TEXAS SEASONAL OUTLOOK
WINTER/SPRING
2020/2021

Texas A&M Forest Service
Predictive Services

Prepared
November 11th 2020

TEXAS A&M FOREST SERVICE

A Discussion of Dormant Season Wildland Fire Potential

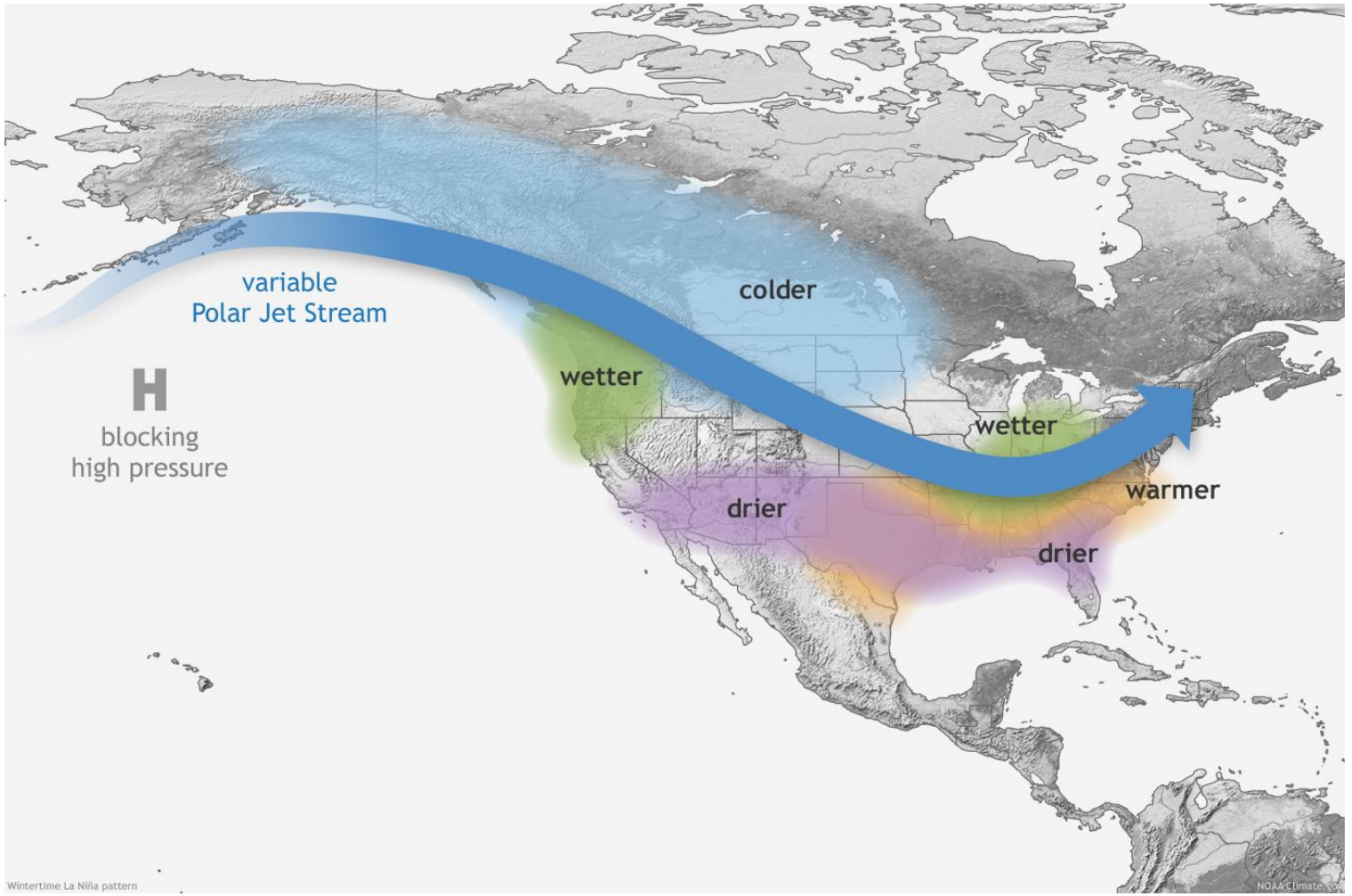
Dormant Season Fire Potential Considerations

- **Seasonal Temperature and Precipitation Trends**
  - El Nino Southern Oscillation (ENSO)
- **Drought Trends**
  - Emerging, Persistent or Improving
- **Fine Fuel Condition**
  - Grass Production or Loading in Grass Dominant Regions
- **Risk of High Impact Fire Weather**
  - Southern Plains Wildfire Outbreak (SPWO)

La Niña Advisory Issued November 12th 2020

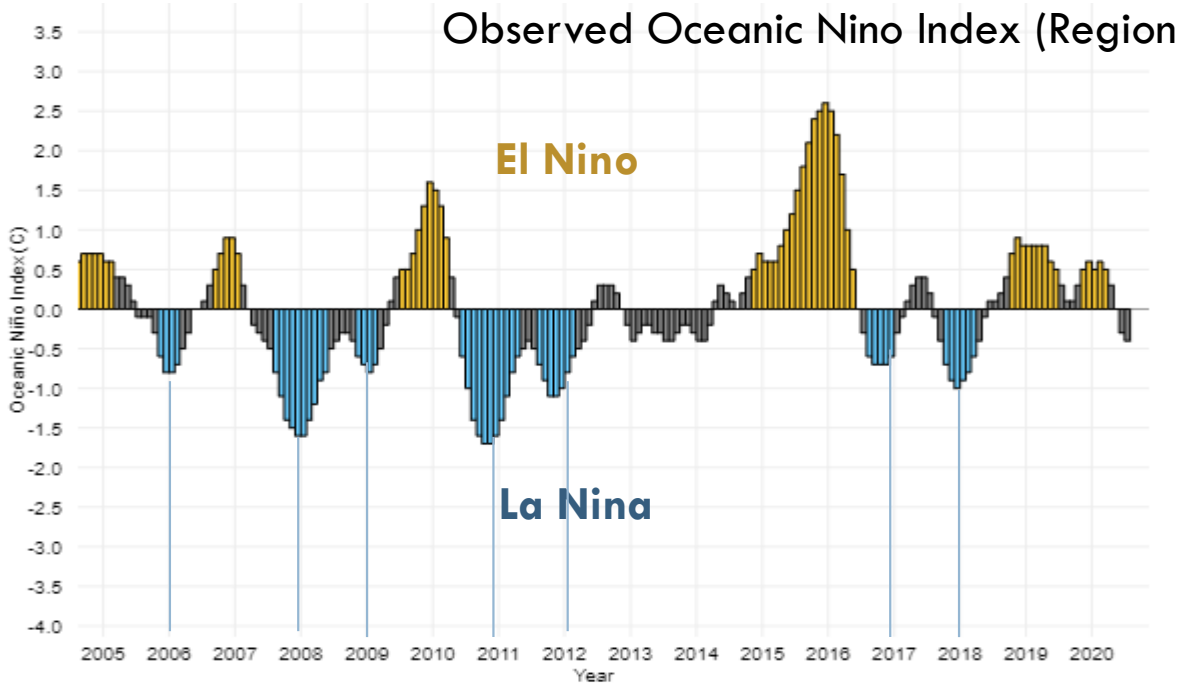
The Climate Prediction Center (CPC) issued a La Niña advisory on November 12th . An Advisory means La Niña conditions are present and likely to continue. CPC states "*La Niña is likely to continue through the Northern Hemisphere winter 2020-21 (~95% chance January-March) and into spring 2021 (~65% chance during March-May)*".

La Niña conditions historically translate into warmer than normal and drier than normal conditions for Texas during the winter and spring fire season. La Niña conditions also increase the chance of experiencing high impact fire weather events that produce Southern Plains Wildfire Outbreaks (SPWO)



ENSO (El Niño Southern Oscillation)

What define El Nino and La Nina conditions

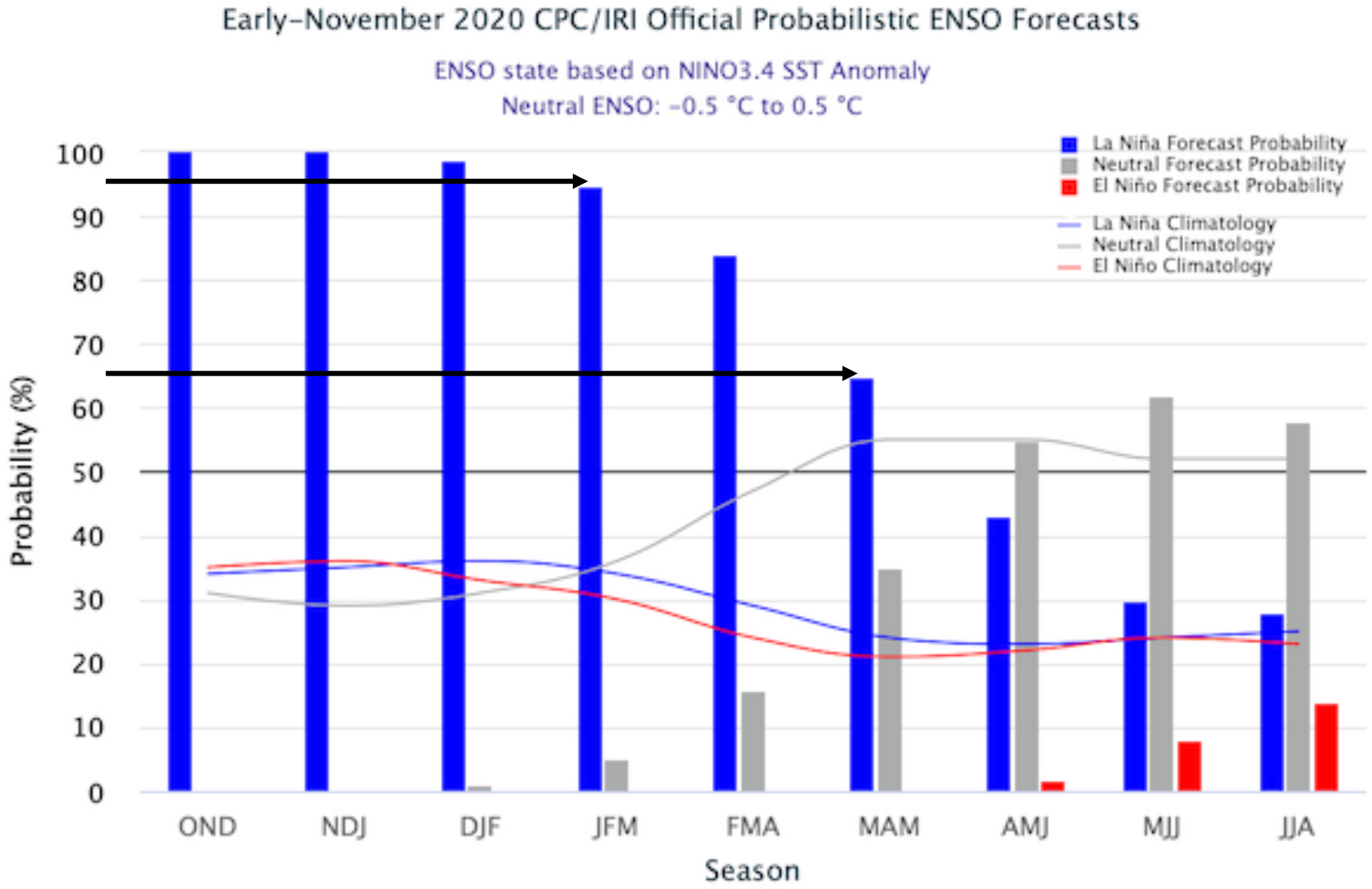


Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
2010	1.5	1.3	0.9	0.4	-0.1	-0.6	-1.0	-1.4	-1.6	-1.7	-1.7	-1.6
2011	-1.4	-1.1	-0.8	-0.6	-0.5	-0.4	-0.5	-0.7	-0.9	-1.1	-1.1	-1.0
2012	-0.8	-0.6	-0.5	-0.4	-0.2	0.1	0.3	0.3	0.3	0.2	0.0	-0.2
2013	-0.4	-0.3	-0.2	-0.2	-0.3	-0.3	-0.4	-0.4	-0.3	-0.2	-0.2	-0.3
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	-1.0
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	0.7	0.6	0.5	0.3	0.1	0.1	0.3	0.5	0.5
Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
2020	0.5	0.6	0.5	0.3	0.0	-0.2	-0.4	-0.6	-0.9			

NOAA Operational Definitions for El Niño and La Niña

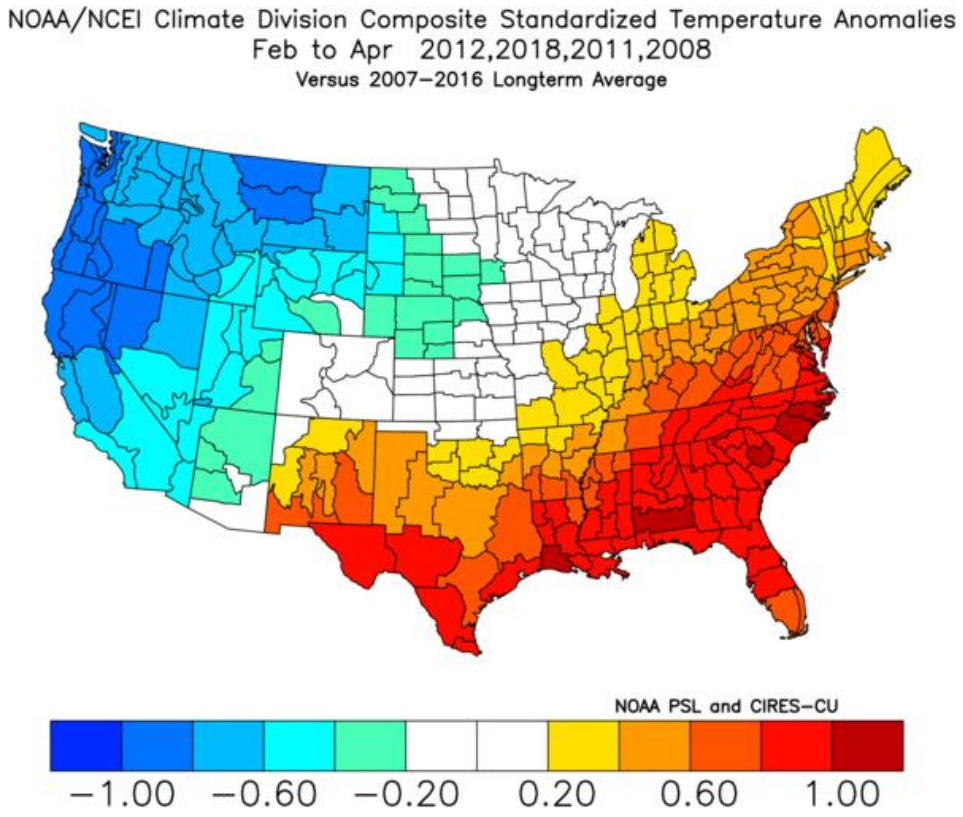
El Niño: characterized by a positive Oceanic Nino Index (Region 3.4) average sea surface temps greater than or equal to +0.5ºC.
La Niña: characterized by a negative Oceanic Nino Index (Region 3.4) average sea surface temps less than or equal to -0.5ºC.

There is an 95% chance for La Nina through March and a 65% chance for La Nina through May.

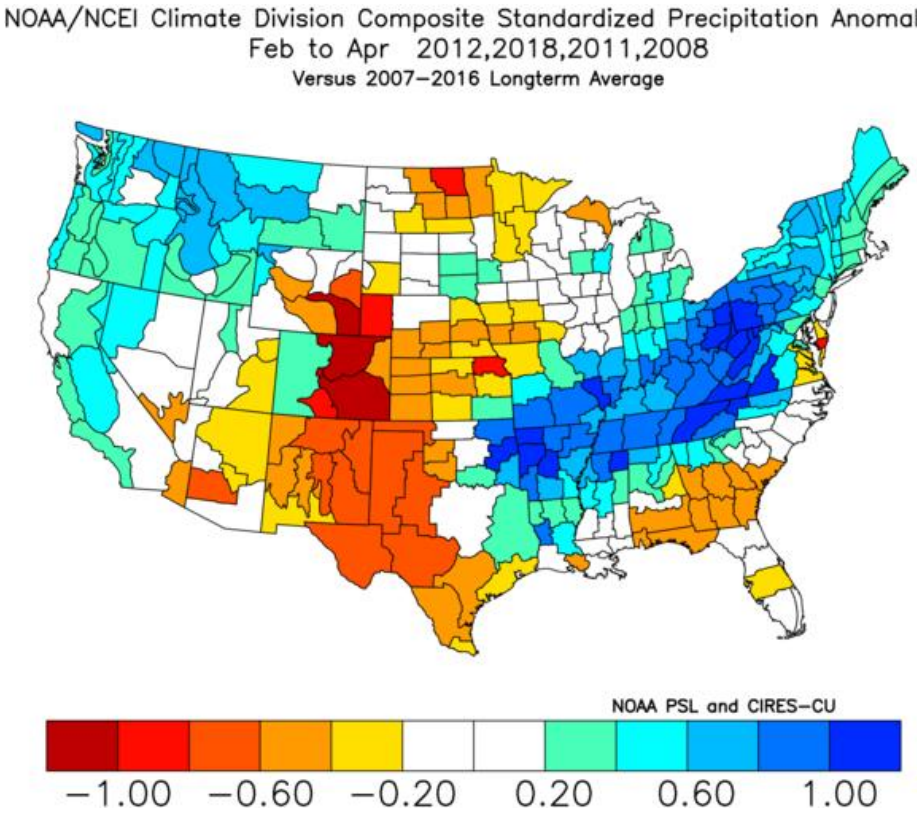


Above normal temperatures and below normal precipitation have been the trend in Texas for past La Nina winter/spring fire seasons.

Temperature

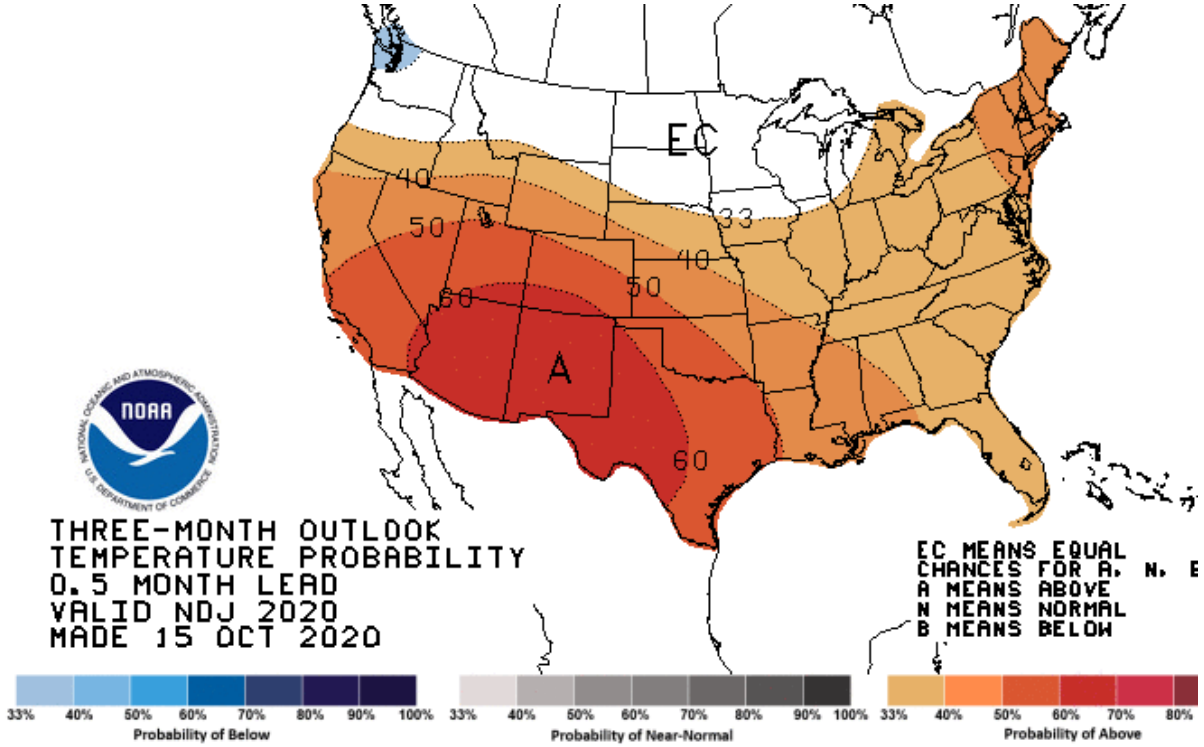


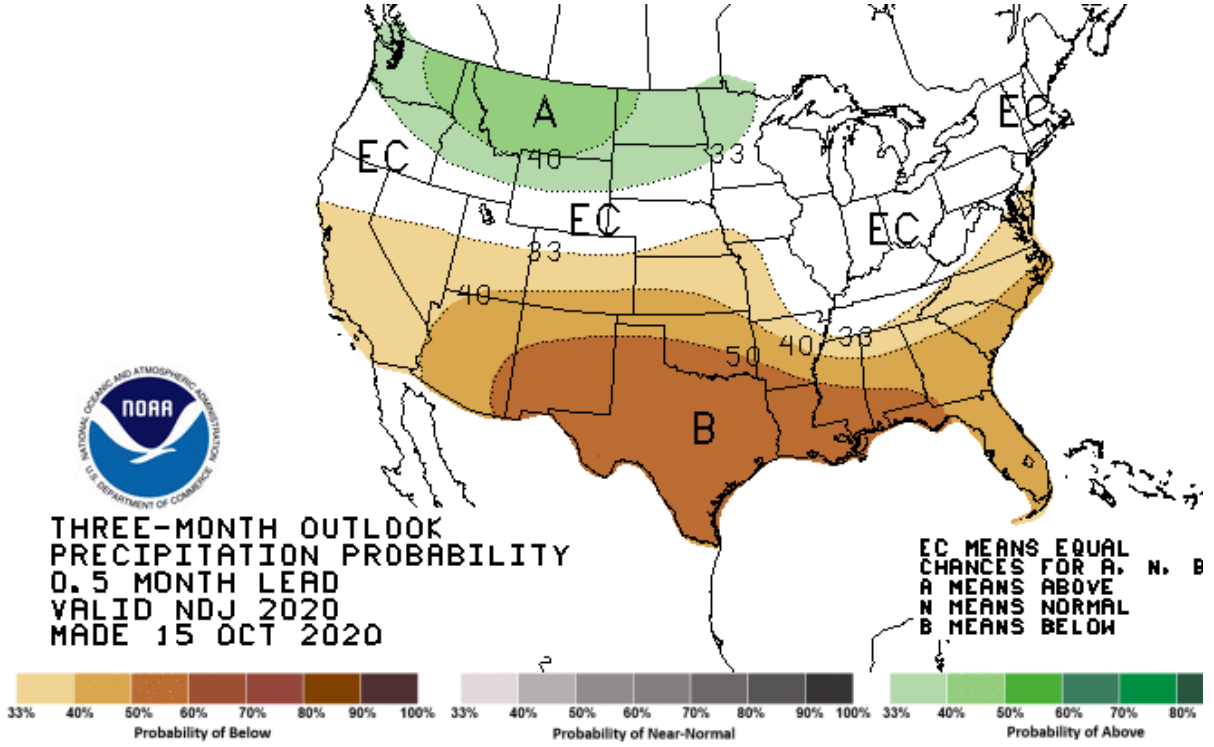
Precipitation



Composite February through April precipitation and temperature anomalies in recent seasons (2008, 2011,2012, and 2018) with moderate to strong La Nina conditions.

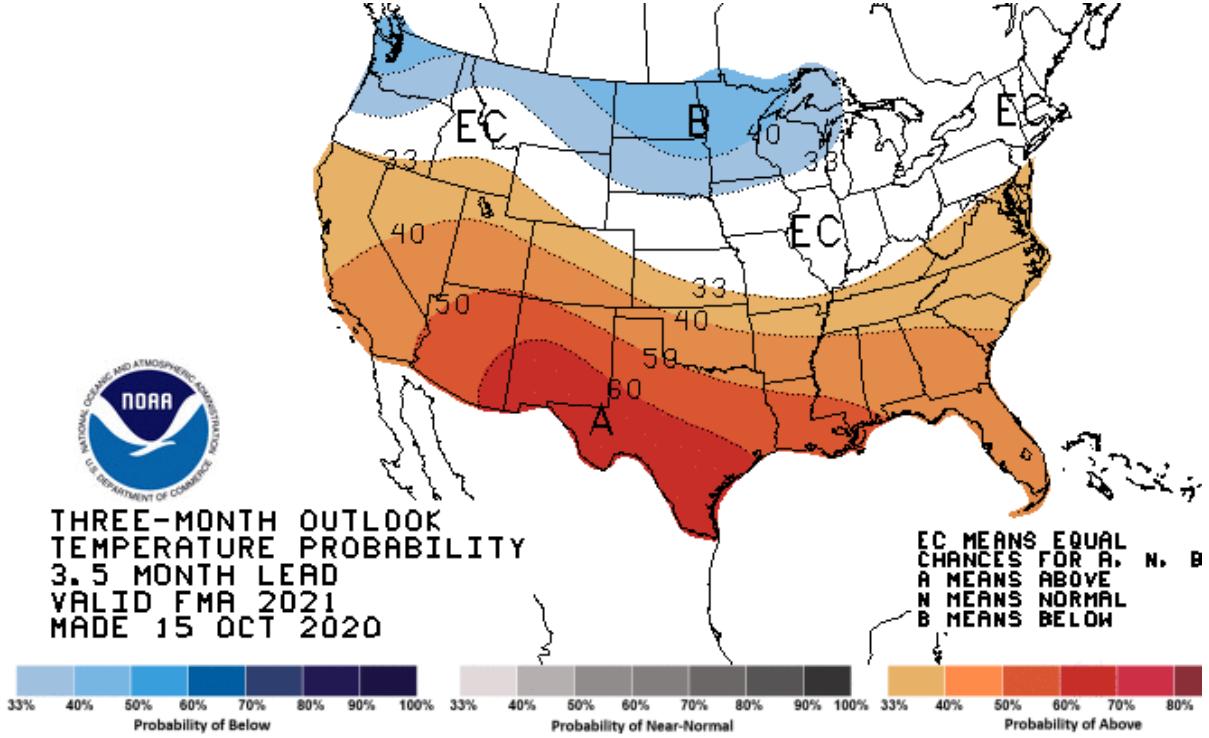
Climate Prediction Center **Temperature and Precipitation Outlook**
November through January

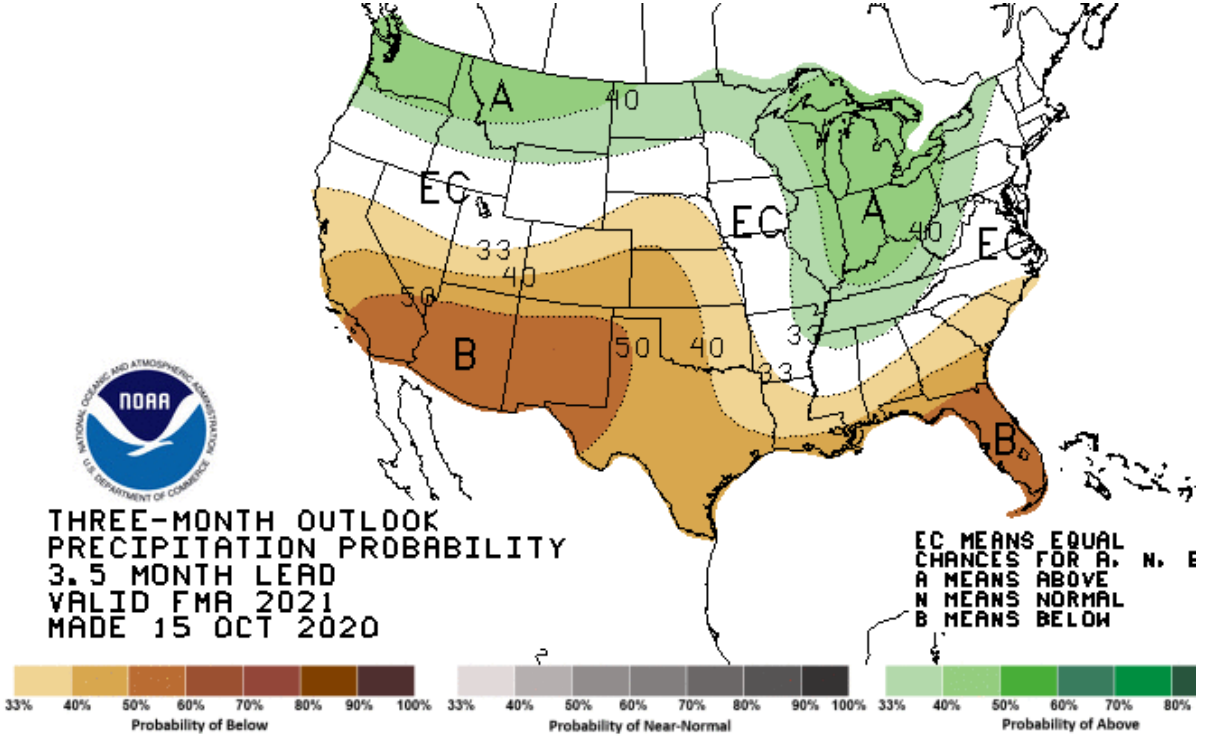




The three month outlook for above normal temperatures and below normal rainfall in Texas is consistent with conditions Texas has experienced in past La Nina winters.

Climate Prediction Center **Temperature and Precipitation Outlook**
February through April





Past La Nina winter/spring fire seasons have experienced above normal temperatures and below normal precipitation. There is no reason to believe Texas will not experience the same for the upcoming 2021 winter/spring fire season.

Seasonal Temperature and Precipitation Discussion

The primary diagnostic measure for the seasonal temperature and precipitation forecast is the current presence of La Nina and the expectation that La Nina conditions will persist through April. Texas has experienced a number of La Nina winter/spring fire seasons. These include 2006, 2008, 2009, 2011, 2012, 2017 and 2018. All experienced notable fire seasons except 2012. 2012 was a second consecutive drought year and followed the record 2011 fire season. Above normal temperatures and below normal rainfall were the trend for the 2012 winter/spring season but the lack of grass fuel loading due to persistent drought and 2011 fire activity is generally noted as the reason for the below normal 2012 fire activity.

The following links provide more information about La Nina and La Nina seasonal weather impacts.

https://oceanservice.noaa.gov/facts/ninonina.html
https://www.pmel.noaa.gov/elnino/lanina-faq
https://www.climate.gov/news-features/blogs/enso/september-2020-enso-update-la-ni%C3%B1a-here

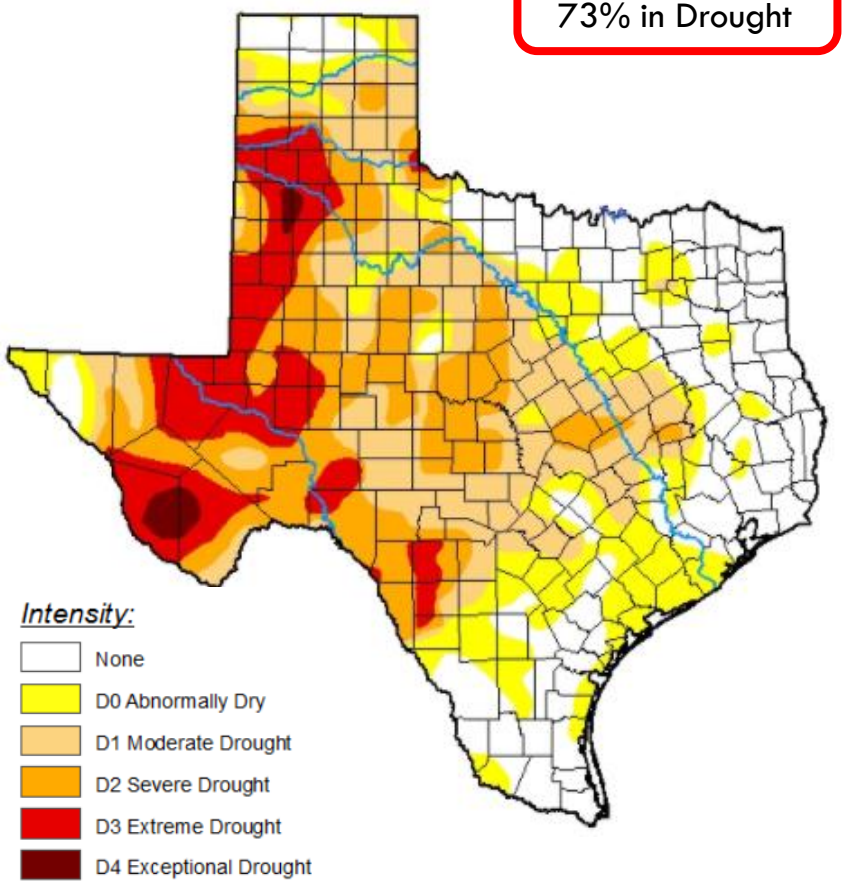
Two multi-day rain events in early September reduced the coverage of drought by 30% in central regions of the state. A dry October (17th driest) has helped reestablish drought in multiple regions of the state. The seasonal forecast for below normal rainfall and above normal temperatures through April make it likely that most, if not all of the state, will experience some level of drought or abnormal dryness by March of 2021.

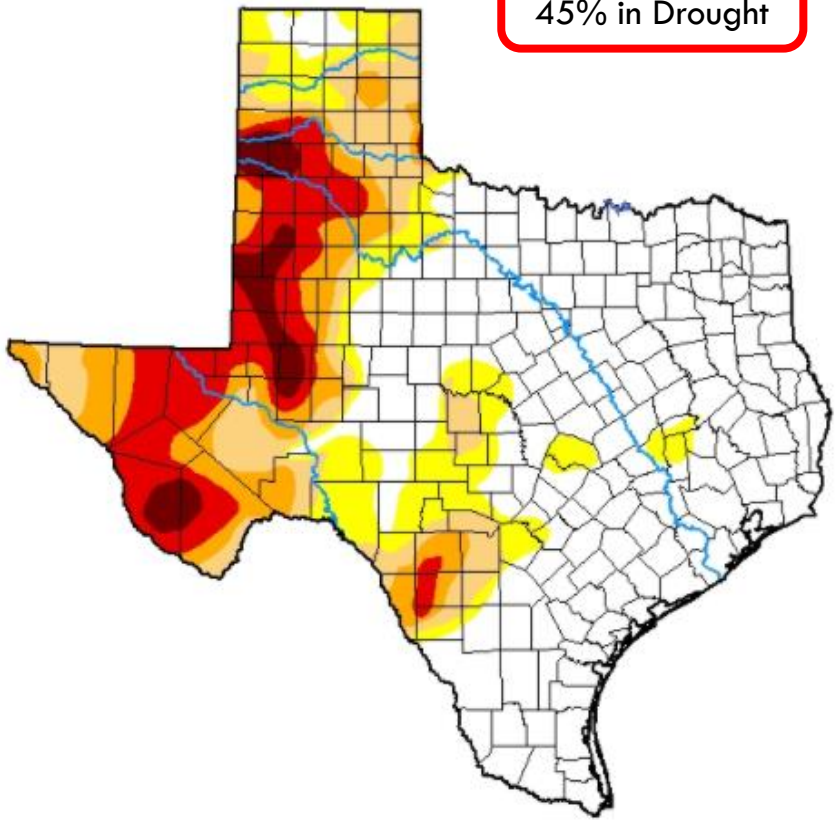
United States Drought Monitor

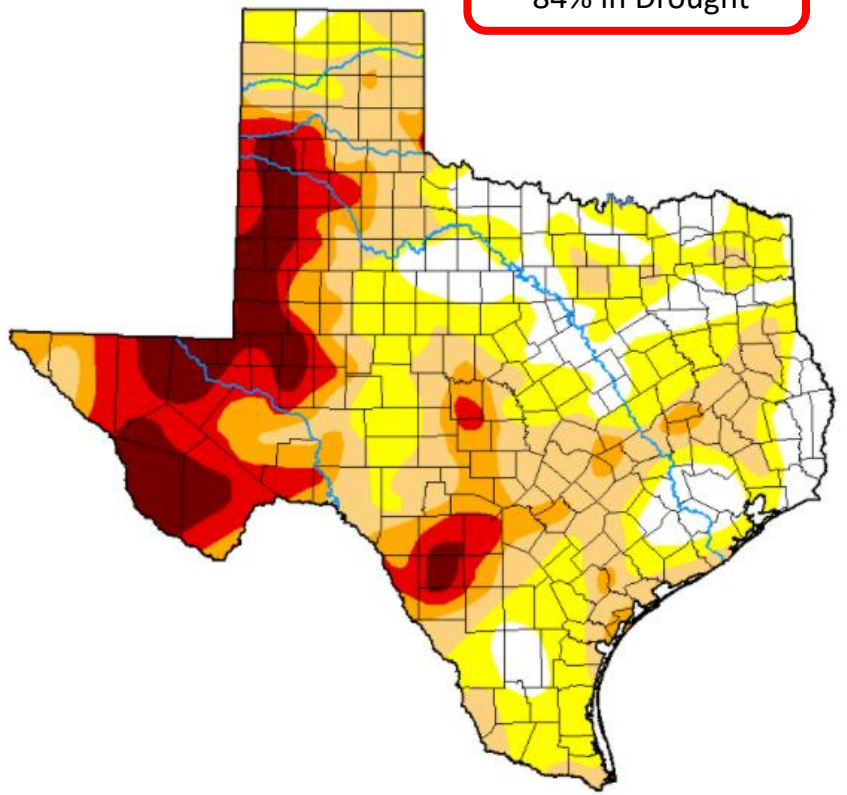
September 1, 2020
73% in Drought

October 6, 2020
45% in Drought

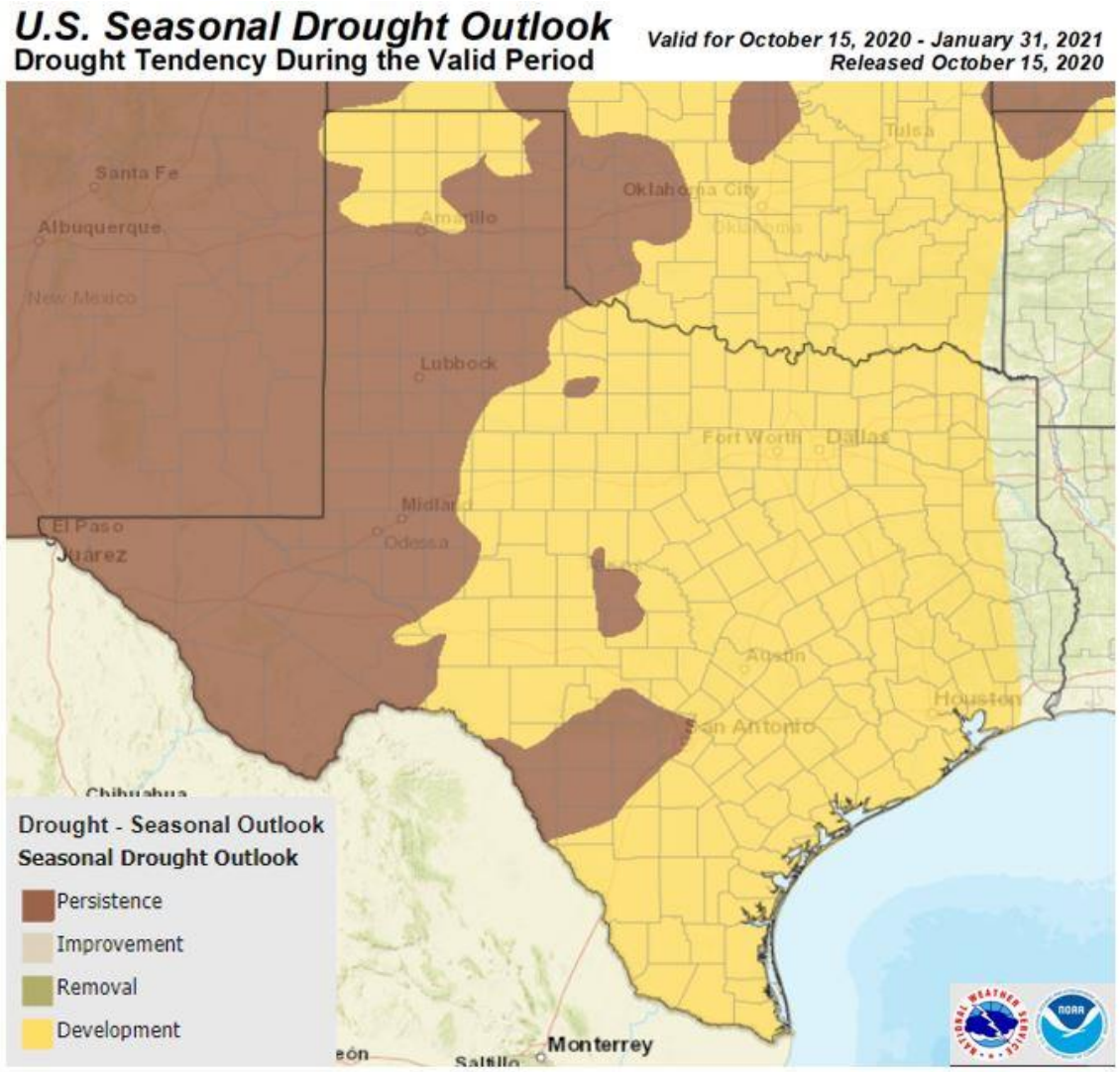
November 12, 2020
84% in Drought







The seasonal drought outlook for October through January indicate drought conditions will persist and expand to include most all of the state.



Expectations are that a large percentage of the state will be experiencing some level of drought or abnormal dryness just prior to the beginning of 2021 peak winter/spring fire season (mid-February to mid-April). There was a significant amount of drought present in Texas during March for 6 of the last 7 La Nina fire seasons according to the U.S Drought Monitor.

- 2006 99%
- 2008 67%
- 2009 100%
- 2011 97%
- 2012 93%
- 2017 35%
- 2018 75%

Percent of the state with some level of drought or abnormal dryness during early March for recent La Nina fire seasons

Drought Discussion

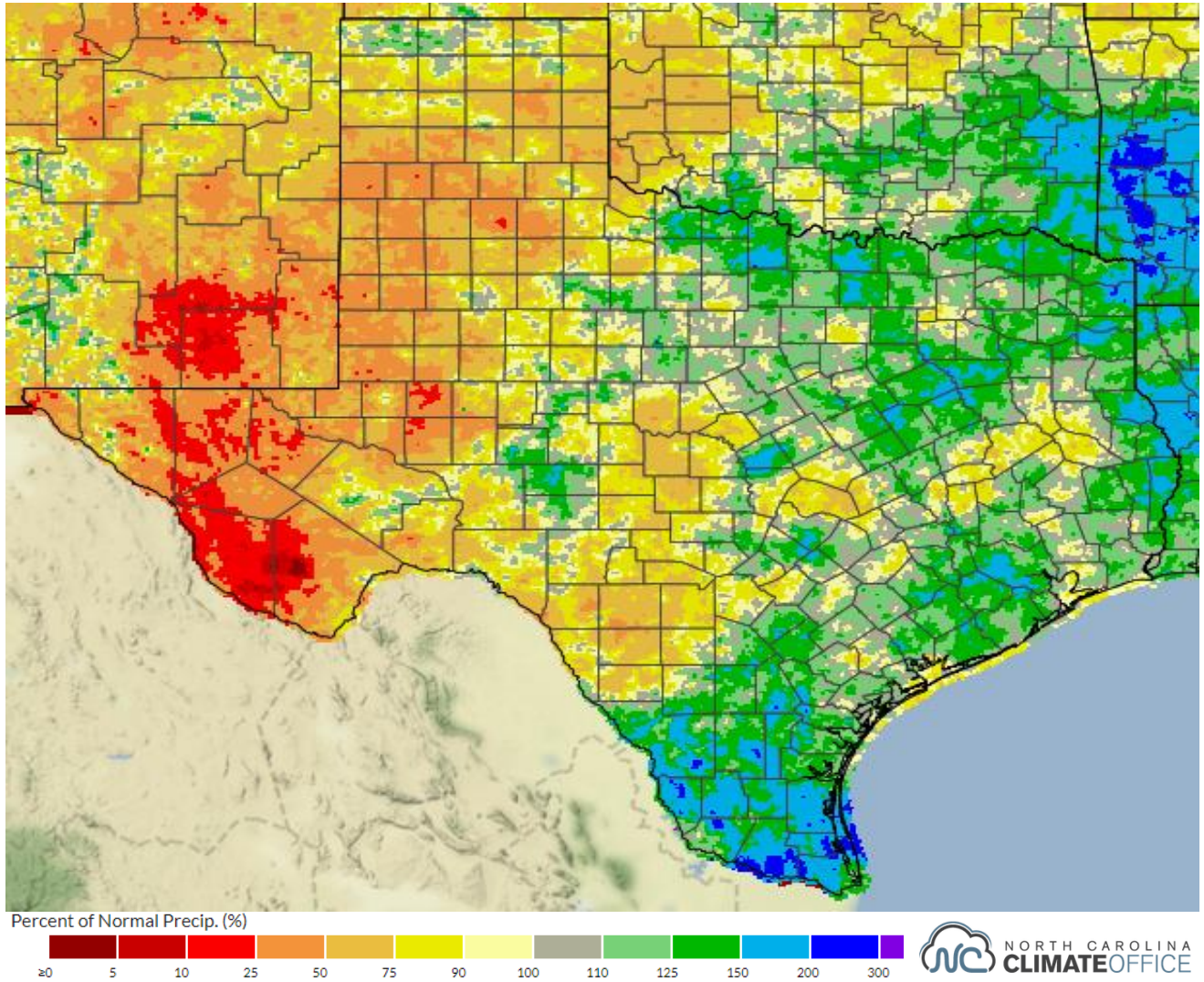
There is general forecast consensus that most if not all of the state will be experiencing some level of drought or abnormal dryness by late winter or early spring of 2021.

Drought implies an increased availability of dead and live fuels that will contribute to combustion. Increased fuel availability will increase fire intensity, increase the rate of spread and generally increase a wildfire's resistance to control.

The expectation of drought across the state in late winter 2021 will set the table for an above normal fire season as we enter the peak of the winter/spring fire season from mid-February through mid-April. In 6 of the past 7 La Nina fire seasons, 65-100% of the state experienced some level of drought or abnormal dryness by mid-March. Drought is not a requirement for significant fire activity but past La Nina fire seasons have shown that drought does enhance the risk of above normal fire occurrence and increases significant fire activity.

2020 Growing Season Percent of Normal Rainfall

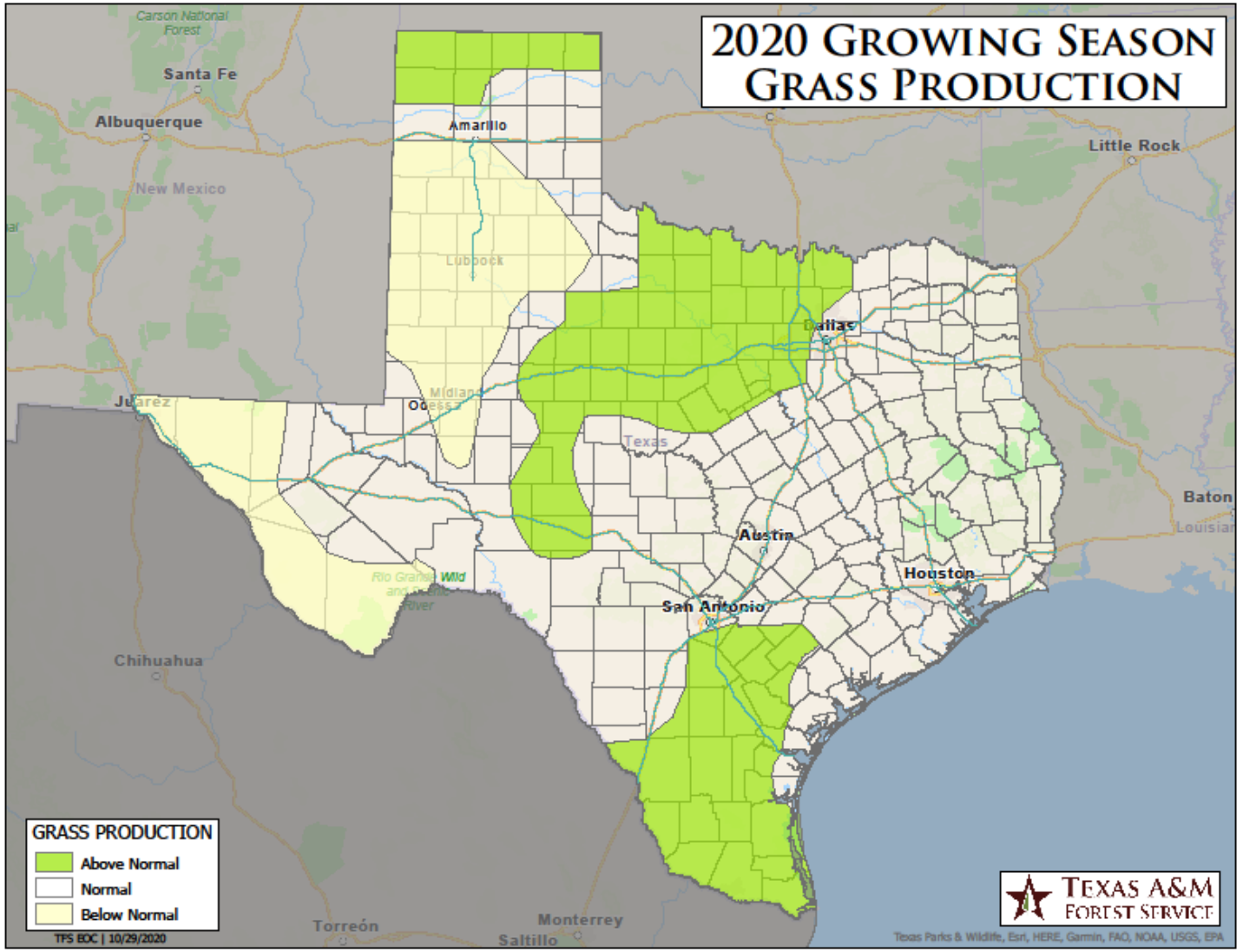
(May through September)



Growing season rainfall provides guidance for grass production for the grass dominant regions in the state. Above normal rainfall can promote above normal grass production. Above normal grass production provides a continuous, robust grass fuel bed that enhances the ignition and spread of wildfires. 2008, 2011, and 2018 supported widespread above normal grass loading.

The 2020 growing season was drier than normal for most of the grass dominant western Plains. Grass production was below normal for much of this region. Grass production has been above normal in north central Texas and a large portion of south Texas. Both regions are vulnerable to increased dormant season fire activity in grass/brush fuel beds during periods of frontal passage activity.

Grass Fuel Loading Based On Grass Production



Normal to below normal grass production and the effects of livestock grazing have reduced the amount of grass for most of the western Plains to below normal. A few counties in the northern High Plains are supporting near normal amounts of grass loading.

Normal to above normal grass loading has been observed in the Rolling Plains and Cross Timbers regions. These grass/brush dominant fuel regions are vulnerable to increased fire activity in prefrontal and post frontal fire environments.

Above normal grass loading has been observed in South Texas. A post frontal fire environment can trigger increased fire activity in high load grasses.

Normal to below normal grass loading is prevalent on the grass dominant Plains this year. Grazing impacts are more prominent due to the absence of late summer grass production.

Grazed compared to ungrazed north of Miami.

Fire backing in near normal grass load in Roberts County

Normal to above normal loading observed in North Central Texas

Above normal loading in Bluestem grass east of Windthorst in Clay County

Above normal loading found in Mineral Wells State Park

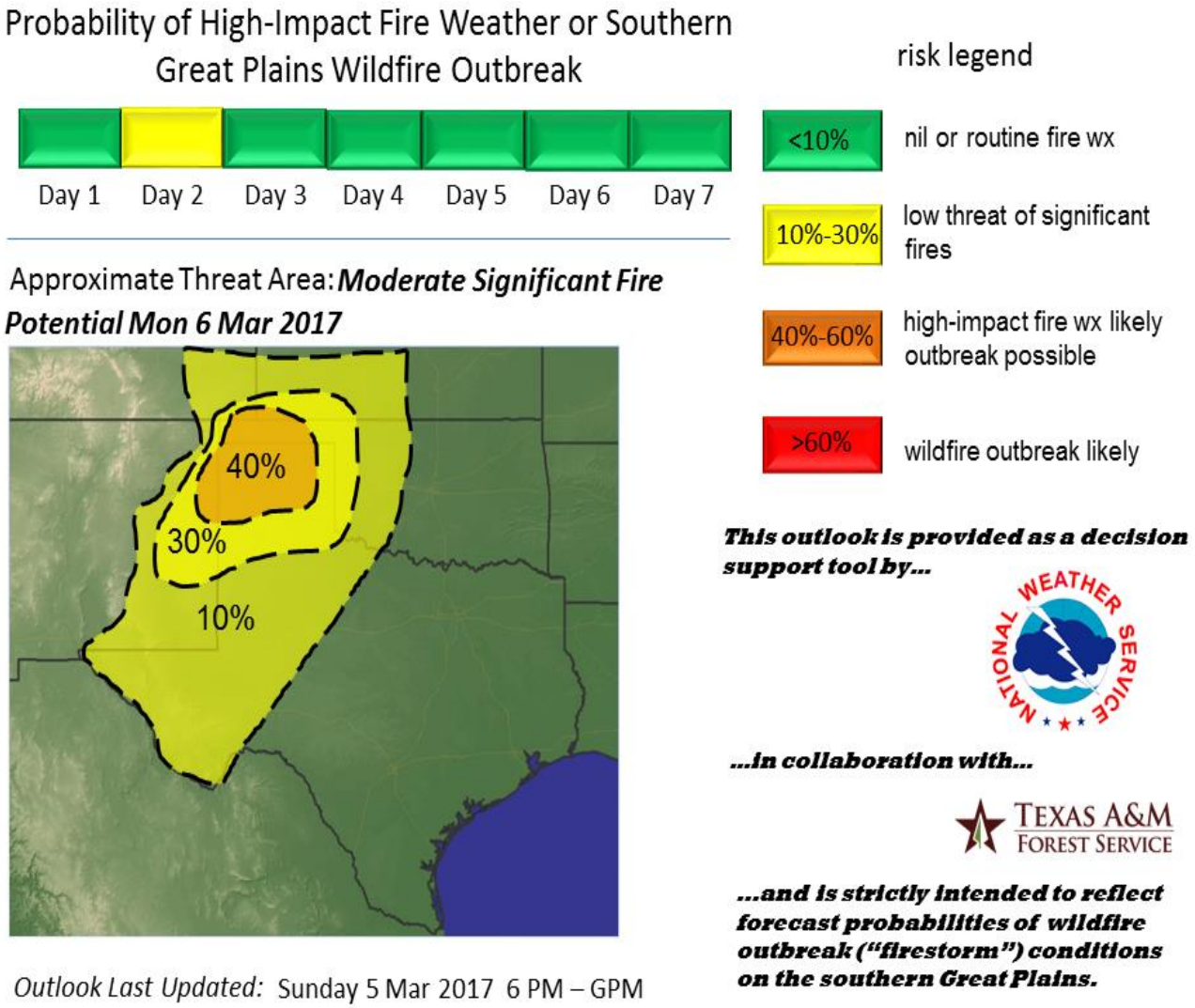
Grass Production and Grass Loading Discussion

Persistent drought and grazing have reduced the grass loading across much of the western Plains. Below normal loading will help to reduce significant fire activity on all but the strongest or high impact fire weather days. High impact fire weather can produce significant fires in below normal grass loading.

North Central Texas received timely rainfall throughout the growing season. This has resulted in above normal grass loading in the grass/brush and grass/timber fuel types found in the region. The risk for increased initial attack activity will be high in this region when moderate fuel dryness (50-75th% ERC) combines with elevated fire weather.

A large portion of south Texas is supporting above normal grass loading. Abundant grasses combined with a post frontal fire environment was the recipe in the winter/spring 2008 fire season for above normal significant fire activity in South Texas. Above normal grass loading and an expectation of increased frontal activity through the winter/spring fire season increases the chances for above normal significant fire activity this season.

High Impact Fire Weather Events

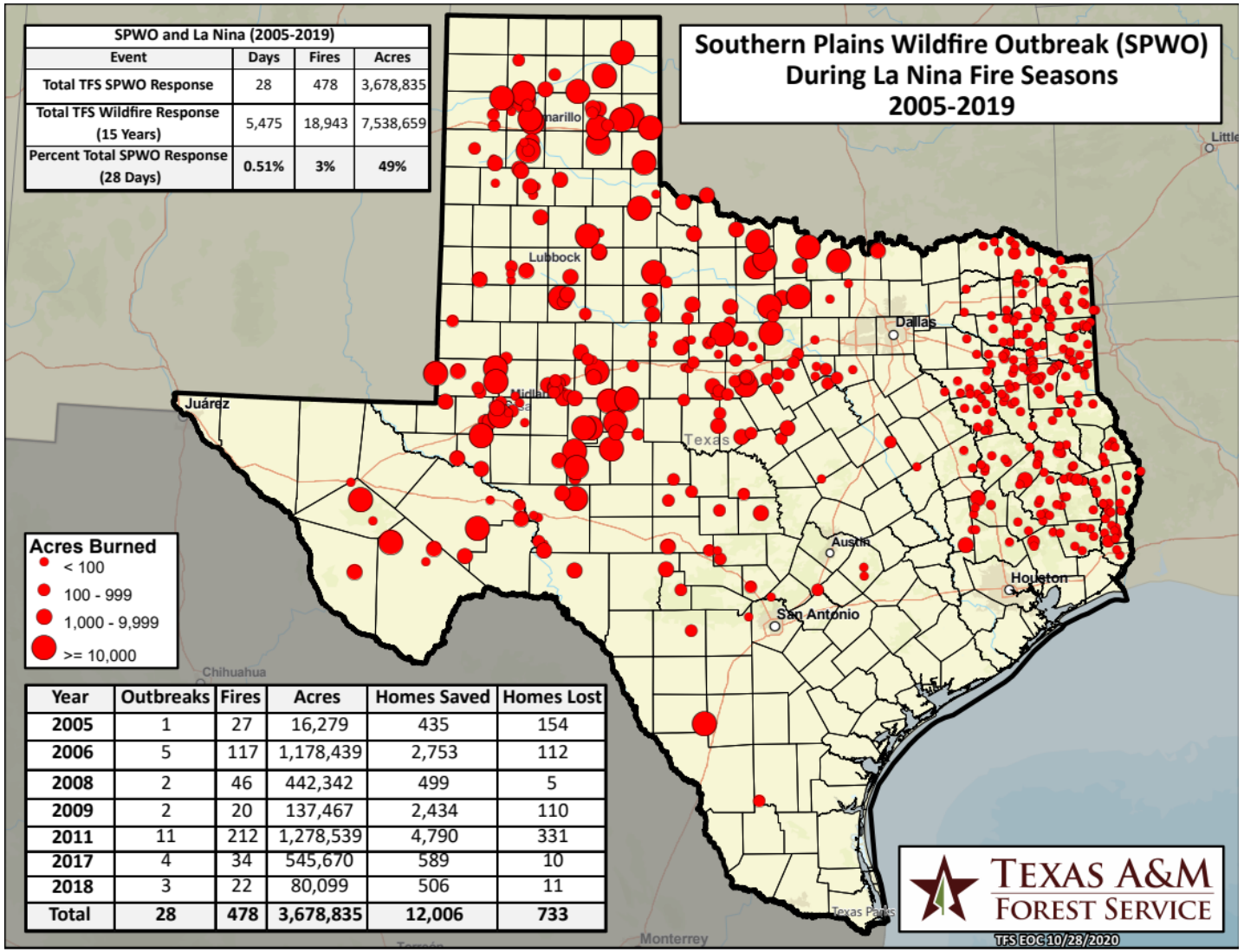


The most famous high impact fire weather event in the United States is the Santa Ana wind event in California. NWS forecasters use pattern recognition to successfully predict when Santa Ana events will occur.

NWS forecasters in the southern Plains also use pattern recognition to predict the location and timing of a high impact fire weather event known as the Southern Plains Wildfire Outbreak (SPWO).

The high impact fire weather forecast shown here was for March 6th 2017. Three significant fires burning just shy of ½ million acres (482,000) occurred in Texas within the 40% area on the forecast map. There was also a complex of fires in NW Oklahoma in the 30% area that burned over 800,000 acres.

Impacts from Southern Plains Wildfire Outbreaks in La Nina Fire Seasons 2005-2019



Southern Plains Wildfire Outbreaks account for 3% of the reported fires but have accounted for 49% of the acres burned from 2005 to 2019.

These large, fast moving, wind driven wildfires can easily outpace suppression efforts to contain them with an average forward speed of 6-7 mph (almost 2 football fields per minute). These outbreak wildfires have been the biggest threat to public safety and property during past winter/spring fire seasons.

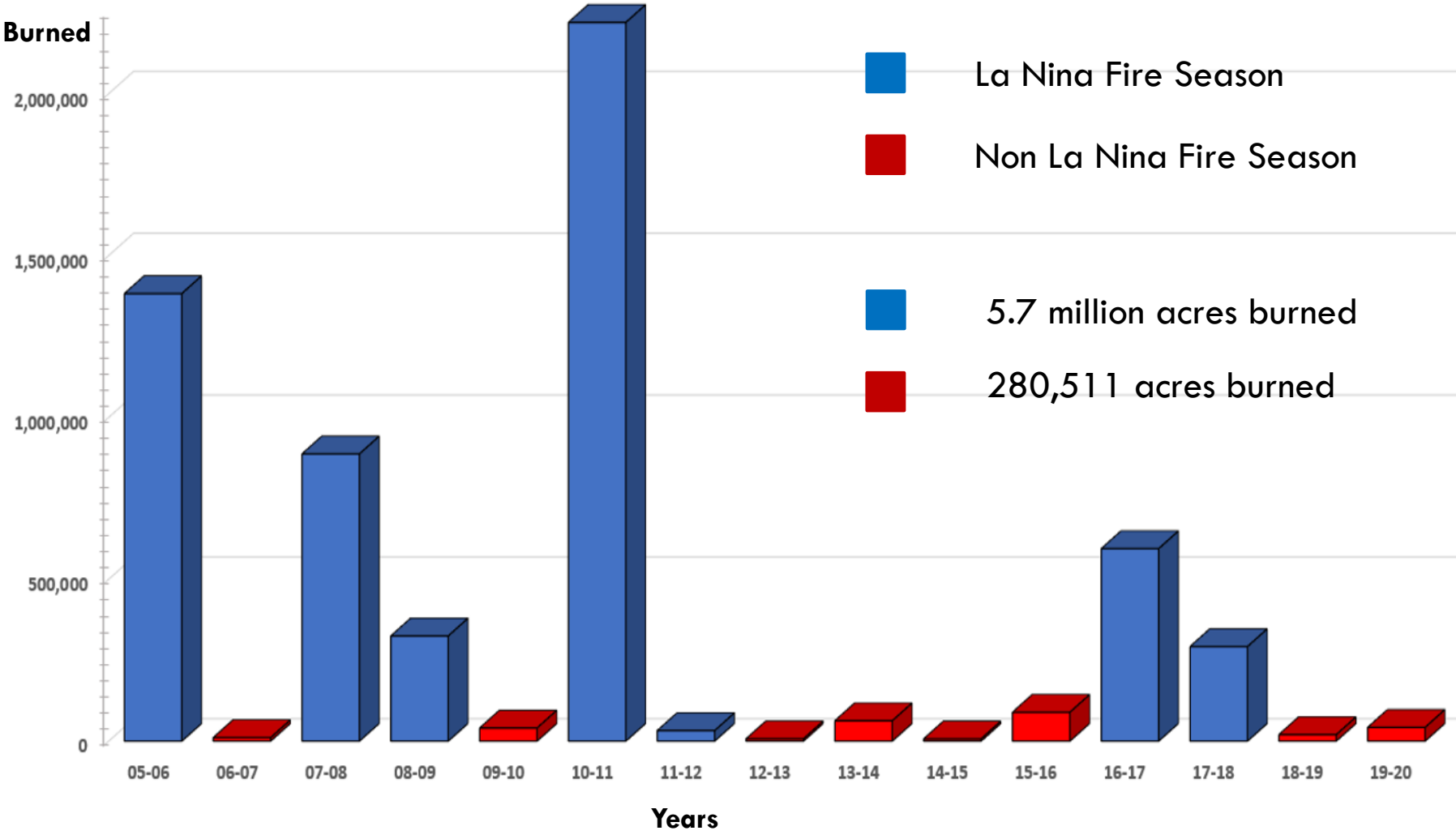
The risk of Southern Plains Wildfire Outbreaks is much greater during La Nina fire seasons.

Acres Burned December Through May from 2005 to 2020

There is a significant contrast in the number of acres burned for La Nina years when compared to non La Nina years.

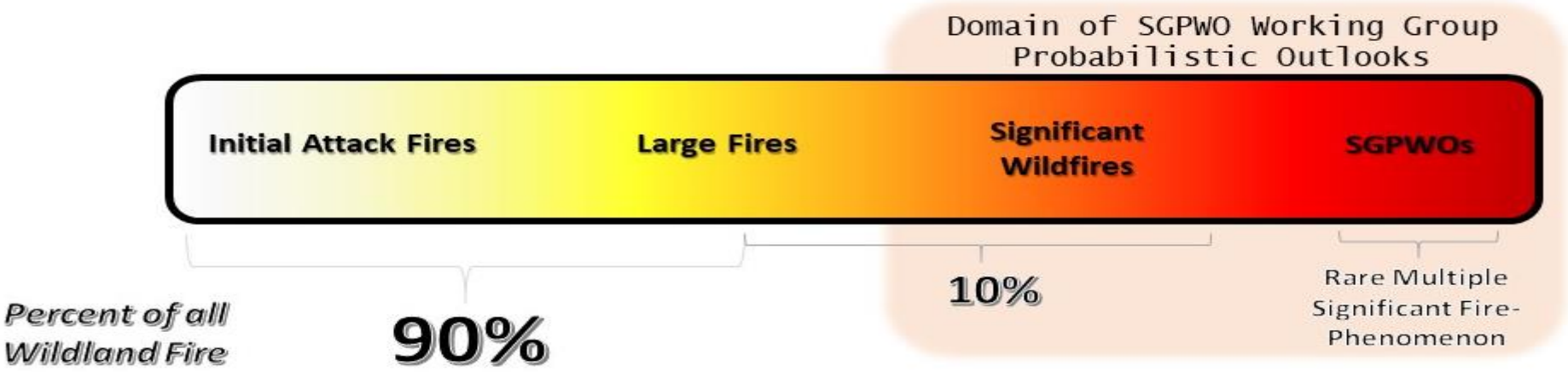
The acres burned in the 8 non La Nina seasons shown here are only 5% of the acres that burned in 7 La Nina seasons.

20 times more acres burned in 7 La Nina years than in the other 8 non La Nina years.



Southern Great Plains Wildfire Outbreak (SGPWO) Working Group

Fire Event Categories Defined & SGPWO Working Group Objective



Fire categories can not be determined strictly by size and are additionally dependent upon a given fire's complexity and resistance to control, which is difficult to quantify. Thus fire size is used here as a poor, but best available, proxy for complexity. Cited fire sizes should not be considered as the sole defining characteristic of any wildfire.

Initial Attack Fire:
- Class A-D (0-299 acres)

Large Fire
- Class E-F (300-4,999 acres)

Significant Wildfire
- Class G-K (5,000-99,999 acres) and/or notable structure loss or casualties

SGPWO:
- 10+ cumulatively burning >10,000 acres (implies high complexity fire behavior)

Special Cases:
- Firestorm: 24+ fires cumulatively burning ≥100,000 acres (implies high complexity fire behavior)
- Megafire: Class L (>100,000 acres)

High Impact Fire Weather Discussion

High impact fire weather that can produce a Southern Plains Wildfire Outbreak has shown the ability to dominate the fire environment. High impact fire weather can overcome below normal grass loading. High impact fire weather can overcome normal fuel moistures to produce significant fires. ERC values at or near the 90th percentile are not required to produce significant fires during a high impact fire weather event.

The worst case scenario is a high impact fire weather event acting on a receptive fire environment that includes critical fuel dryness (ERC values at or above the 90th percentile) and underlying drought. This describes a fire environment that can support a high end Southern Plains Wildfire Outbreak or what the Southern Great Plains Wildfire Working Group defined as a firestorm.

For more information regarding Southern Plains Wildfire Outbreaks please see the following references:

Southern Great Plains Wildfire Outbreaks
https://ejssm.org/ojs/index.php/ejssm/article/view/132/98

Predictive Services References
https://ticc.tamu.edu/PredictiveServices/default.aspx

2020-2021 Dormant Season Fire Potential Summary

- The forecast for a moderate to strong La Nina increases the risk for high impact fire weather events. It is possible that multiple Southern Plains Wildfire Outbreaks will occur this season. Wildfire outbreaks are most likely from February through April.

- The consensus seasonal forecast for a warmer and drier Texas dormant season supports an expansion and intensification of drought across the state. Drought in central and east Texas will contribute to increased fire occurrence in the timber fuels of the regions. Large fires are possible in a strong post frontal fire environment.

- Normal to below normal grass loading on the western Plains is expected to reduce the resistance to control of wildfires occurring in fire environments that include critical and elevated fire weather. These grass loadings are not expected to mitigate resistance to control at the front end of wildfires when subjected to high impact fire weather.

- Above normal grass loading in north central and south Texas should enhance fire occurrence and make wildfires more resistant to control in fire environments that include lower fire weather thresholds.