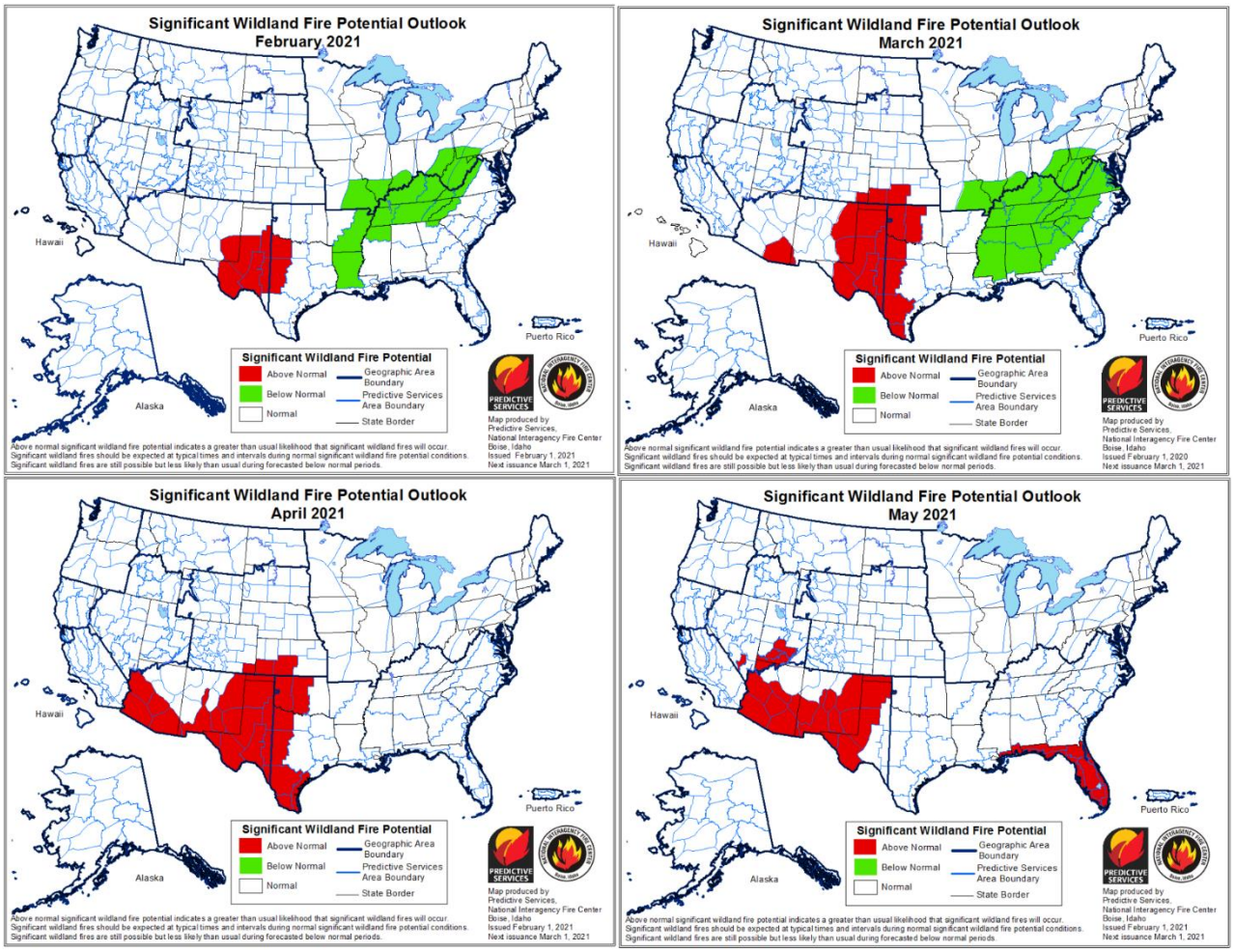
Southern Area Fire Risk Assessment

Spring 2021



Southern Area Coordination Center
Rapid Assessment Team

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Executive Summary

In response to the combination of a normal wildland fire season, coupled with La Nina weather, a Fire Risk Analysis was conducted to assess the potential and expected fire situation for the spring fire season of 2021. The assessment period extends from mid-January through May. The analysis included a look at the current weather situation and extended forecast, fuels compared to normal for the time of year, National Fire Danger Rating System's energy release component for each Southern Area Predictive Service Area, and fire occurrence. Recommendations are provided based on the findings and conclusions of the analysis.

The portion of the region in this analysis is entering their normal fire season. With the exception of the western quarter of the Geographic Area, including Oklahoma, Arkansas, and Texas, the fire environment has observed normal and average fire danger and fire weather over the past two years.

This rapid risk analysis was conducted to determine:

- What is the probability of an above average spring fire season and what are the anticipated impacts?
- Where are the critical locations in the Southern Area?
- What are the key fire environment indicators and thresholds which demonstrate above normal fire potential?
- Have drought conditions, observed over the past several years, improved?

Based on current fuel conditions and forecasted weather conditions, the most likely scenario is a normal to below normal level of wildfire activity for the next month and beyond across the majority of the Southern Area Geographic Area. The exception would be in the far western reaches of the area in both western Oklahoma and Texas where drought conditions are established and trend worse in severity, and in the longer term, Florida and the Coastal Plain of Mississippi and Alabama. Overall, normal firefighter mobilization should occur within the Geographic Area. Minimal state to state and national mobilization should occur. Overall, drought conditions observed over the past three years have significantly improved and the spring fire season is setting up to be a good planned prescribed fire implementation season.

Analysis Findings and Recommendations

Analysis Findings

The analysis findings indicate the following probabilities for the spring fire season for the analysis area:

Scenario Description for the 2021 Spring Fire Season (February through May)	**Southern Area Probability**
Most Likely Case The Southern Area, overall, observes a normal to below normal spring wildfire season. A normal amount of initial attack activity is experienced for this time of the year; however, western portions of the Geographic area (including Oklahoma, Texas, Florida, and the Coastal Plain of Mississippi and Alabama) will see an uptick in seasonal wildfire risk. Few Type III incidents occur at the same time in the geographic area. There will be the potential for the deployment of either Type 1 or Type 2 Incident Management Teams in Texas and Oklahoma.	75
Best Case The observed wet trend continues and these systems bring frequent rainfall events and enough moisture to mitigate rainfall deficits and compact leaves after leaf drop. The normal spring time wildfire occurrence develops and very light to no initial attack is experienced. The availability of resources across the Geographic Area are sufficient to support normal wildfire and prescribed fire operations as well as supporting elevated wildfire risk in both Texas and Oklahoma.	15
Worst Case The spring fire season rapidly escalates in severity extends deeper into spring than normal due to the unforeseen absence of forecast precipitation. A normal amount of initial attack activity is experienced for this time of the year; however, new ignitions would observe severe fire behavior and spread potential due to prolonged drought and minimal rainfall frequency (i.e., fires would get bigger faster). Some additional aviation and ground resources are required due to fire behavior. Several Type III incidents occur at the same time in the geographic area. However, no large scale mobilization of out of region resources are required due to at least some mitigating weather pattern (high humidity or periodic rainfall).	10

Table 1. Analysis findings for the Southern Area 2021 Spring Fire Season with Probability Rating

Recommendations

- The primary areas of concern as we transition into a spring wildfire season will be the far western reaches of the Geographic Area (Texas and Oklahoma).
    - In these areas fire managers must consider potential extreme fire behavior, which can be expected with the current drought conditions under moderate fire weather conditions. As fire danger indices exceed the 97th percentile, extreme fire behavior and rapid fire spread characteristics should be expected. Tactics should be altered to provide for firefighter and public safety. Appropriate management response may be point protection rather than direct attack.
    - Do not expect any fire in these western reaches to be routine. Be prepared to utilize indirect tactics with extended mop-up. Utilize aerial supervision to help direct crews and keep them informed on fire behavior. Ensure that LCES is in place before engaging on any fire. Remember to STOP, THINK, and TALK before you ACT… and actively look for ways to minimize risk to firefighters in what is forecast to be a period of very high fire danger.
    - Augmentation of initial attack resources will likely be required throughout the spring. This will result from increased fire behavior, fire spread, and longer mop-up times due to drought stressed fuels and soil.
    - Additional resources, both ground and aviation, may be needed.
- Florida and the Coastal Plain of Mississippi and Alabama started the season observing dry conditions, eventually received mitigating rain, and eventually should trend back to dry in the longer 2+ month outlook. Managers should continue to access these conditions and prepare for an uptick in wildfire risk in the coming months.
- Fire managers in those areas observing remnant drought condition should continue to assess these local conditions. These isolated areas have experienced fairly prolonged drought conditions that could observe increased fire spread and fire behavior as leaf drop occurs and in conjunction with wind events.
- Maintain capabilities to mobilize IMTs at the 1, 2, and 3 levels throughout the spring wildfire season.
- Ensure firefighter pocket cards are up-to-date and posted on the national website. http://fam.nwcg.gov/fam-web/pocketcards/
- Maintain national standardized predictive services products in a timely fashion. Produce new products as requested.

Introduction and Background

The majority of the Southern Area has observed normal to above normal precipitation over the past three years. As evident in the U.S. Drought Monitor image below (Figure 1), areas of Extreme to Exceptional Drought are limited to the far western reaches of the area along the Southern Area and Southwestern Area Geographic Boundary. There are though several areas of Abnormally Dry and Moderate Drought areas scattered across the central States of Tennessee, Louisiana, Mississippi, Alabama, Georgia, and Florida.

Large portions of the Southern Area experienced Severe to Exceptional Drought starting in 2014 and typically ending in the spring and summer of 2017. During this period of time, long duration drought conditions have continued to improve thanks to observed rainfall, especially in the past year and a half, due to shifting weather and several tropical systems.

The different levels of drought are classified by percentiles, with exceptional rating in the top 2-3% of the historical record. It takes a several seasons of dry weather to reach the exceptional level and several seasons of wet to reduce these drought conditions. Figure 2 shows that drought conditions have been subsiding in the central portion of the Southern Region for the past twelve months. The legend shows direction of change over time and is displayed as deteriorating (increasing drought) or improving (decreasing drought). Improving (decreasing drought) conditions are indicated over most of the area since January of 2018. The remaining areas on the west side of the region have seen generally improving (decreasing drought) conditions.

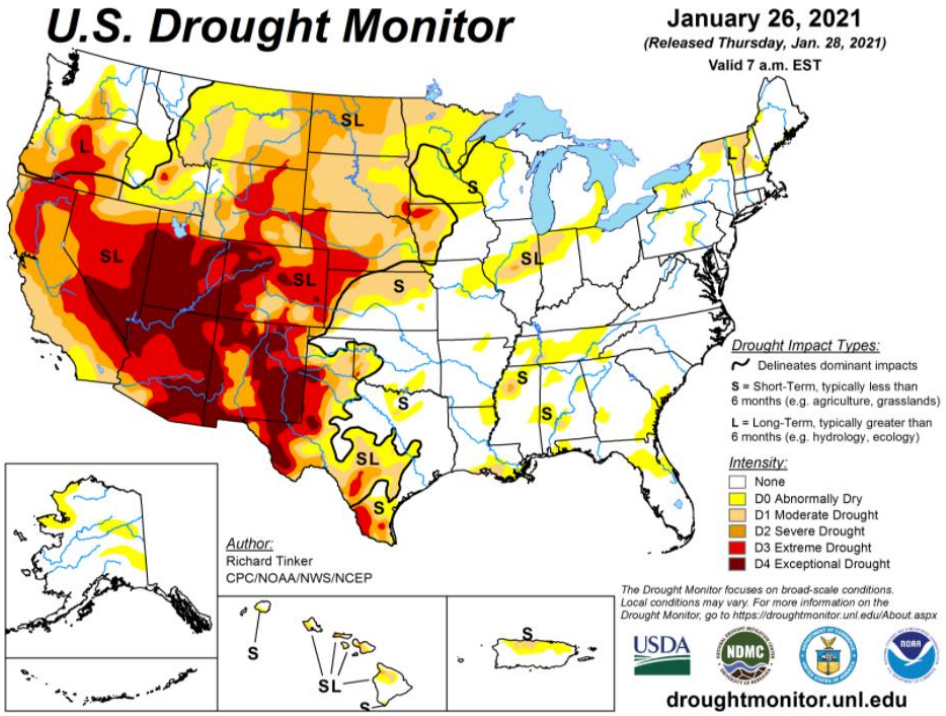


Figure 1. The National Drought Monitor displays the size and severity of drought conditions across the United States. Source: National Drought Monitor website

Figure 2. National Drought Monitor Class Change at 1 week, 1 month, 6 months, and 1 year. Source: National Drought Monitor website

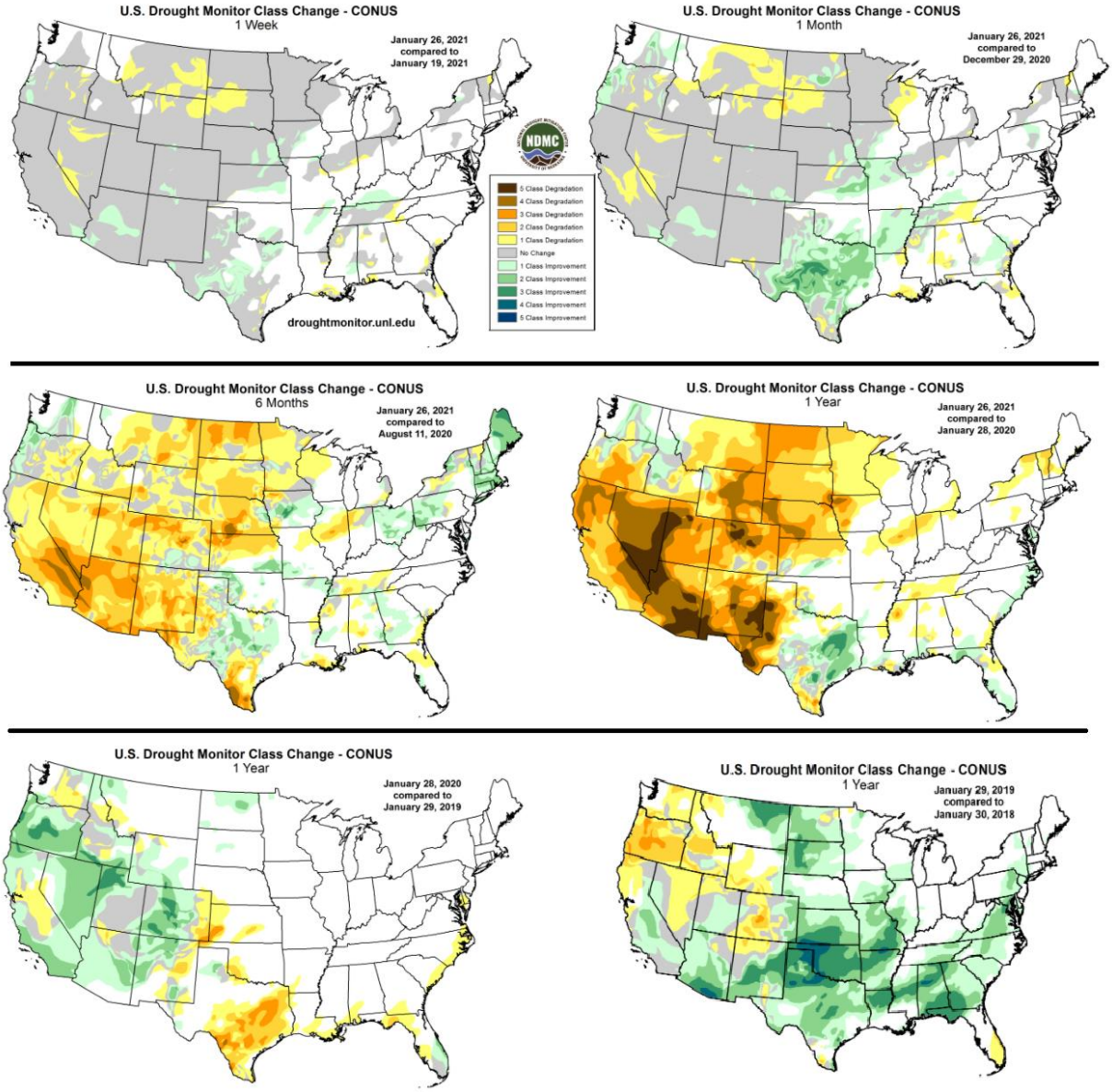


Figure 3 provides a general overview of Drought as percentiles across the area. It is observed that the majority of the Geographic Area has observed good drought response, with the exception of west Texas.

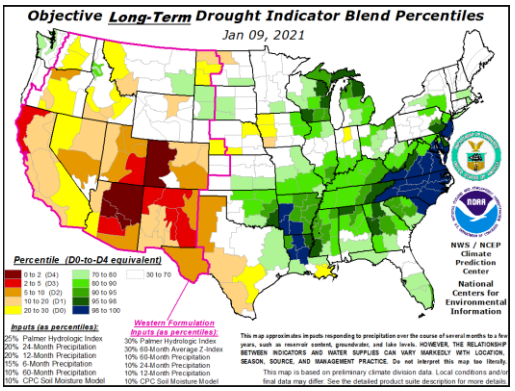


Figure 3. CPC Long Term Drought Indicator for the United States for Jan 09, 2021. Source: WFAS.net

Risk Analysis

Weather

Weather and Climate Outlook for the next Four Months: February, March, April
Discussion of weather trends and fire potential outlook maps are posted on the SACC web site.

Outlook Summary: At least in the first half of the outlook period, the weather pattern still appears to support a continuation of an unusual "wetter" biased La Nina pattern. As such, fire potential for a broader area of the Southern Area should stay at below average to average levels with only limited and short duration episodes of elevated initial attack. While west Texas and Oklahoma, areas generally always subject to rapid fine fuel drying from combinations of low humidity's and dryline windy weather, the "wetter" condition this year will likely keep any extensive and wider spread critical conditions from developing. This, however, based upon the outlook could be changing later February and then into March. A much drier than average rain fall situation already entrenched across the Florida peninsula (and spreading west along the southern Gulf coast) may be the forerunner to increasing fire danger should the outlook for persisting below average rain fall and warmer than average temperatures materialize before and through green-up.

Past Weather and Drought: The unusual high(er) frequency of rain producing storm systems remained a fixture across the south from late last year and is keeping fuel moistures trending at high to very high levels. Again, exceptions can be found in Texas/Oklahoma (short/long term D3/D4 drought in the Trans Pecos and southern Panhandle) as well as emerging dryness in Florida. While significant drought is missing from the south, there are minor areas of short term D0 drought scattered across the states. The rain pattern and track with the weather systems, while lately more southerly based, varies by storm with each event eventually, over time, producing overlapping and more complete coverage across the Southern Area. This pattern is helping to keep fuel moistures, and especially the fine fuels, in a moist and fire ignition limiting condition. One other condition which has not been very prevalent this year is the lack of strong and gusty winds which has mitigated the potential for large fire.

Recent/Ongoing Fire Activity and Area Discussion (By exception): Fire activity remains minimal and well below average with any periods of elevated initial attack being driven by short term and rapid drying of fine fuels; mainly a phenomenon for Texas/Oklahoma.

Fuel Conditions (by exception): Fuel moistures are currently very high (most near or better than 20%) with the only lower and/or marginal conditions (15% and below) occurring in the west and central-west Texas PSAs. Some drying in January has been occurring across our northeast states due to the more southerly track of storm systems. We expect the pattern will adjust, however, during February and will allow the 100 hour fuel moistures to once again increase above their current season low of 12 to 15 percent. 1000 hour moistures continue to trend at very high, GTE 21 percent, levels.

Outlook Discussion: In the near 1 to 2 month timeframe, a still fairly active storm tack and "wetter" pattern should continue to produce periodic rain events which, along with a persisting elevated humidity trend, should limit fine fuel drying and keep a rather moist fire environment in place for most areas of the south. The two main exceptions will be the desert areas of far western Texas (and to some extent west Oklahoma), and Florida which remain abnormally dry with a forecast which keeps these areas in a drier condition. While otherwise atypical "wetter" weather patterns associated with the current La Nina (right now more "Modoki-like" and an unusual variant) is likely to keep fire potential at bay, the pattern can become more variable as we move into spring and before green-up. As of now, and before May, mostly below average to average fire danger should be expected. Continued dry conditions for Florida would necessarily mean higher potential perhaps as early as April but primarily during May.

PRECIPITATION AND TEMPERATURE OUTLOOK

Both the 6 to 10 and 8 to 14 day precipitation probability maps from the Climate Prediction Center indicate a above normal temperatures and below normal to normal precipitation for the south, before

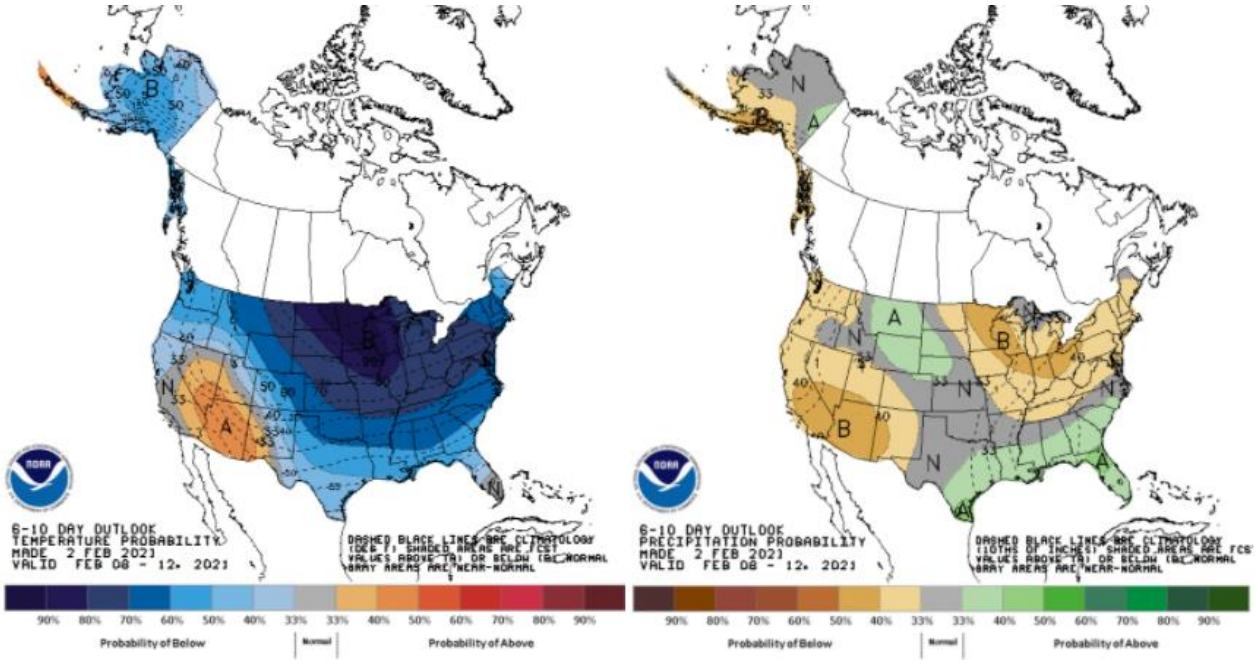


Figure 4. Map 1- Six to ten day outlook temperature probability, Map 2- Six to ten day outlook precipitation probability

dryer conditions are projected to form over the Northeastern US and down into the eastern third of the Geographic Area.

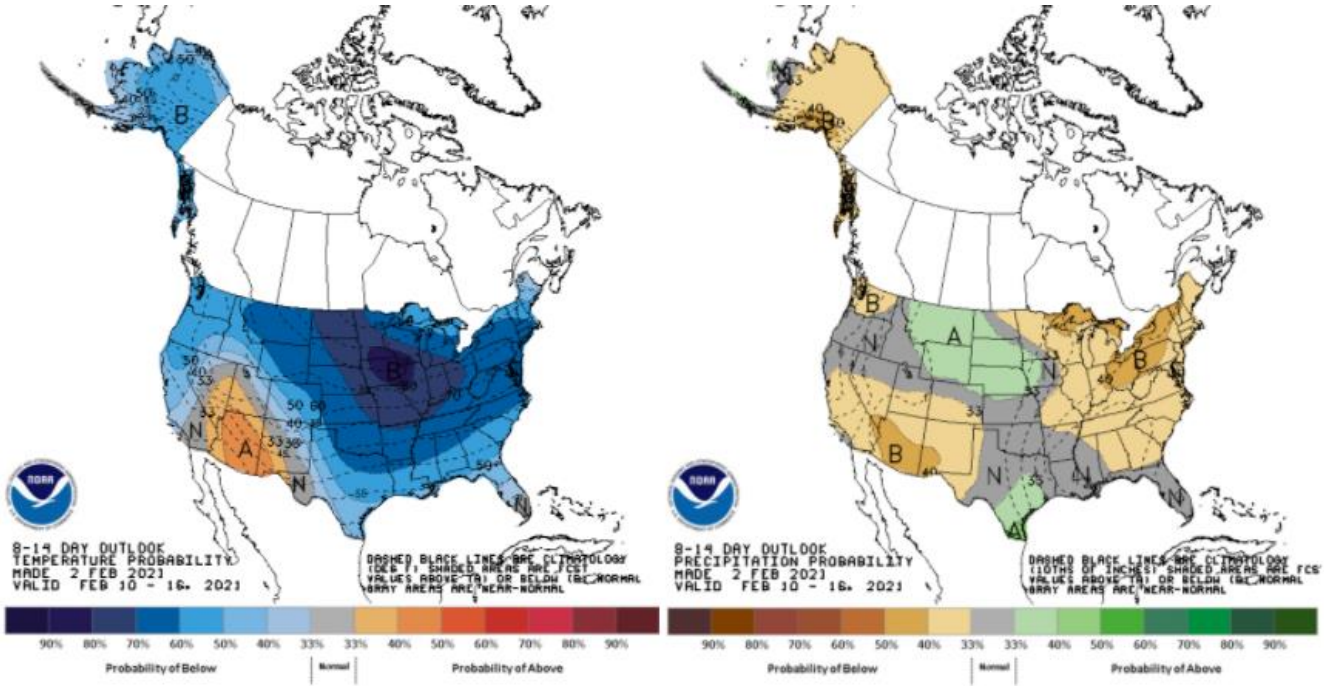


Figure 5. Map 1- 8 to 14 day outlook temperature probability, Map 2- 8 to 14 day outlook precipitation probability

The long-term three-month outlook projects above normal temperatures and below normal precipitation across the southern half of the Geographic Area.

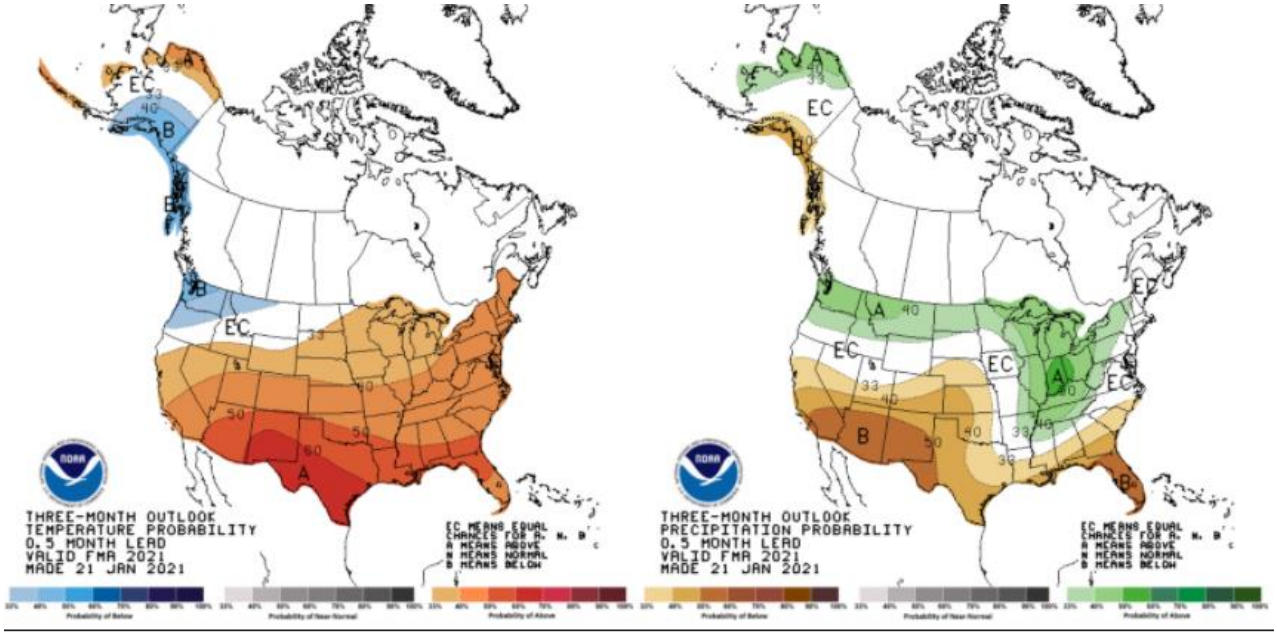


Figure 6. Map 1- Three month outlook temperature probability, Map 2- Three month outlook precipitation probability

DROUGHT CONDITIONS

Over the past year and a half, overall, drought conditions have improved across the Southern Area. Large fuel classes (100 hour and 1000 hour) remain very moist and generally above critical thresholds as we move through January and into February. These fuel moistures should continue to trend as displayed on the map.

Maps of the most recent observed FM100 and FM1000 values can be found on the Southern Area Coordination Center (SACC) Predictive Services page (http://gacc.nifc.gov/sacc/fire_weather.php). These maps are typically updated daily and are generally available between 730 and 800 AM Eastern time. Additionally, maps of short-term drought and the additional precipitation needed to bring the Palmer Drought Index (PDI) to -0.5 are also available. Each image is hyperlinked to its original source to provide access to the most recent depiction available.

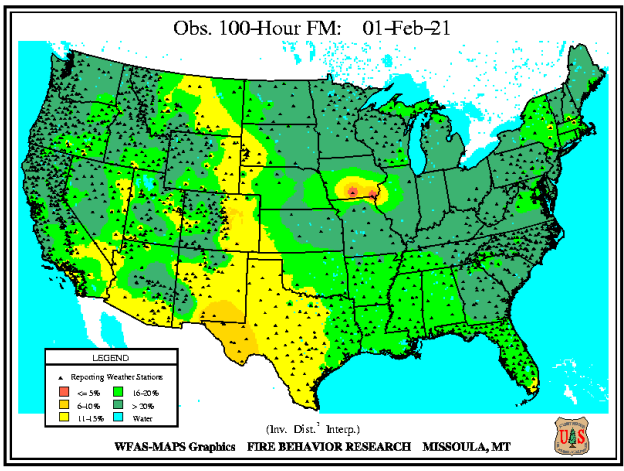


Figure 7. 100 Hour Fuel Moisture values for February 1, 2021

February Drought Outlook

February will see persisting and developing drought conditions in Texas and Oklahoma and developing drought along the Coastal Plains of Louisiana, Alabama, Florida, and South Carolina. Puerto Rico continues to trend dry with periods of rain mitigating drought severity.

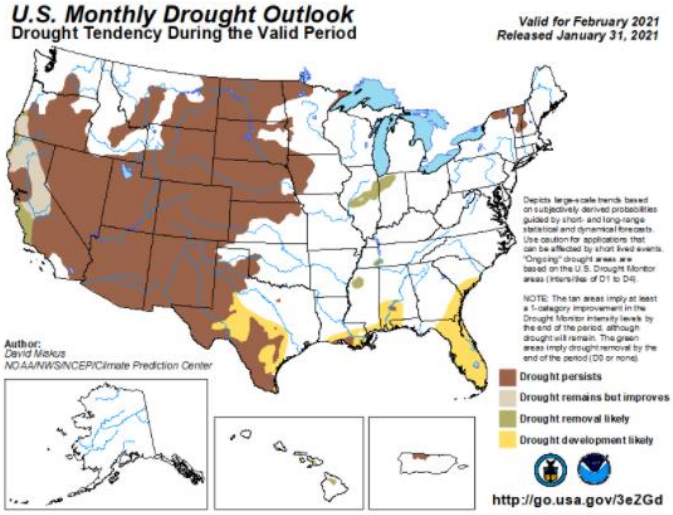


Figure 7. Map of Monthly Drought Outlook for February 2021 for the United States

March through April

Fire risks are expected to remain at seasonal levels as temperatures and precipitation hover near normal levels. Southern Plains can be problematic, especially if there has been prolific grass growth in the preceding months followed by dry. Short-term forecasts project above normal precipitation across the entire geographic area over the next two weeks. The isolated pockets of drought currently being experienced across the southeastern reaches of the area are forecast to continue developing and broadening, with those isolated dots connecting into larger areas.

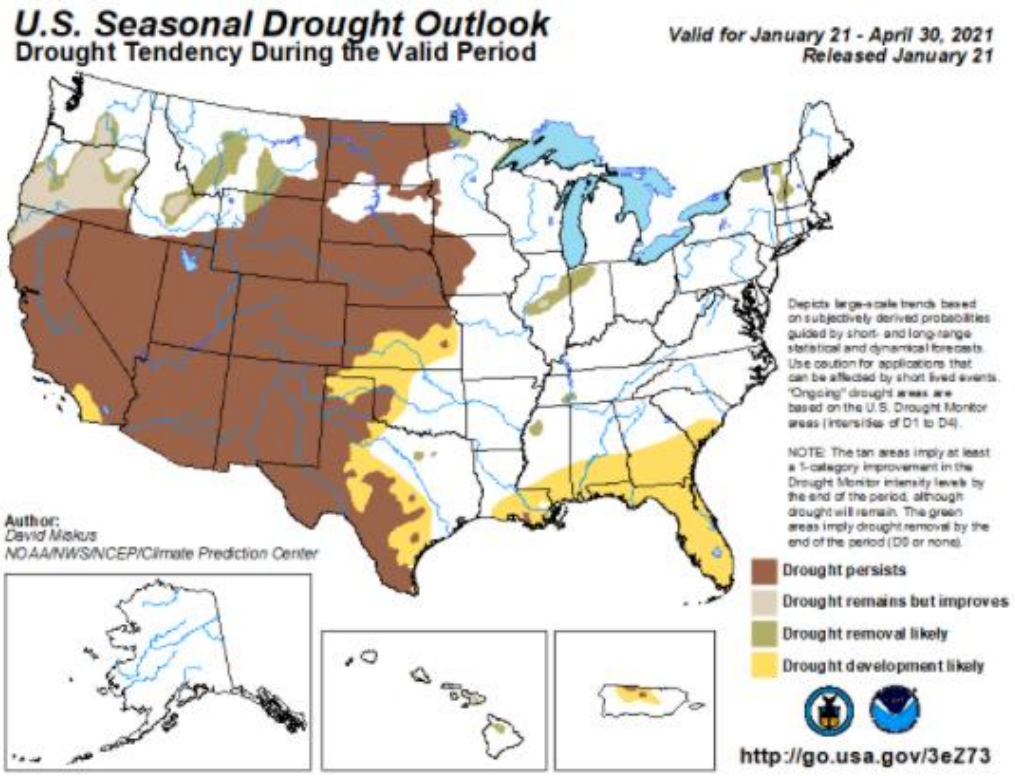
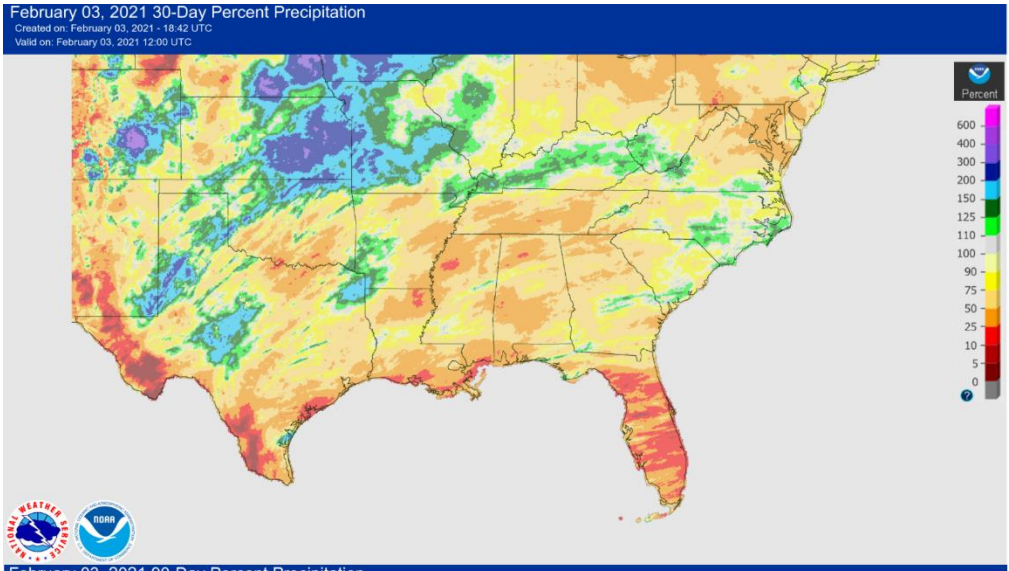


Figure 8. Map of Seasonal Drought Outlook from January 21 through April, 2021 for the United States

Fuel and Fire Danger Conditions



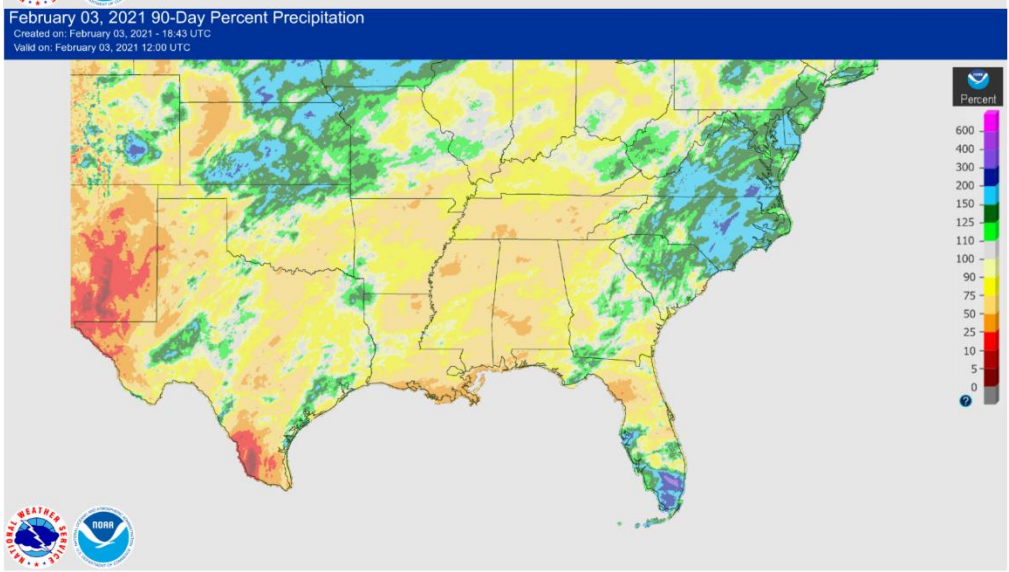


Figure 10. And 11. Maps showing the Advanced Hydrologic Precipitation Analysis (AHPS), percent of normal precipitation for the Southern Area.

Figure 10 demonstrates the short-term percent of normal precipitation for the past 30-days. Overall, the past 30-days have observed below normal precipitation with ranges of 90 to 50 percent of normal being observed across the Geographic Area. These areas are moderated by fairly frequent precipitation events and near normal precipitation over the past 90 days (Figure 11), and expected precipitation from over the next two weeks.

Energy release component (ERC) provides an index that is correlated with flammability of fuel and difficulty of suppression. ERC is often referred to as an indicator of fuel dryness. This index seems to be most useful for characterizing the seasonal severity of the fire season across the Southern Area. ERC for each Southern Area Predictive Service Area (PSA) can be calculated based on weather measurements taken at Remote Automatic Weather Stations (RAWS). The areas sampled by the assessment are noted in Figure 12. Values above the 90th percentile are considered critical and represent fire danger that is only experienced less than 10% of the time. Also, any ERC value that is close to the 97th percentile is closest to the record high ERC value, signifying that those areas are at record high fire danger values for that time of the year. The areas highlighted above the 80th percentile represent the most critical areas currently. Based on these current conditions, as well as forecasted outlooks, it is expected that the region should remain moderated.

The following hyperlinks display analysis products put out by the states of Texas and Oklahoma and describe current conditions as well as local outlooks:

- http://ticc.tamu.edu/Documents/PredictiveServices/Outlooks/texas_fire_potential_update.pdf
- http://www.forestry.ok.gov/situation-reports

Figures 13-24 are samples of ERC conditions across the Southern Area Geographic Area. The ERC graphs plot current year values in relation to historic high values for comparison.

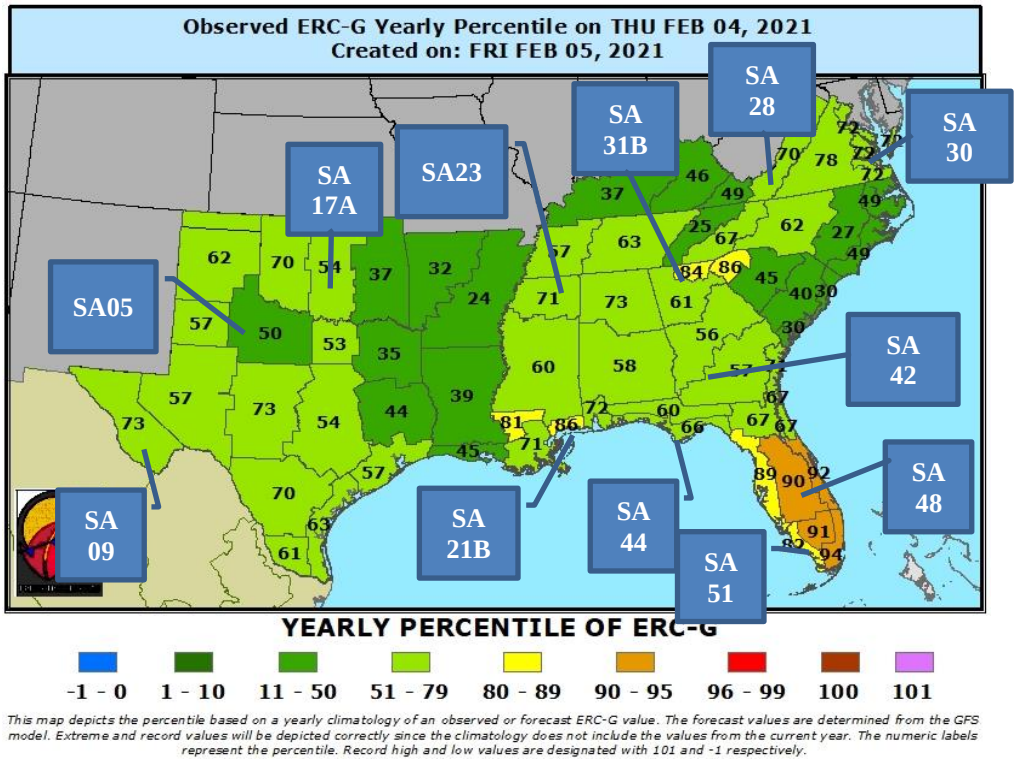


Figure 12. Map of energy release component percentiles in the Southern Area for February 4, 2021. Predictive Service Areas (PSAs) used in the analysis below are

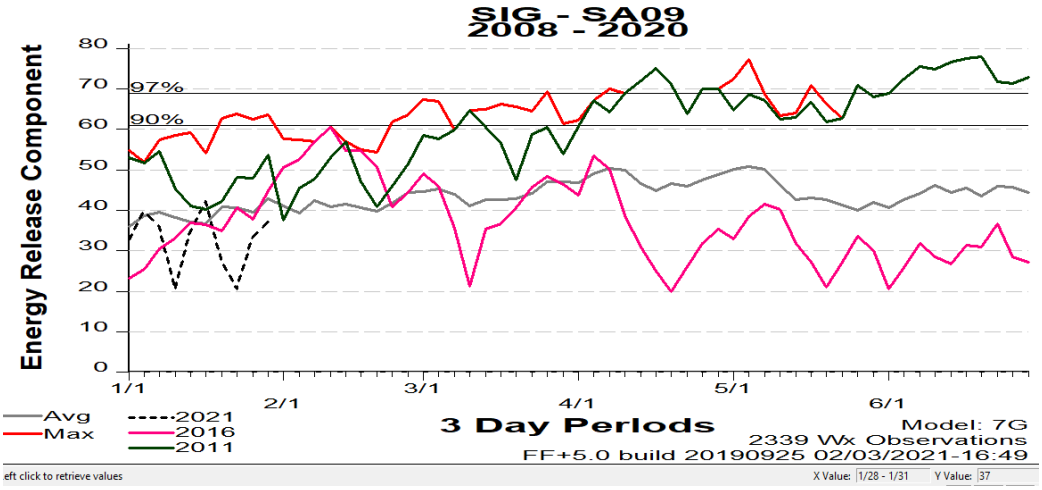


Figure 13. ERC values for Predictive Service Area SA09, which covers the Trans-Pecos of far west Texas. 2021 values on the chart are represented by the black hashed line. Both 2011 and 2016 were elevated years which trended at or above historic high records early February and show potential tracks moving forward. It is observed that 2021 has trended below average however drought conditions should be monitored as we move deeper into wildfire season.

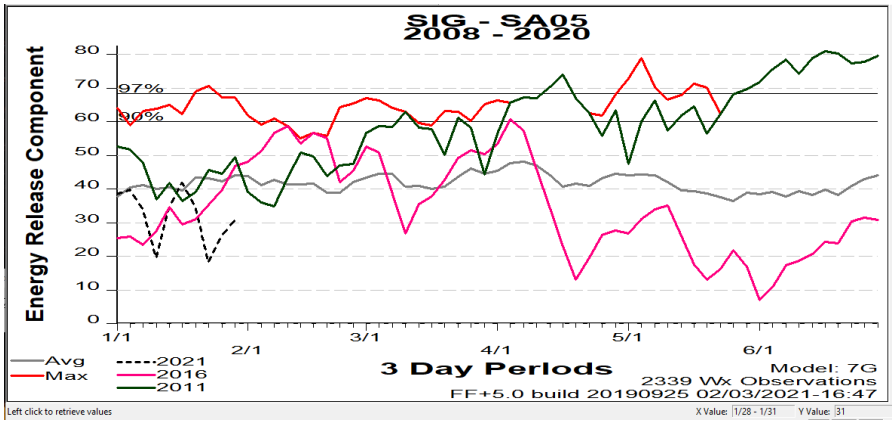


Figure 14. ERC values for Predictive Service Area SA05, which covers a portion of northwest Texas. 2021 values on the chart are represented by the black hashed line. Both 2011 and 2016 were elevated years which trended at or above historic high records for both indices and has been overlaid for comparison purposes. It is observed that 2021 has trended below average however drought conditions should be monitored as we move deeper into wildfire season.

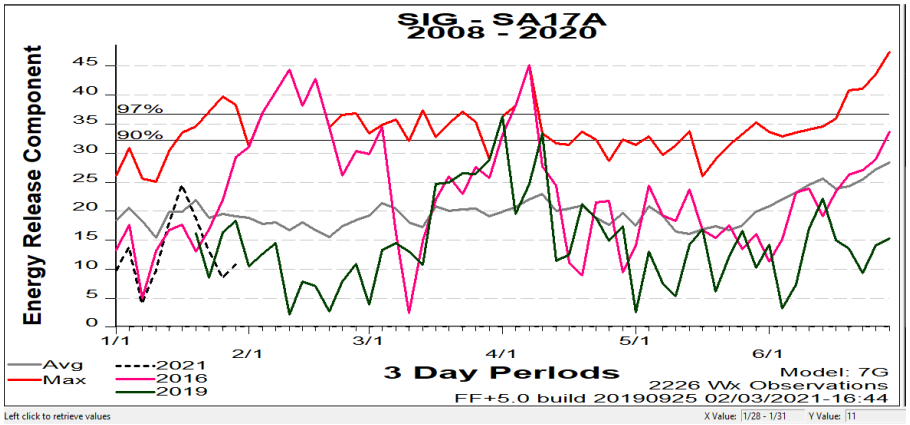


Figure 15. ERC values for Predictive Service Area SA17A, which covers eastern Oklahoma. 2021 values on the chart are represented by the black hashed line. Both 2016 and 2019 were elevated years which trended at or above historic high records for both indices held historic high trends during different periods of those spring fire seasons. It is observed that 2021 has trended below average however drought conditions should be monitored as we move deeper into wildfire season.

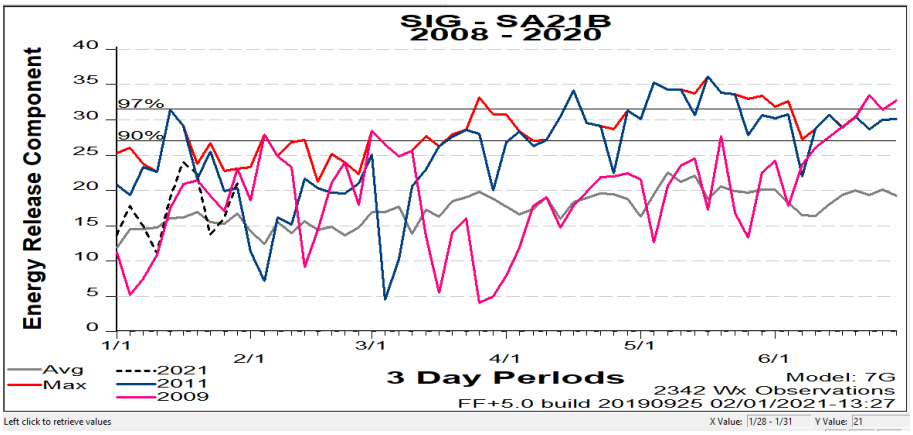


Figure 16. ERC values for Predictive Service Area SA21B, which covers the coastal plain of Mississippi. 2021 values on the chart are represented by the black hashed line. Both 2009 and 2011 were elevated years which trended at or above historic high records for both indices and has been overlaid for comparison purposes. It is observed that 2021 has trended at or above average and longer-term drying trends should be monitored over the next three months.

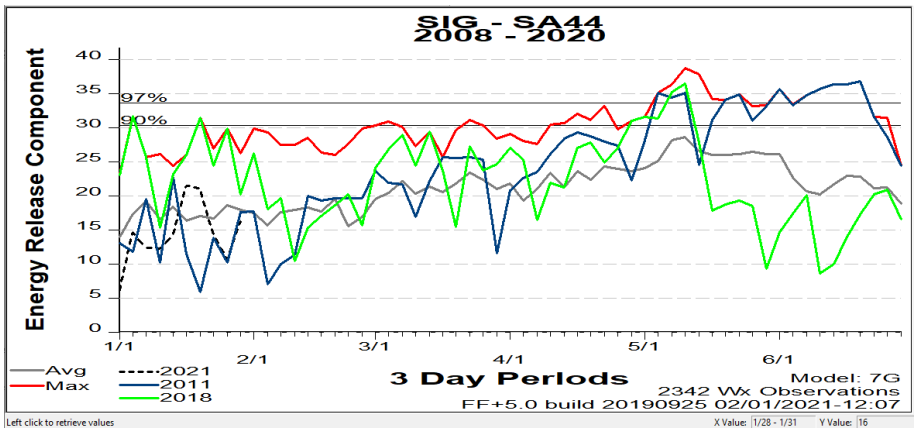


Figure 17. ERC values for Predictive Service Area SA44, which covers the panhandle of Florida. 2021 values on the chart are represented by the black hashed line. Both 2011 and 2018 were similar years which trended at or above historic high records for both indices and has been overlaid for comparison purposes. 2021 closely resembles 2011 and this fire environment should be continually monitored as we move into spring fire season.

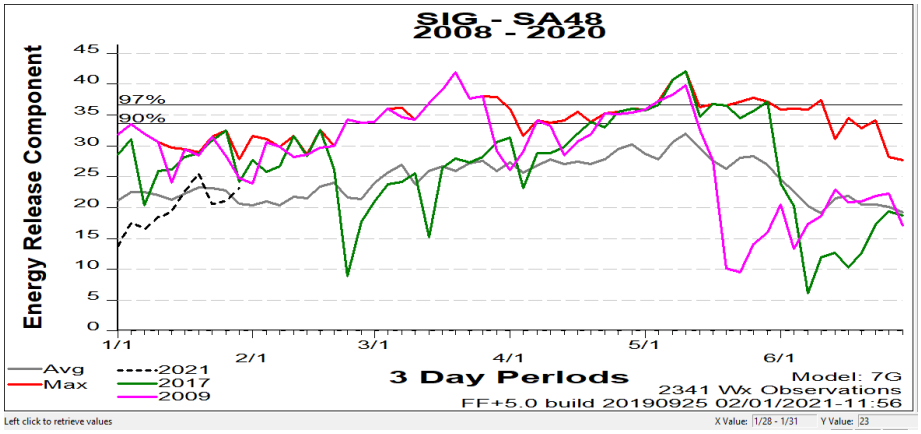


Figure 18. ERC values for Predictive Service Area SA48, which covers south central Florida. 2021 values on the chart are represented by the black hashed line. Both 2009 and 2017 were similar years which trended at or above historic high records for both indices and has been overlaid for comparison purposes. Though 2021 at average ERC conditions, those levels are currently similar to 2017, which produced historic high values through early May.

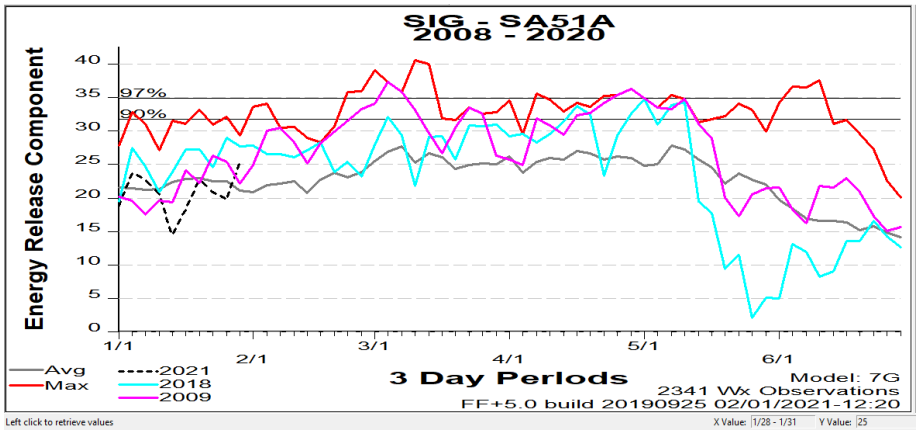


Figure 19. ERC values for Predictive Service Area SA51, which covers south very southwest Florida. 2021 values on the chart are represented by the black hashed line. Both 2009 and 2018 were similar years which trended at or above historic high records for both indices and has been overlaid for comparison purposes. Though 2021 at average ERC conditions, those levels are currently similar to both 2009 and 2018, which both trended well above average and at historic high through May.

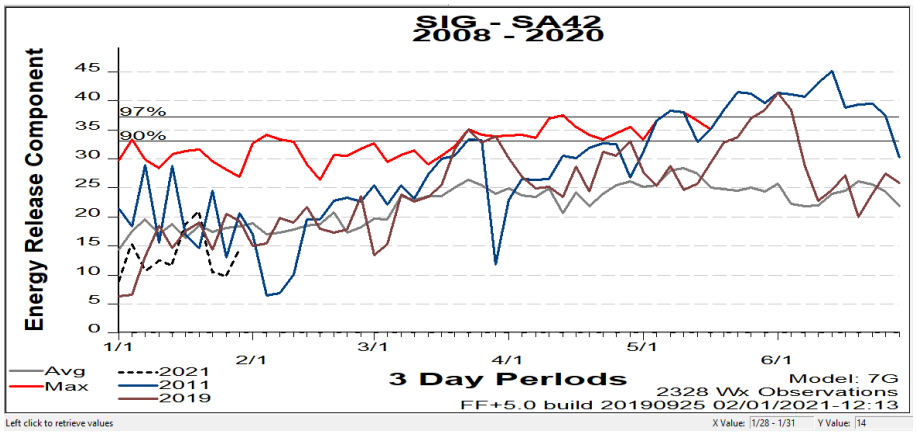


Figure 20. ERC values for Predictive Service Area SA42, which covers southern Georgia. 2021 values on the chart are represented by the black hashed line. Both 2011 and 2019 were similar years which trended at or average through the normal through March. 2011 is of particular importance as this year mimics 2021, trends at average, and then breaks historic high levels from early May through June.

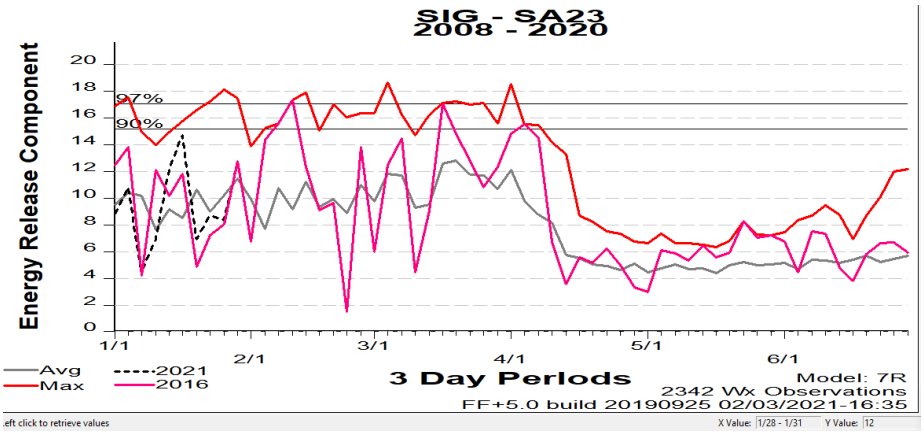


Figure 21. ERC values for Predictive Service Area SA23, which covers northern Mississippi. 2021 values on the chart are represented by the black hashed line. 2016 was an elevated year which fluctuated between average and historic high conditions and is overlaid in for comparison purposes. It is observed that 2021 has trended at or above average through the winter with mitigating rainfall moderating conditions.

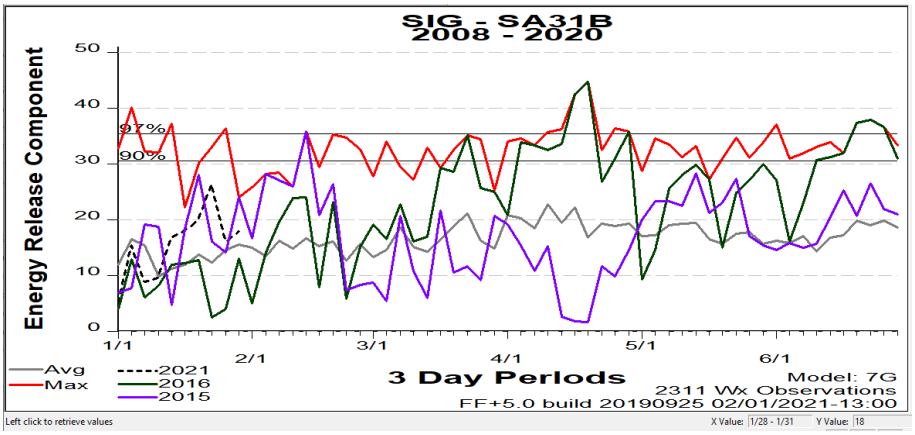


Figure 22. ERC values for Predictive Service Area SA31B, which covers the mountains of Georgia. 2021 values on the chart are represented by the black hashed line. The fall of 2016 ended up being a historic season, in terms of wildfire occurrence and growth, and has been added just for that comparison context. Fairly request rainfall and some snow events have mitigated the overall wildfire risk in this PSA.

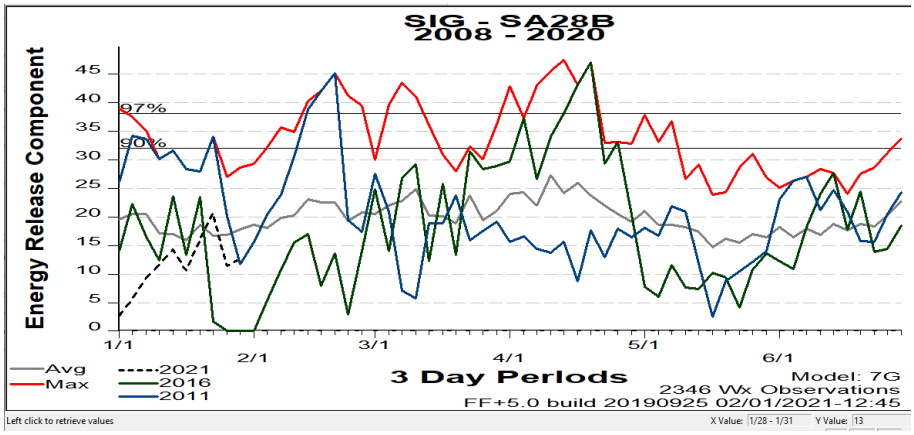


Figure 23. ERC values for Predictive Service Area SA28B, which covers the mountains of Virginia. 2021 values on the chart are represented by the black hashed line. The fall of 2016 ended up being a historic season, in terms of wildfire occurrence and growth, and has been added just for that comparison context. Fairly request rainfall and some snow events have mitigated the overall wildfire risk in this PSA

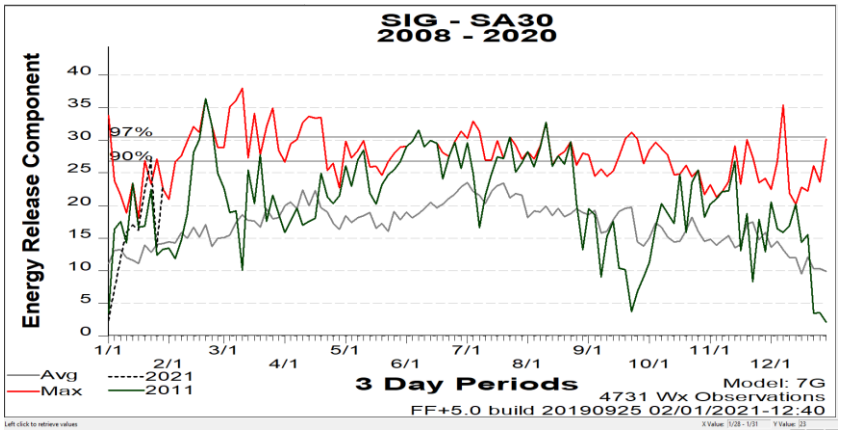


Figure 24. ERC values for Predictive Service Area SA30, which covers the Coastal Plain of Virginia. 2021 values on the chart are represented by the black hashed line. 2011 was a significant fire season in terms of occurrent and growth, with several long duration complex fires. Forecast. ERC currently trends above average however, mitigating spring weather should keep ERCs from replicating 2011. Managers should definitely be aware of current conditions as they move into the spring fire season.

Summary

- Western Texas and Oklahoma have significant drought conditions established with no fire stalling or ending weather relief expected through their spring wildfire season.
- Northern Florida has observed some moderation thanks to recent precipitation. The southern half of the state however has continued to trend higher in severity. Longer term 2–3-month outlooks for temperature and precipitation both highlight warmer drying conditions throughout Florida and extending west along the Coastal Plain of Alabama and Mississippi. These areas more than likely will continue trending towards higher wildfire risk.
- Rainfall frequency has been normal to below normal across the remainder of the Geographic Area over the past 3 months. There are isolated areas that are shown to be observing abnormally dry conditions (U.S. Drought Monitor) and as we continue moving into the spring fire season these areas should be continually assessed for fire danger.
    - It is important to note that while the next 10 days are forecast to be wetter than normal, the longer term 1–3-month outlook projects warm and dry weather to prevail. As we continue to move into the spring fire season fire managers and personnel should continue to assess current and forecast conditions and make decisions based on that analysis.
    - The frequency of precipitation events is critical to staying out of an extended fire season. These events need to take place on a five-to-seven-day cycle.
- Fire managers should continue to stay vigilant on fuel conditions coupled with daily fire weather forecasts.
- An increased frequency of rain events coupled with more normal humidity levels will mitigate the fuel dryness.