



## **2019-20 Preliminary Winter Weather Outlook**

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Generator Weatherization Workshop  
Sep 5, 2019

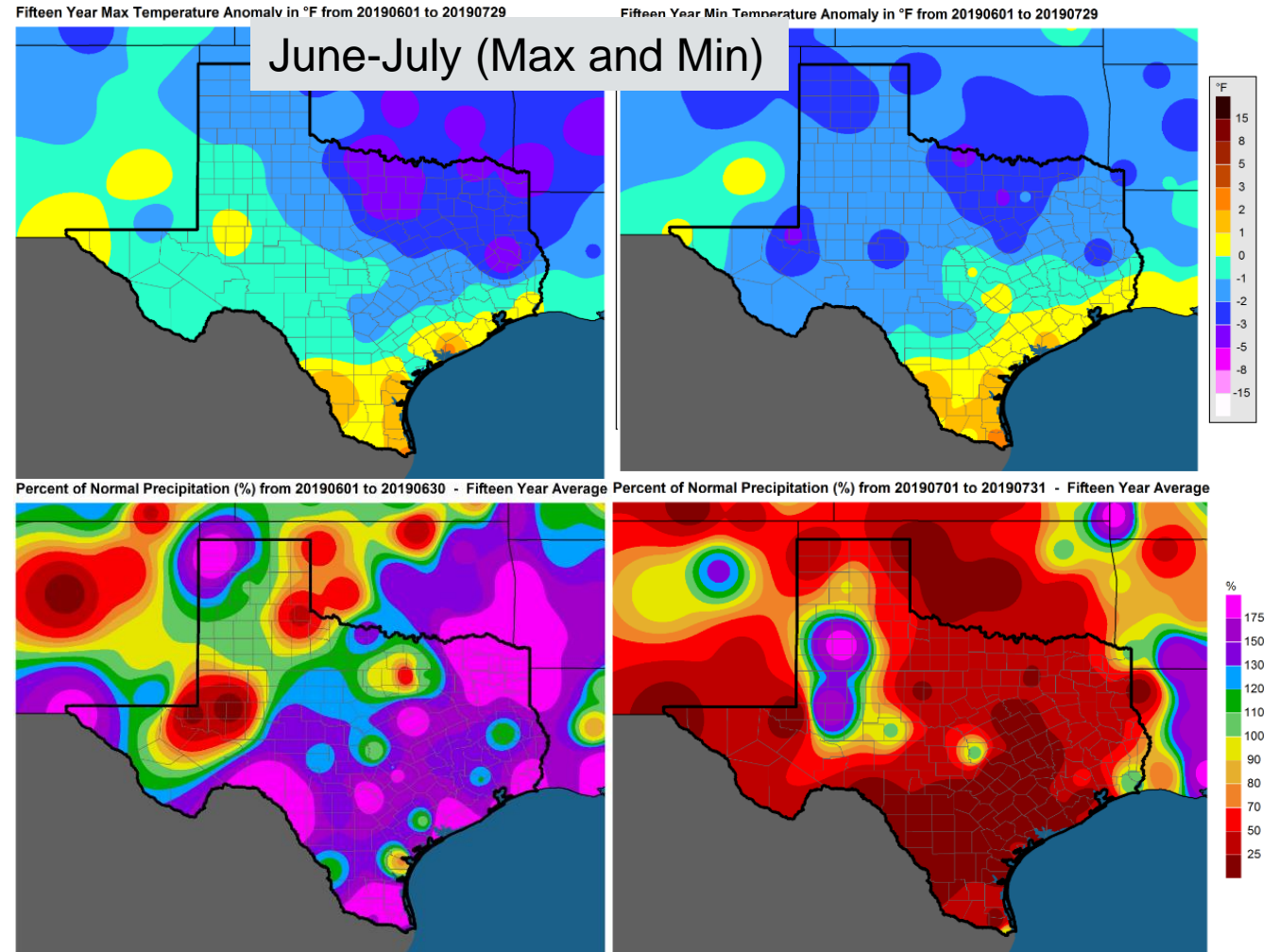
# Agenda

- Updating the summer
- Quick look ahead to fall
- Review of last winter (and other recent winters)
- Expectations for the upcoming winter



# Updating Summer 2019

- June 2019 was the coolest for the state of Texas since June 2007. July was the coolest since 2014. **Jun-Jul combined was the coolest since 2007**
- Dallas-Fort Worth recorded its first 100° day on 7/30 – the latest first 100 since 2007
- June 2019 was the wettest for the state of Texas since June 2007
- The back half of the summer was forecast to be hotter than the front half (like August, September has above normal potential)

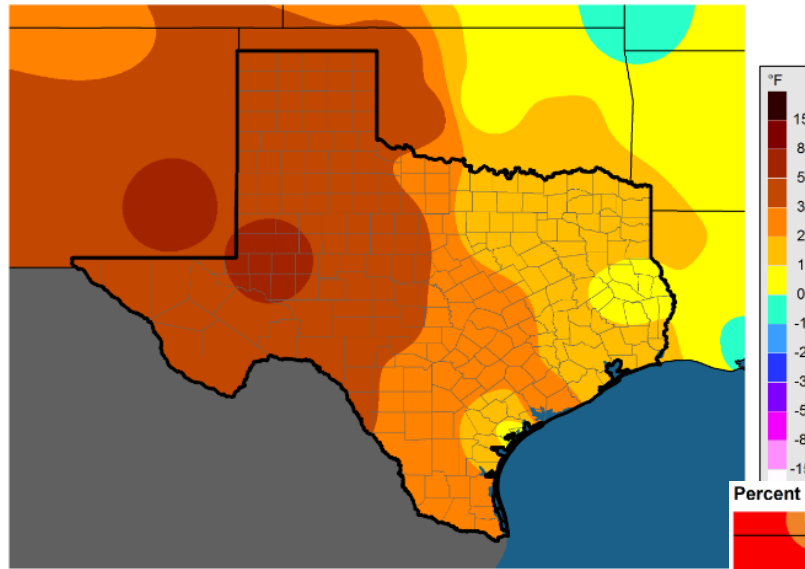


July trended much drier – driest since 2011 – which resulted in a significantly hotter August

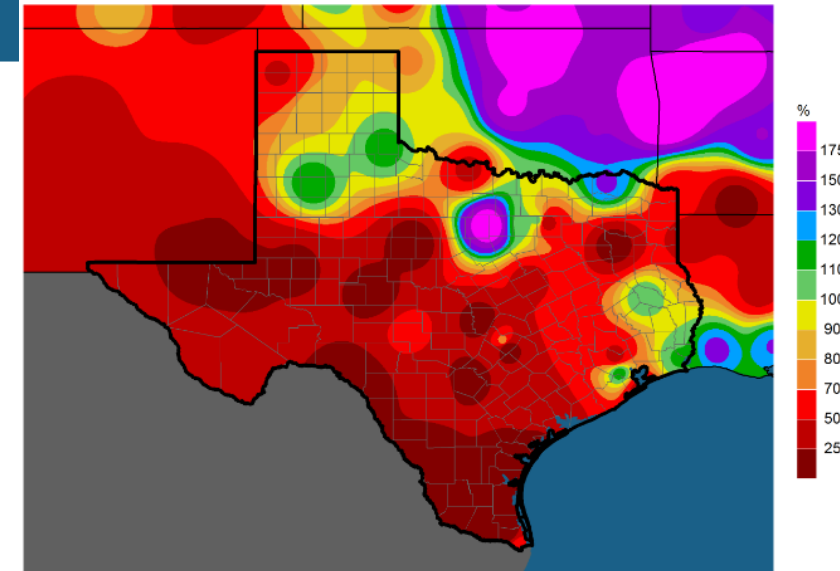
# Updating Summer 2019

- The dry trend that started in July continued through August
- This resulted in a very hot August, likely the hottest since August 2011
- After very few 100 degree days in June and July, August has made up a large chunk of the deficit
- September is likely to see August's hotter-than-normal trend continue

Average Temperature (°F) Departure from 20190801 to 20190830 - Fifteen Year Average



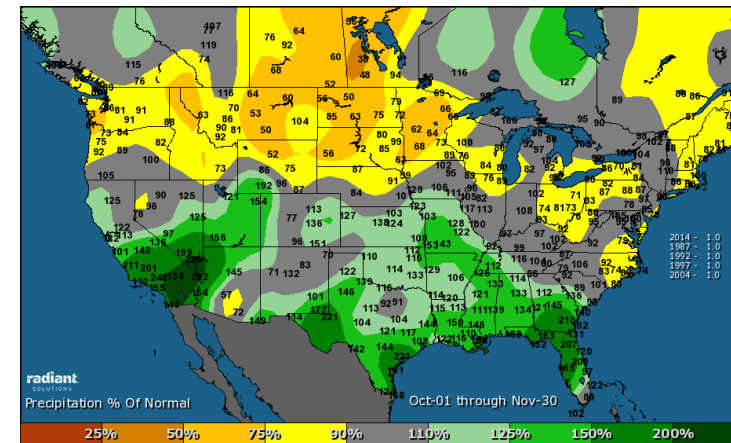
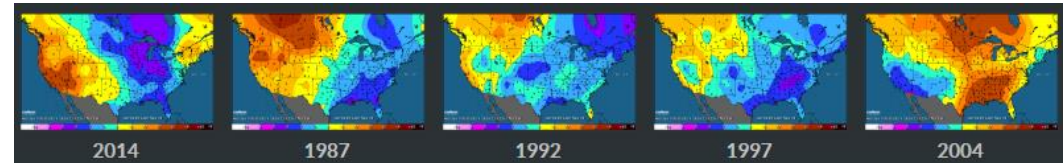
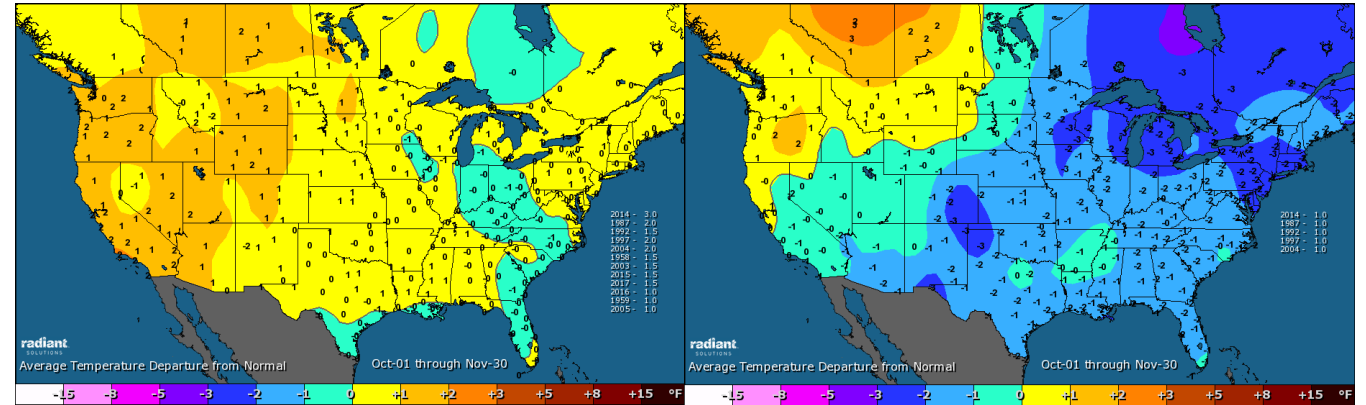
Percent of Normal Precipitation (%) from 20190801 to 20190830 - Fifteen Year Average



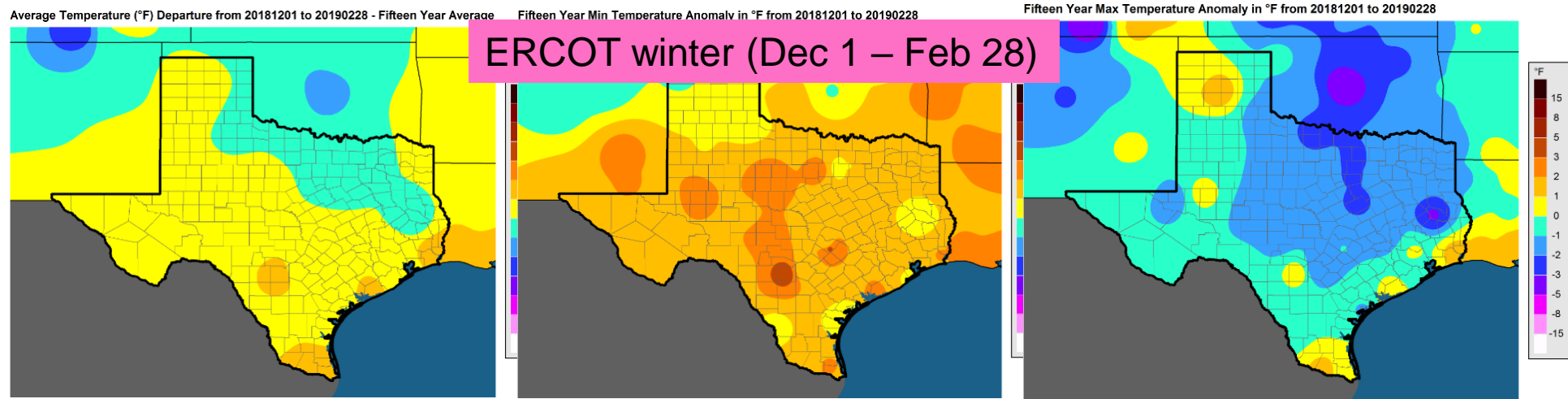
August 2019 – hotter and drier than normal

# Fall 2019 Weather Outlook

- Late-summer/early-fall indicates warmer than normal conditions
- **October** shows **above normal** temperature potential
- Potential to turn significantly **cooler** in **November** – but not necessarily a precursor to the winter
- Possible early-season ice/snow event in West Texas in November
- After a dry period this summer, indications of a wetter pattern developing in the fall



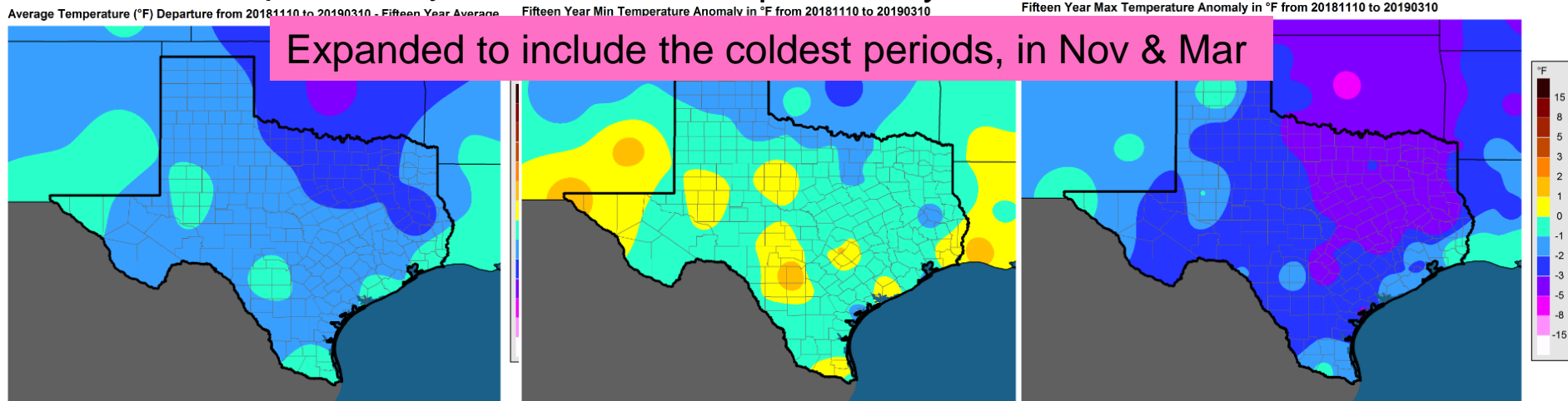
# Reviewing Last Winter



Mean temp anomaly

Min temp anomaly

Max temp anomaly



November 14, 2019  
March 5, 2019



## Mean Temperature Ranking of Recent Texas Winters (124 historical winters)

2018-19	93 <sup>rd</sup> coldest
2017-18	75 <sup>th</sup>
2016-17	124 <sup>th</sup> coldest (warmest winter on record)
2015-16	116 <sup>th</sup>
2014-15	67 <sup>th</sup>
2013-14	30 <sup>th</sup>
2012-13	109 <sup>th</sup>
2011-12	98 <sup>th</sup>
2010-11	67 <sup>th</sup>
2009-10	8 <sup>th</sup>
2008-09	111 <sup>th</sup>

Since 2001, only two winters have ranked in the coldest third (1-41) of historical winters

Last winter's two coldest periods were technically just outside of the ERCOT winter (Dec 1-Feb 28). The coldest periods were in mid-November and early-March (11/14/18 & 3/5/19)

# Seasonal Rankings

- ❑ 125 years of data, 1895-2019
- ❑ Chart shows the ranking within that set of years, by season
- ❑ 1 = warmest, 125 = coldest
- ❑ 38 total seasons thus far this decade
- ❑ Of the 38, **23** have ranked in the **warmest** third (1-42; indicated by red-shaded cells)
- ❑ **12** have ranked in the **middle** third (43-83; indicated by no shade)
- ❑ **3** have ranked in the **coldest** third (84-125; indicated by blue-shaded cells)

- ❑ What does this tell you?
  - You'd better have strong supporting evidence if forecasting a colder-than-normal season

spring 2019	72
winter 2018-19	31
fall 2018	103
summer 2018	6
spring 2018	7
winter 17-18	48
fall 2017	8
summer 2017	50
spring 2017	9
winter 16-17	1
fall 2016	1
summer 2016	21
spring 2016	21
winter 15-16	8
fall 2015	8
summer 2015	17
spring 2015	58
winter 2014-15	54
fall 2014	65
summer 2014	50
spring 2014	81
winter 13-14	93
fall 2013	83
summer 2013	21
spring 2013	76
winter 2012-13	15
fall 2012	17
summer 2012	12
spring 2012	1
winter 2011-12	25
fall 2011	32
summer 2011	1
spring 2011	3
winter 2010-11	54
fall 2010	32
summer 2010	10
spring 2010	68
winter 2009-10	114



# Winter vs Summer

## Winter extremes happen quickly

- A strong cold front moves through dropping temperatures sharply – sometimes 30-40 degrees in a matter of an hour or two.
- High wind speeds also tend to accompany strong cold fronts, resulting in even colder wind chills – and cold air that more readily penetrates buildings and other structures.
- A winter load peak can literally be 20,000 MW or more higher than the day prior

## Summer extremes are typical, with an uninterrupted build of heat over an extended period

- A hot summer pattern in Texas is the result of high pressure that parks itself over the state, limiting rain chances and cloud cover, while allowing the high angle of the Texas sun in the summer to reach its full impact
- It's commonly the day-after-day impacts of heat that result in load peaks during summer
- A summer load peak is likely **only a few hundred** to a couple thousand megawatts higher than the previous day

Because of this difference, a summer long-range weather outlook tends to do a better job at capturing extremes and peaks than a winter long-range outlook. Remember, a very strong cold front can move through in an otherwise mild winter (cold winters are defined more by the frequency of cold fronts).

# Seasonal versus Extremes

**\*\*\*Mild winters can have very cold periods\*\*\***

- February 2, 2011:
- **Dallas:** 13° (20MPH wind)
- **Houston:** 21° (16MPH wind)
- **San Antonio:** 19° (25MPH wind)
- **Austin:** 18° (26MPH wind)
- **Brownsville:** 32° (26MPH wind)
- **Abilene:** 7° (16MPH wind)
- **Midland:** 6° (16MPH wind)

Winter of 2010-11: **67<sup>th</sup> coldest** in TX weather history

Remains  
the  
winter  
peak  
record  
(65,915  
MW)



- January 17, 2018:
- **Dallas:** 13° (5MPH wind)
- **Houston:** 19° (13MPH wind)
- **San Antonio:** 23° (10MPH wind)
- **Austin:** 18° (10MPH wind)
- **Brownsville:** 30° (14MPH wind)
- **Abilene:** 8° (5MPH wind)
- **Midland:** 28° (7MPH wind)

Winter of 2017-18: **75<sup>th</sup> coldest** in TX weather history

**\*\*\*Including the Coldest day since February 2011\*\*\***

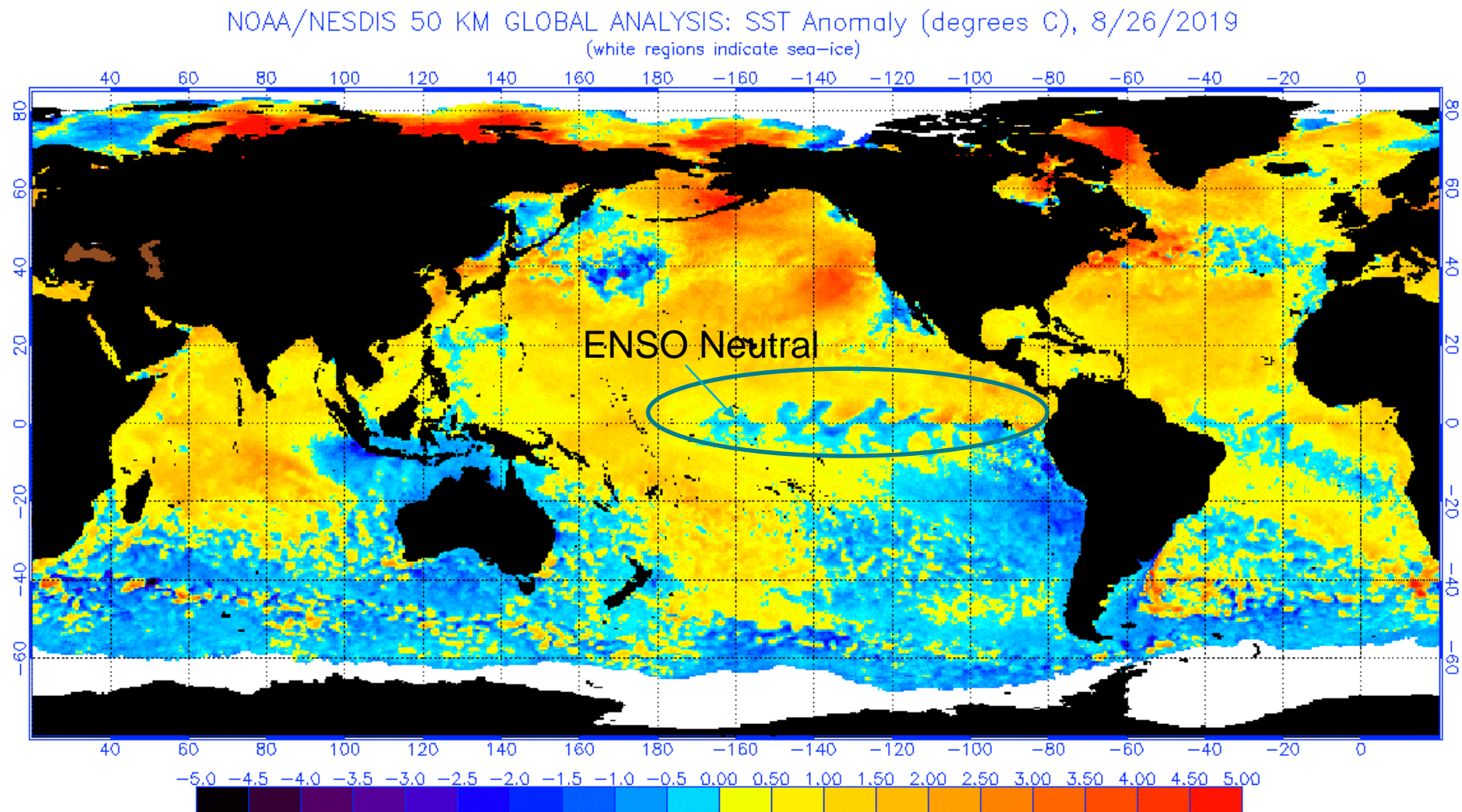
All-time winter peak load on this date: **65,750 MW**

Those were the **two  
coldest days** this decade



Winter 2013-14 was the coldest  
this decade (polar vortex  
winter) – but no single day that  
winter approached the cold  
extremes of 2/2/11 or 1/17/18

# Ocean Temperatures



# ENSO (El Niño Southern Oscillation)

A Weak El Niño event started last fall. It's transitioned to a **neutral** state this summer

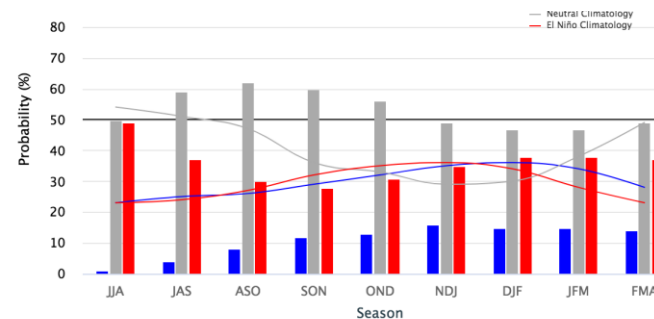
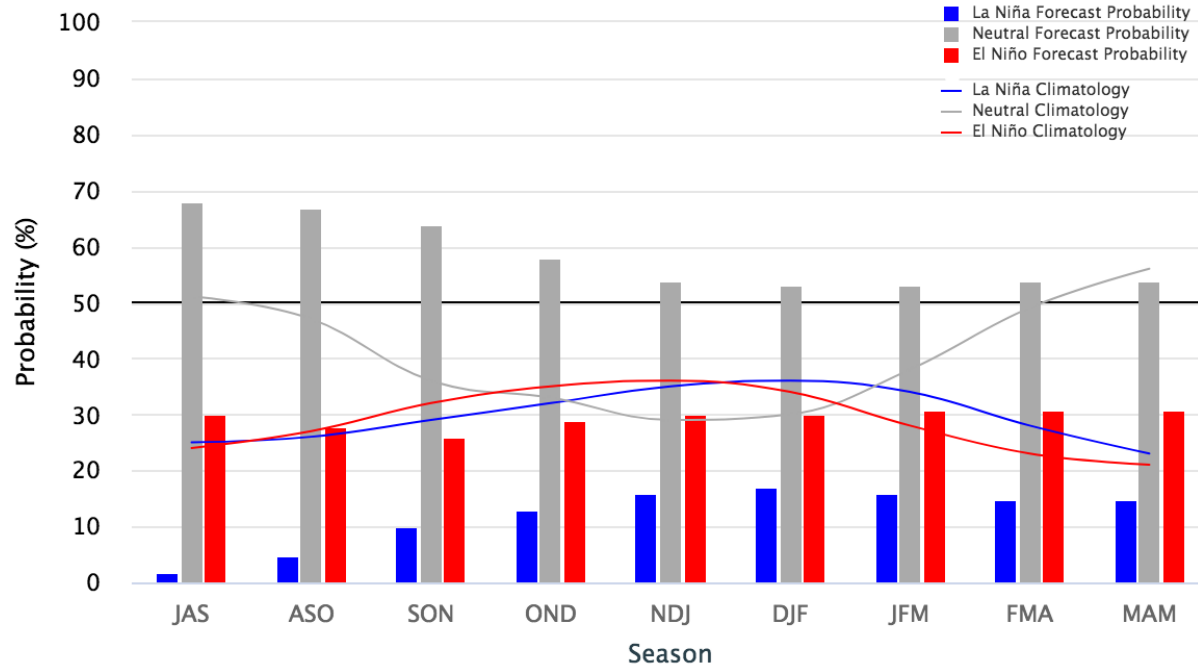
ENSO models are poorest performing in the summer (when ENSO is typically weak – so less for models to initialize)

**Neutral** (neither El Niño nor La Niña) is the most likely scenario through fall and winter. El Niño has more support than La Niña, with a very warm Pacific Ocean

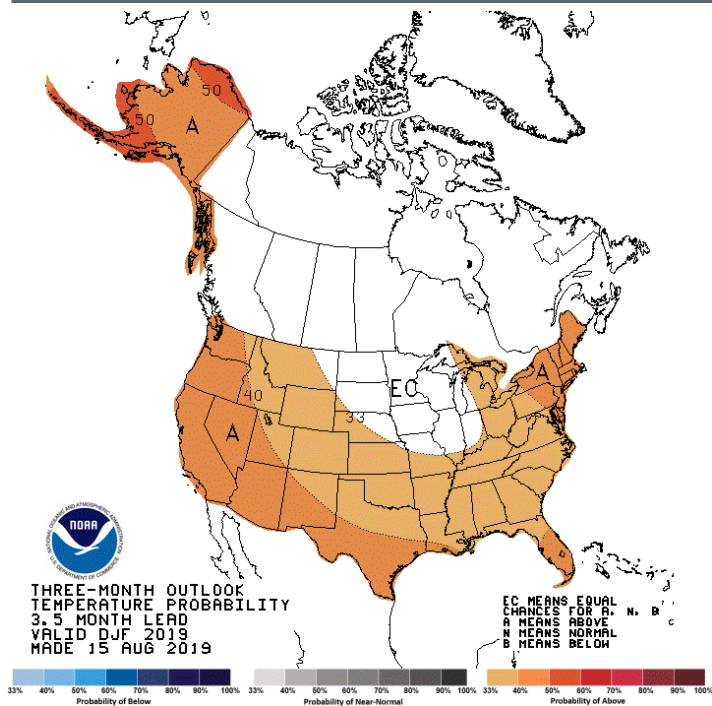
Early-August 2019 CPC/IRI Official Probabilistic ENSO Forecasts

ENSO state based on NINO3.4 SST Anomaly

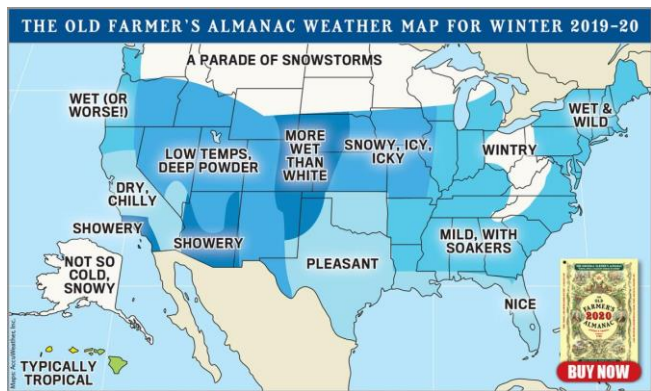
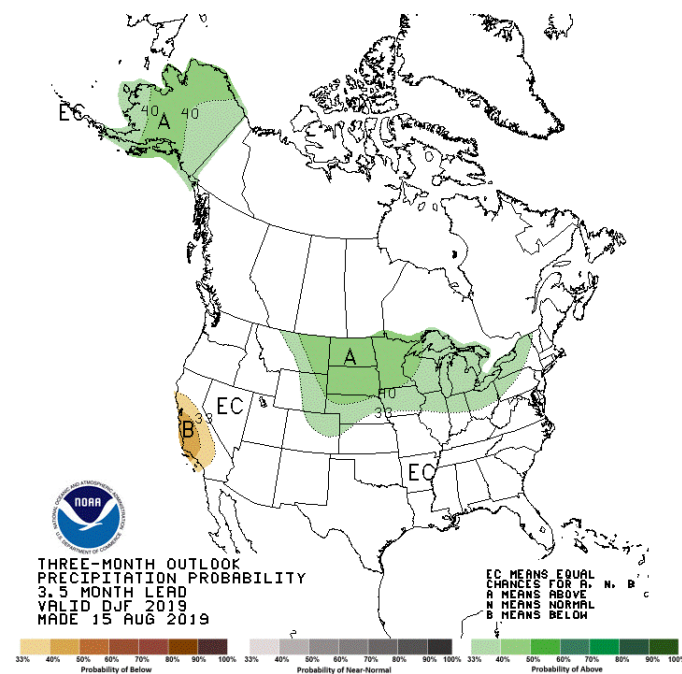
Neutral ENSO:  $-0.5^{\circ}\text{C}$  to  $0.5^{\circ}\text{C}$



# Other Winter Outlooks Currently Available



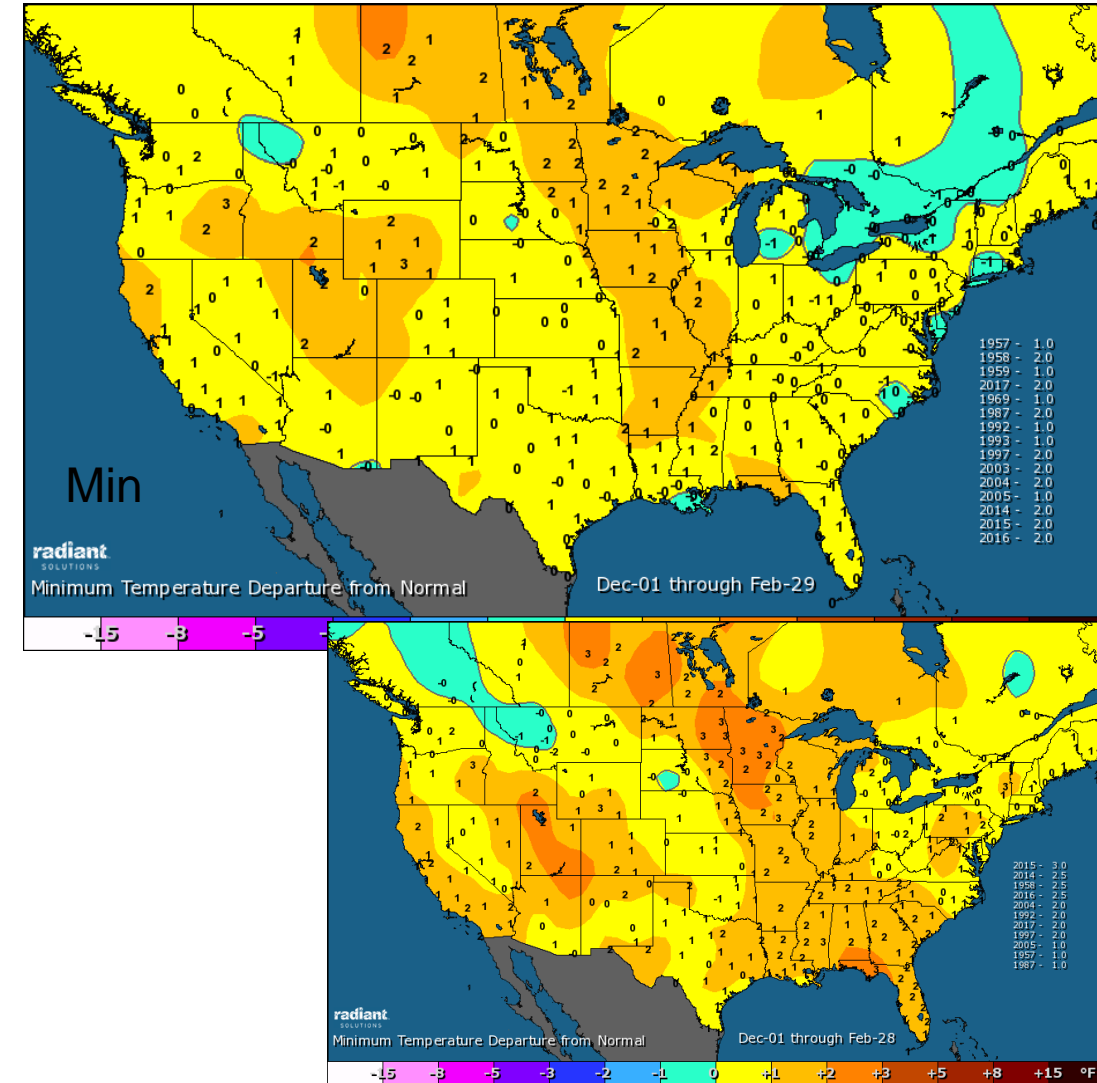
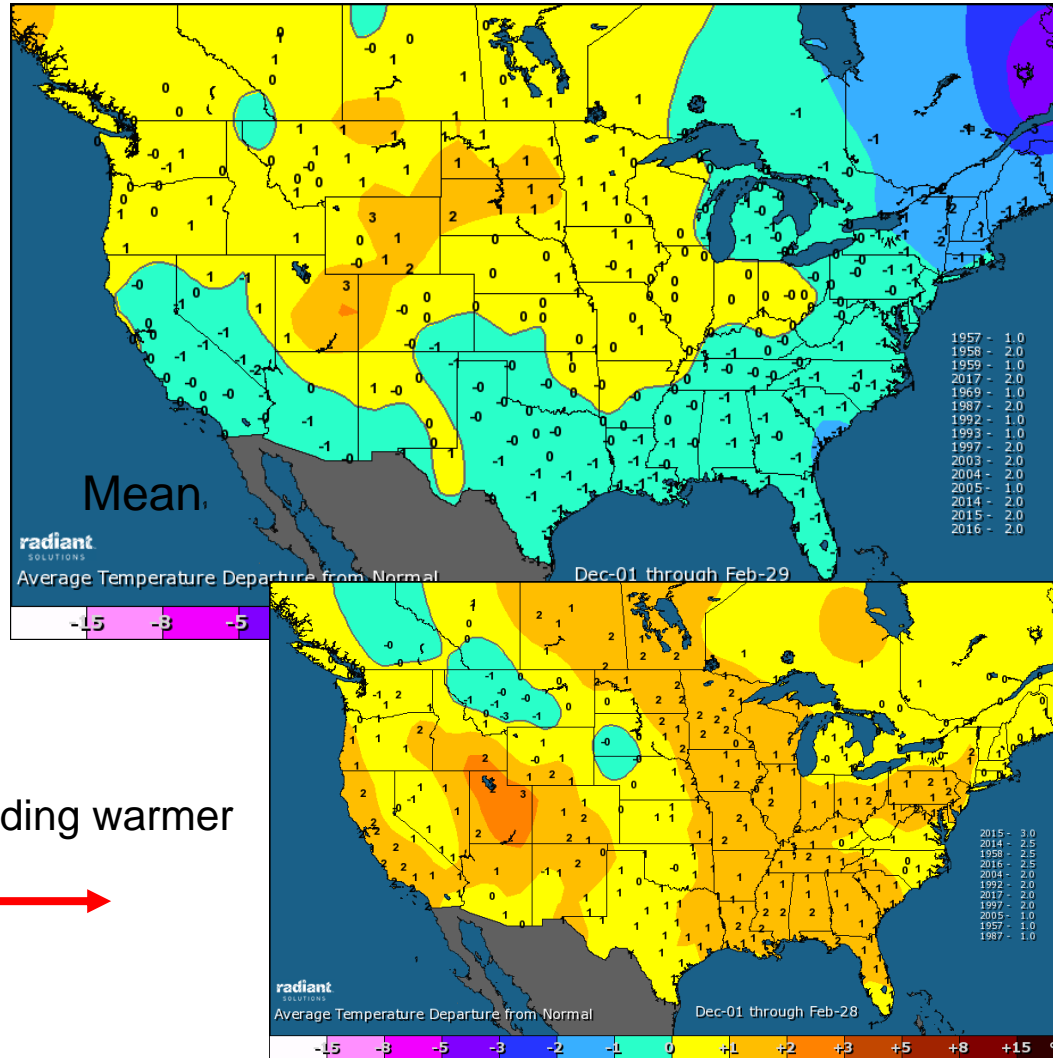
(All based on 30-year normal)





# Preliminary Winter 2019-20 Temperature Outlook

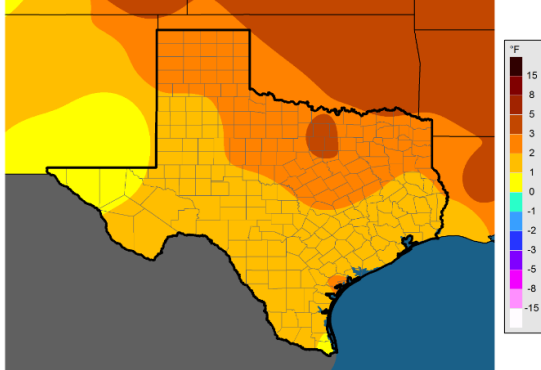
Analog weighted consensus:





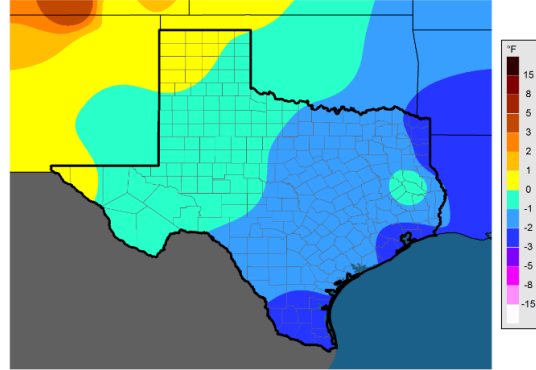
# Historical Matches (Analog)

Average Temperature (°F) Departure from 20151201 to 20160228 - Fifteen Year Average

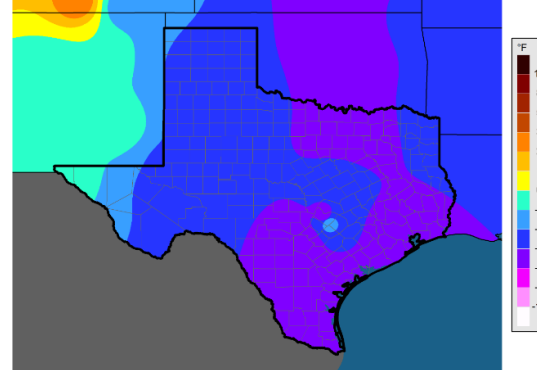


2015-16 (116<sup>th</sup>/106<sup>th</sup> coldest) 2014-15 (67<sup>th</sup>/101<sup>st</sup>)

Average Temperature (°F) Departure from 20141201 to 20150228 - Fifteen Year Average

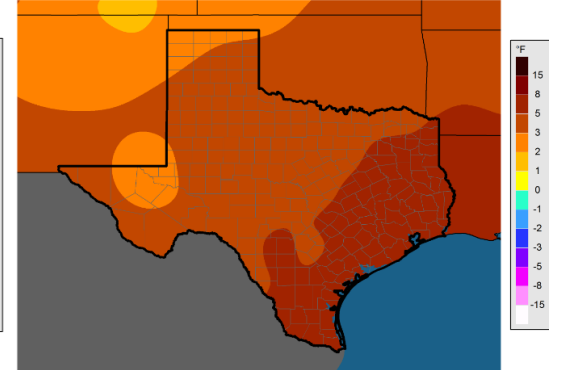


Average Temperature (°F) Departure from 19581201 to 19590228 - Fifteen Year Average



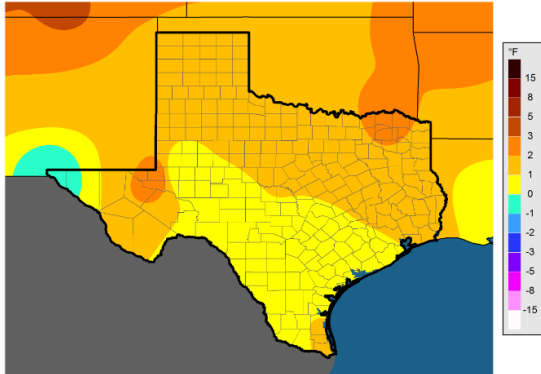
1958-59 (35<sup>th</sup>/22<sup>nd</sup>)

Average Temperature (°F) Departure from 20161201 to 20170228 - Fifteen Year Average



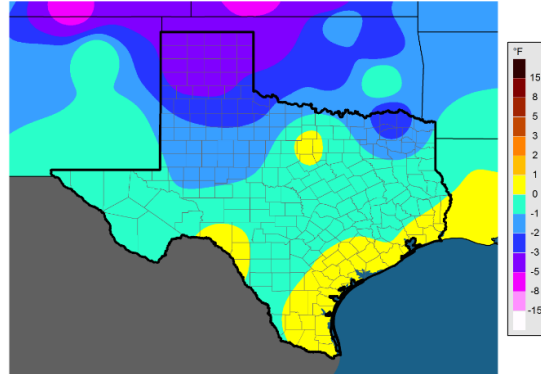
2016-17 (124<sup>th</sup>/124<sup>th</sup>)

Average Temperature (°F) Departure from 20041201 to 20050228 - Fifteen Year Average



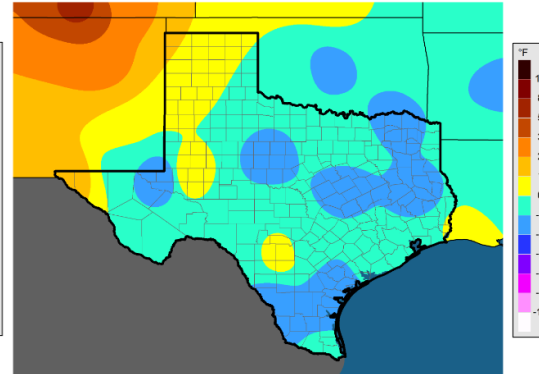
2004-05 (107<sup>th</sup>/119<sup>th</sup>)

Average Temperature (°F) Departure from 19921201 to 19930228 - Fifteen Year Average



1992-93 (71<sup>st</sup>/101<sup>st</sup>)

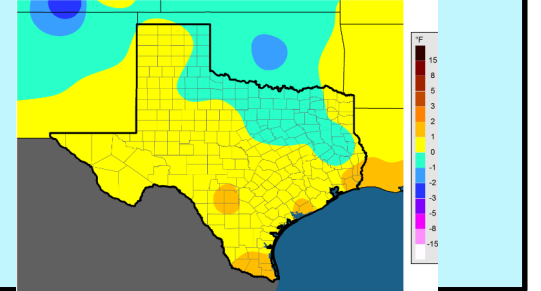
Average Temperature (°F) Departure from 20171201 to 20180228 - Fifteen Year Average



2017-18 (75<sup>th</sup>/67<sup>th</sup>)

Last winter ranked 93<sup>rd</sup>/109<sup>th</sup>  
(mean/min) coldest; this  
winter could be similar.

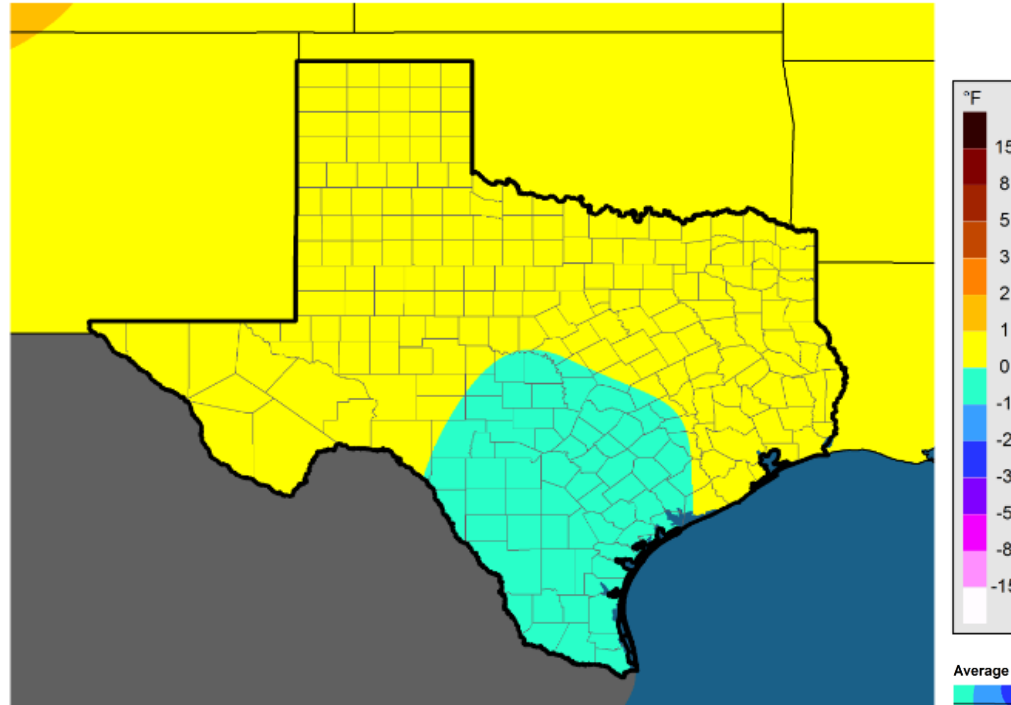
Average Temperature (°F) Departure from 20181201 to 20190228 - Fifteen Year Average



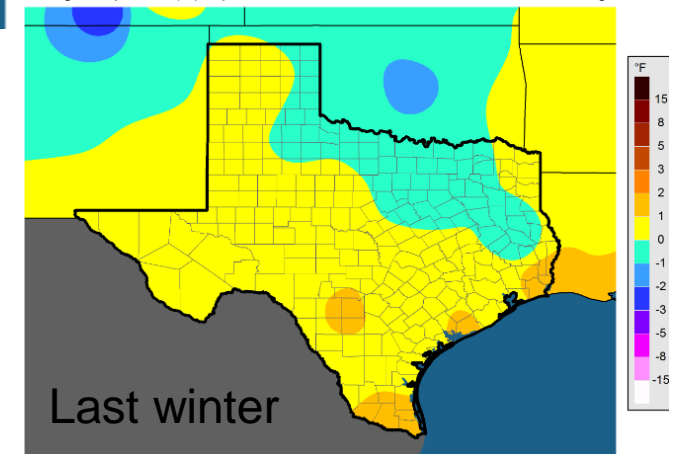
# Preliminary Winter 2019-20 Temperature Outlook

- **Unlikely to see a winter that ranks among the top third coldest** of all-time (2013-14 is the most recent winter that ranked that cold)
- Can't yet rule out a finalized, colder forecast (1987-88), which would be on the cusp of the coldest third and colder than last winter
- Preliminary forecast has been trending warmer/milder
- **Mild winters can – and oftentimes do – have very cold periods!**

Fifteen Year Avg Temperature Anomaly in °F from 1201 to 0228



Average Temperature (°F) Departure from 20181201 to 20190228 - Fifteen Year Average



# Precipitation Ranking of Recent Winters (Texas)

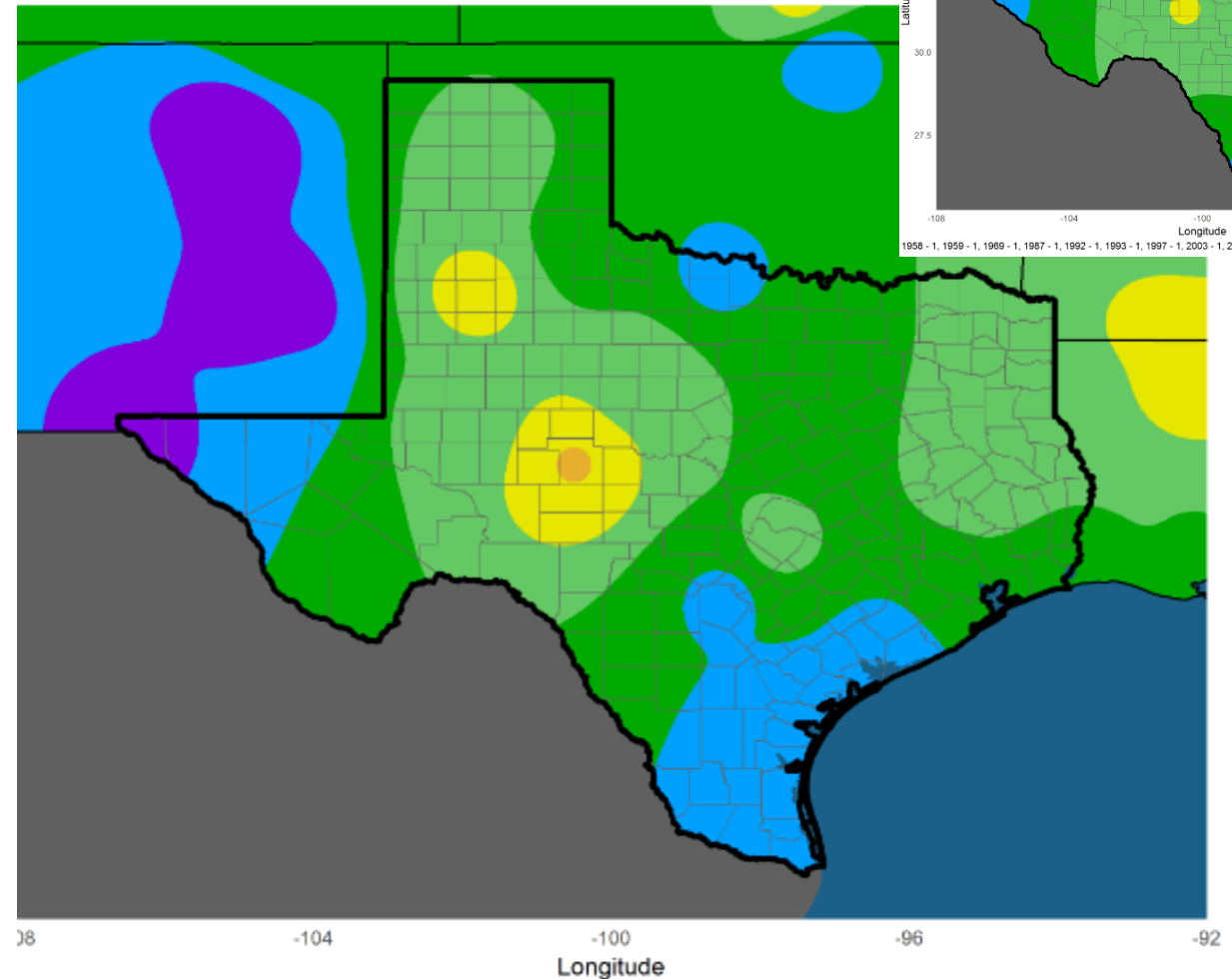
2018-19	<b>87<sup>th</sup> driest (out of 124)</b>
2017-18	71 <sup>st</sup>
<b>2016-17</b>	<b>94<sup>th</sup></b>
2015-16	56 <sup>th</sup>
2014-15	70 <sup>th</sup>
<b>2013-14</b>	<b>11<sup>th</sup></b>
2012-13	60 <sup>th</sup>
<b>2011-12</b>	<b>114<sup>th</sup></b>
<b>2010-11</b>	<b>17<sup>th</sup></b>
<b>2009-10</b>	<b>113<sup>th</sup></b>
<b>2008-09</b>	<b>1<sup>st</sup> driest</b>

Last dry winter was 2013-14 (during long-term drought)

# Winter 2019-20 Precipitation Outlook

- We are still in a pattern that supports wet winters over dry
- I wouldn't expect widespread, severe drought conditions to continue to expand and intensify late in the year and extend into the start of 2020 (even given the current summertime drier conditions)

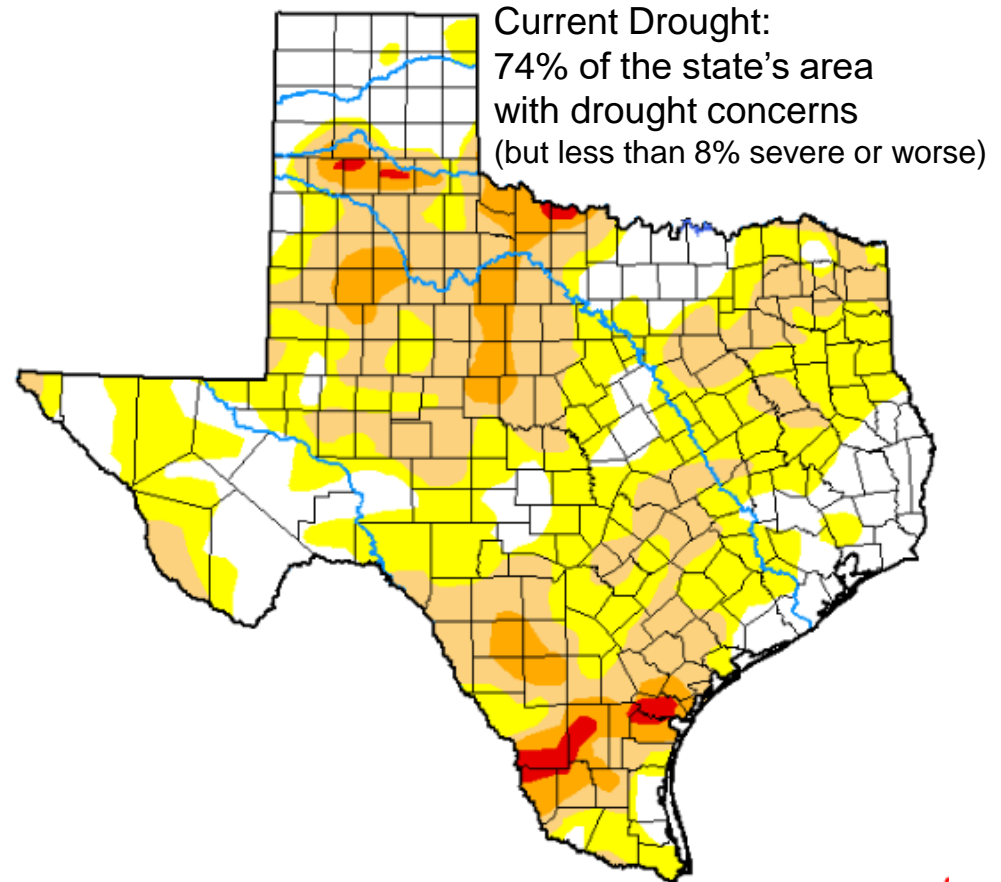
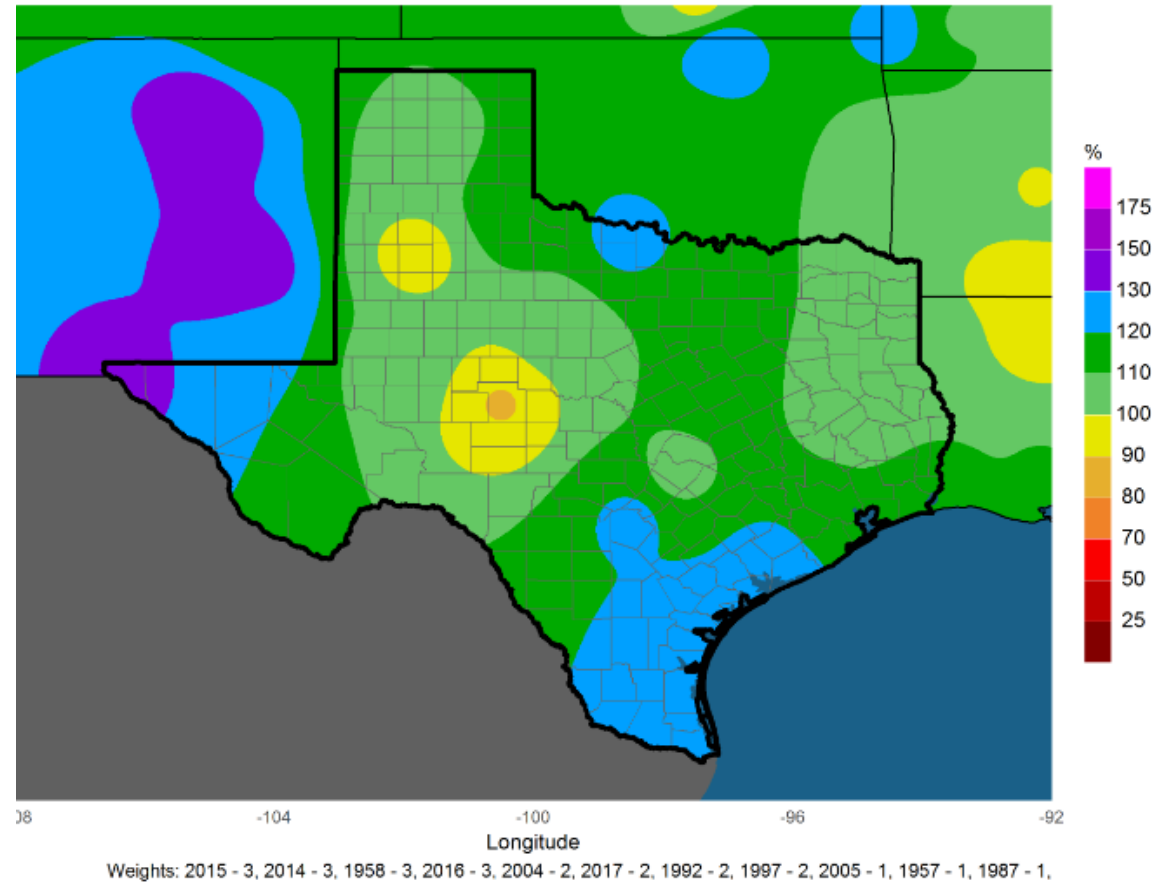
Fifteen Year Precip Temperature Anomaly in °F from 1201 to 022



Weights: 2015 - 3, 2014 - 3, 1958 - 3, 2016 - 3, 2004 - 2, 2017 - 2, 1992 - 2, 1997 - 2, 2005 - 1, 1957 - 1, 1987 - 1,

# Winter 2019-20 Precipitation Outlook vs Drought

Fifteen Year Precip Temperature Anomaly in °F from 1201 to 0228



General improvements to drought are expected late in 2019, early in 2020

# Winter Weather Outlook Summary

- This is preliminary. The winter forecast will be finalized by November
- At this time, mixed messages if this coming winter will be warmer or colder than last winter – but current forecast trend is warmer
- The 2019-20 winter is most likely to either fall in the warmest third or middle third of winter rankings. Least likely is the coldest third
- Current pattern supports daytime high temperatures to be more anomalously cold than nighttime/morning low temperatures
- Continued opportunities for a relatively wet pattern with decreasing drought concerns
- **Even the mildest/warmest winters are capable of producing a period of extreme to record breaking cold.** Winter is a much more volatile weather pattern than the summer season. Extreme cold can only be forecast in the shorter-term – not long-range, several month out forecasts

