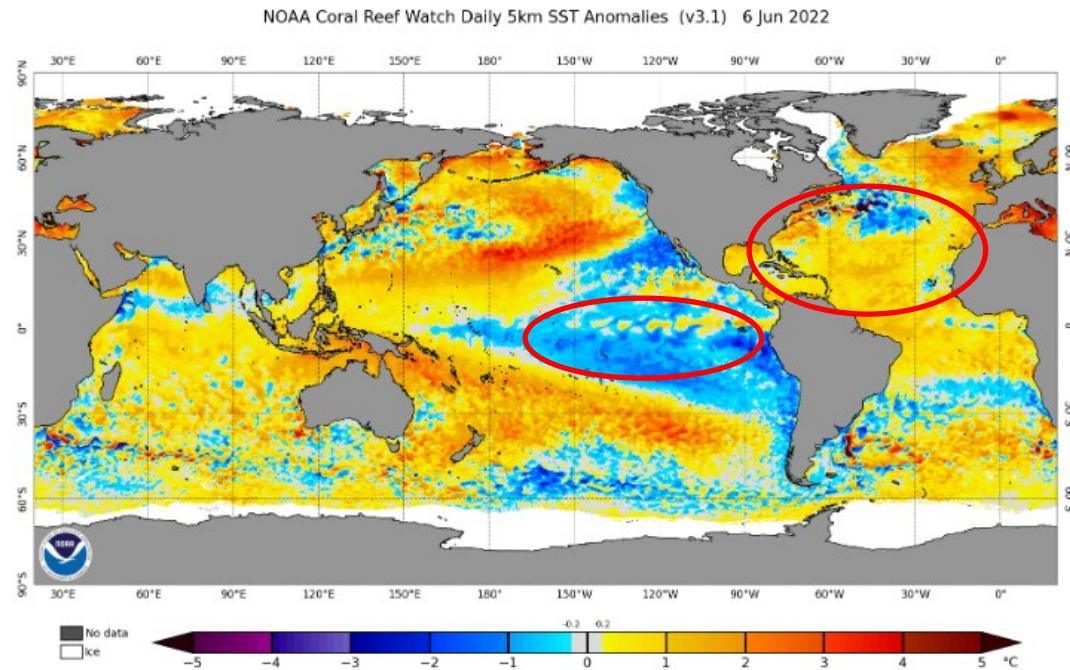
- For the summer as a whole, above average wind is projected for West Texas, closer to normal for South Texas
- This does not separate wind during peak and non-peak load hours

Hurricane Forecast

- Long-term (30-year) average numbers:
14/7/3
(named storms/hurricanes/major hurricanes)
- Since 2016, each year has had greater than 14 named storms
- 2020 and 2021 are #1 and #3 all-time for number of named storms (30 and 21)
- 2021: 21/7/4
- 2011: 19/7/4
- 2022 forecast: 18-22/7-12/4-6

La Niña supports an active season

- 2022 forecast would rank among the most active
- **Alex** became a Tropical Storm on June 5
- Sea Surface Temperatures (map below) are running above-normal over most of the Atlantic Basin as of early-June



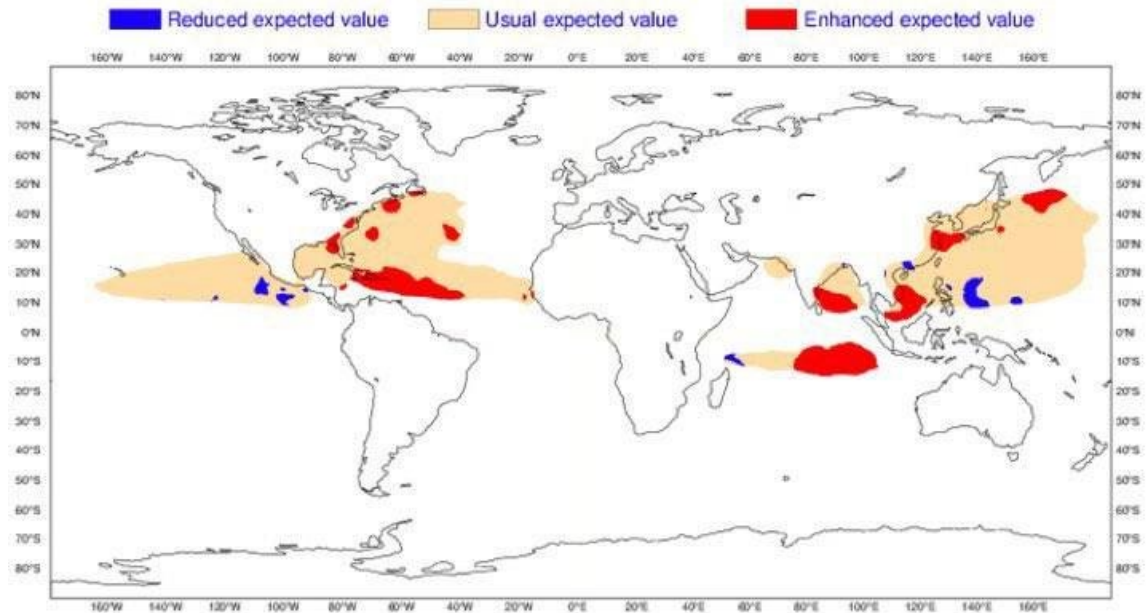
Hurricane Forecast

La Niña supports an active season

- The historical average # of tropical cyclones in the Gulf of Mexico is 4
- Forecast for Gulf named storms in 2022 is 4-6
- Texas landfall cannot be projected until a storm develops

ECMWF Seasonal Forecast
Standardized Tropical Storm Density
Forecast start reference is 01/06/2022
Ensemble size = 51, climate size = 575

SEAS5
JASOND 2022
Climate (initial dates) = 1993-2015



Questions?

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

[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

→ ↺ https://www.ercot.com/files/docs/2021/11/22/seasonal_updates.pdf

seasonal_updates.pdf

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2022 Summer Weather Outlook

Overview: Following a relatively cold January-February period, which ranked as the second coldest over the past 12 years, temperatures rebounded much warmer during the spring. April was the warmest across Texas since 2012, and May is currently in the running for the warmest on record. The spring heat is being aided by a prolonged La Niña event that started in late summer of 2020. The La Niña acts to shift most of the significant rain events north of Texas. This, in turn, has resulted in a significant drought, impacting over 80% of the Texas land area. And the cycle completes as the drought intensifies the heat. Most likely, all of the variables in place during late spring will carry over into the summer. This is setting up to a very hot and dry summer season for the ERCOT system. The big question: Will this summer approach 2011 levels?

