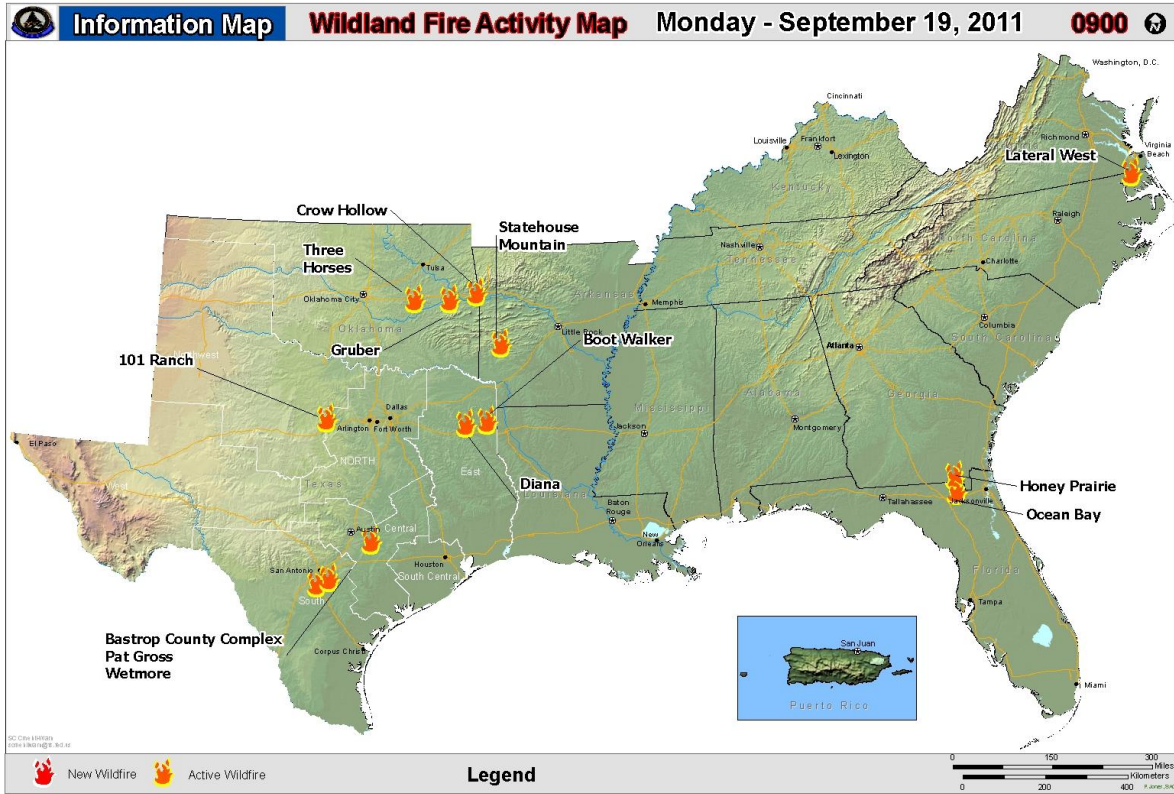


Southern Area Fire Risk Assessment October-December 2011



September 22, 2011



Contents

Section	Page
Executive Summary	3
Introduction & Background	4
Current Conditions	5
Weather Outlook	8
Fuels and Fire Danger	9
Fire Behavior	11
Summary Findings	11
Conclusions	11
Recommendations	12

Executive Summary

In response to a deepening drought over a large portion of the Southern Area, a fire risk analysis was conducted to assess the potential and expected fire situation for a fall fire season. The assessment period extends from September 14, 2011 – December 31, 2011. The analysis included a look at the current weather situation and extended forecast, fuel conditions compared to “normal” for the same 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 weather outlook for fall is for below average rainfall and above average temperatures during October, November, and December. Warm, dry conditions and leaf fall will add to the already significantly elevated fire potential across large portions of the region.

Fuels analysis indicates that energy release component and 1000-hour fuel moisture is running at or above critical levels in all of Texas, Louisiana, and Arkansas. Portions of North Carolina, South Carolina, and Georgia also are experiencing critical fire danger conditions.

Fire activity has been above average to well above average (Texas and Oklahoma) across the region with extended attack fires occurring on USFWS, USFS, and state/private lands.

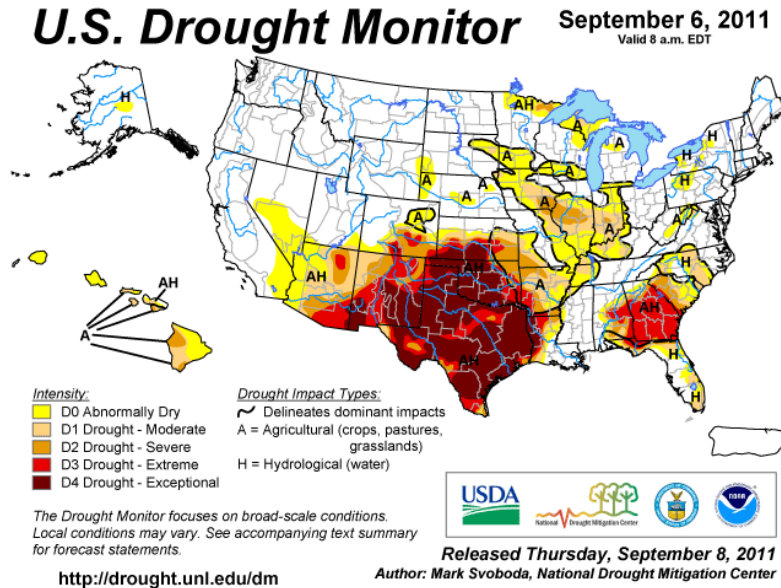
The ongoing fires at the Okefenokee and Great Dismal Swamp National Wildlife Refuges will require a significant rain event to fully extinguish burning organic soils. If a tropical system is not received during the end of September or in October there is a high likelihood that these fires could burn throughout the fall fire season and into winter.

The analysis and findings indicate the following probabilities for the fall fire season in the Southern Area:

Scenario Description for the October- December 2011 fire season	Southern Area probability
<p>Most Likely Case</p> <p>Drought continues from Texas eastward along the Gulf Coast with occasional rains providing short term relief that can be measured in days. Fires continue to occur due to dry lightning or human ignitions, and occasionally become large with winds or burn out operations.</p>	80%
<p>Best Case</p> <p>Dry pattern continues but with periodic rains. Fire activity is average for the upcoming period.</p>	5%
<p>Worst Case</p> <p>Extreme drought advances across the entire region through December. Extreme fire behavior and fire activity affect the majority of states.</p>	15%

Introduction & Background

The deepening drought over a large portion of the Southern Area presents potentially serious influences on a fall fire season. Drought has increased for most of the summer across many areas of the region.



The current drought monitor map indicates areas of exceptional drought covering most of Texas and Oklahoma. Portions of Louisiana, Arkansas, and Georgia also have areas of extreme drought.

The impacts of severe drought as severe as the one in the Southern Area are significant. Of chief importance to fire managers is the influence persistent drought has on live vegetation and dead woody material, collectively called fuels. Drought stresses vegetation through reduced soil moisture availability. The result is a corresponding reduction in the moisture content of the foliage, as well as reduced moisture content in both the duff layers and down material on the forest floor. There is an inverse relationship between fuel moisture content and the availability of a fuel to ignite and burn. As fuel moisture content decreases, fuel availability for ignition and burning increases. During drought, this process takes place over an extended period of time, resulting in an increased amount of available fuels for combustion in a wildland fire. With increased fuel availability comes the potential for increased fire intensities and thus control difficulties. The net result of drought is a heightened fire risk potential and a greater quantity and complexity of fire-fighting resources needed to respond to the situation.

Current Conditions

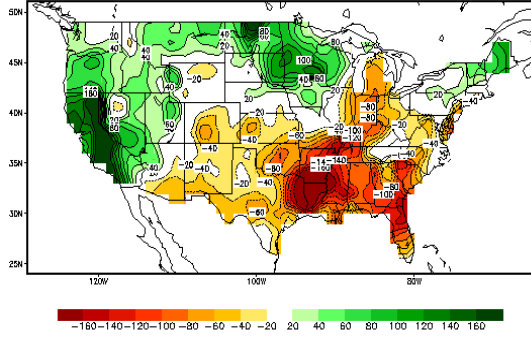
The current situation, especially as it applies to Texas, can be traced back in time to a wet condition in 2010 that came to an abrupt end in about August 2010. Soil moistures across Texas were above normal as late as July 31, 2010. The wetness in 2010 created ideal conditions for prolific growth of grasses, shrubs, and trees. In late October, the situation began to change and the soil moistures began to decline. By late December 2010, soil moisture anomalies were beginning to escalate, and drought was beginning to set in. Fires began to break out in January, but large fires began to occur in late February. Large fires continued to occur through March, April, May, and June. Even though fires continued to occur in July, August, and September, they were generally small fires, with some notable exceptions that became large because of tropical storm Lee's movement to the east of the Lone Star State.

Normally, the fire season in Texas would dwindle with the greening of fuels in April or May. However, there are some areas of Texas that never experienced a "green" condition that would inhibit fire. The National Weather Service has indicated that the drought in Texas can be traced back to deficits that began to build in 2010 if not earlier. There are areas, according to the National Weather Service, that are running between 25 and 40 inches below normal over a period of 2.5-3 years.

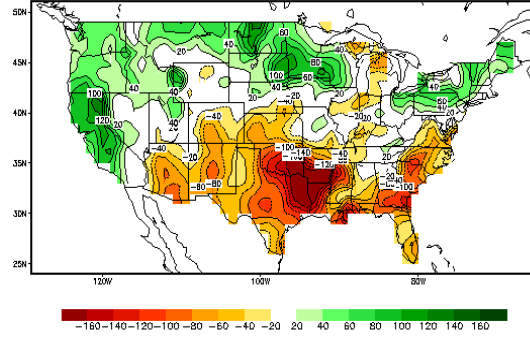
See <http://www.srh.noaa.gov/productview.php?pil=DGTHGX&version=0&max=61> for a full discussion of drought from the Houston/Galveston NWS Office. The drought in Texas during 2011 is similar to the drought experienced in 1934 and 1954.

The maps below show the progression of soil moisture anomalies from July 2010 to the present. The maps reveal how both the Southern Plains and Gulf Coast areas have built toward the current dry state. The last picture is 180 day percent of normal precipitation, a view that covers a period from March-September 2011.

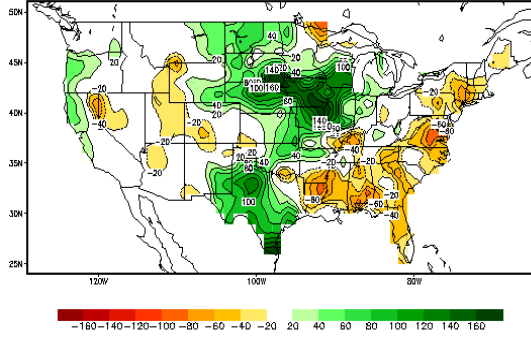
Soil Moisture Anomaly (mm) Last day of DEC, 2010



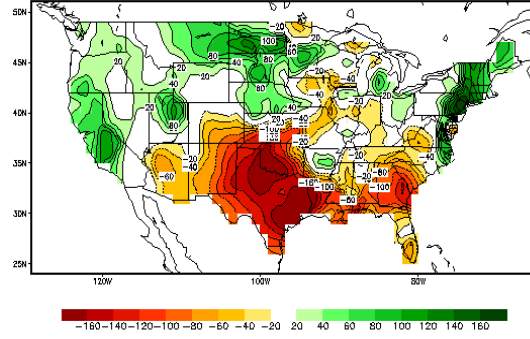
Soil Moisture Anomaly (mm) Last day of MAR, 2011



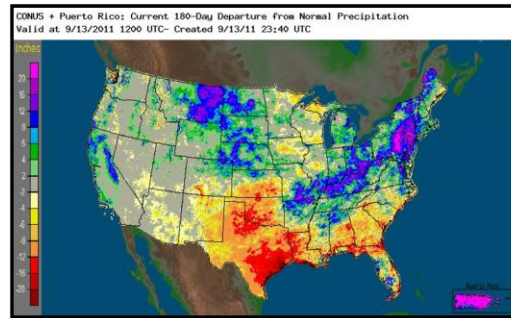
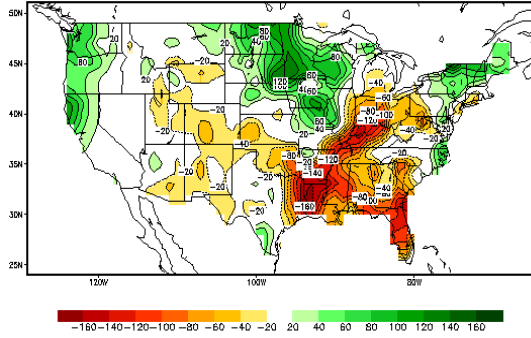
Soil Moisture Anomaly (mm) Last day of JUL, 2010



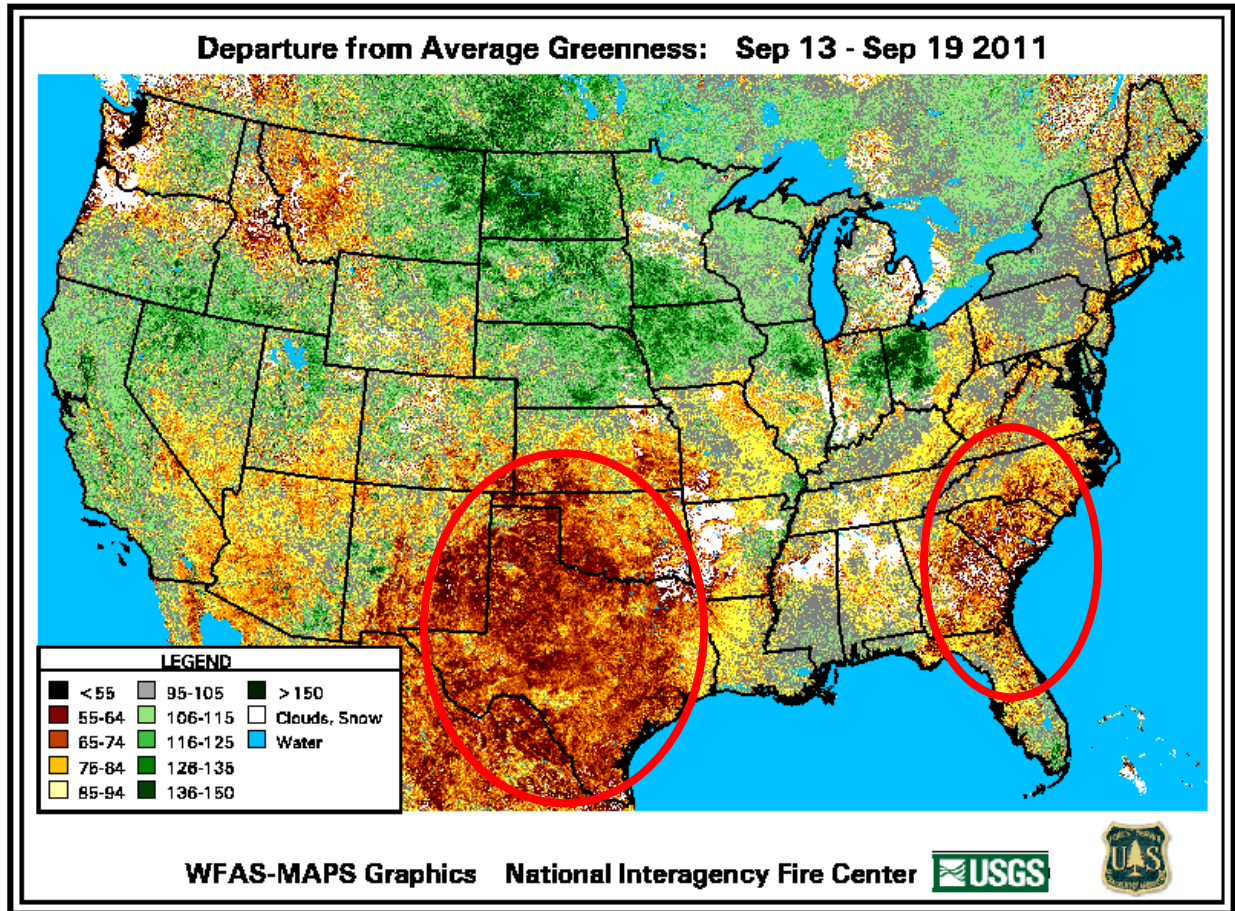
Soil Moisture Anomaly (mm) Last day of AUG, 2011



Soil Moisture Anomaly (mm) Last day of OCT, 2010



Vegetative Conditions



NDVI analysis depicts the entire state of Texas and most of Oklahoma as being severely departed from average vegetative greenness for this period of the year. Portions of north Florida, Georgia and the Carolinas also show a departure from normal. This departure from average greenness is indicative of below normal live fuel moistures and also vegetative dormancy which will result in early leaf fall.



Juniper in Texas has been dormant for most of the year as a result of drought. This dormant juniper burns readily in wildfires and will greatly escalate fire behavior. Any fire in Texas or Oklahoma will continue to be exceptionally difficult to control until live fuel moistures recover.

This photo was taken near Junction, Texas in Kimble Count. Brown juniper in the photo is dead or dormant as a result of drought.

Weather Outlook

Southern Area Predictive Service meteorologists in Atlanta believe that the dry condition will persist over the next three months as well as through the winter into 2012 in an area stretching from Texas, eastward across the Gulf Coastal region, and northward along the Atlantic Coast. The only saving grace that this area might have is a late season tropical system. At this juncture in the year, the probability of a tropical system affecting Texas is small. However, tropical systems have been known to move onshore along the Gulf Coast in October and November. If a tropical system does affect the Gulf Coast, fire potential would lessen, perhaps for as long as two weeks before slowly rebuilding. Tropical systems that do affect Texas during the fall typically originate in the Caribbean or spin up on the tail end of a frontal boundary that stalls over the Gulf of Mexico. While these systems bring beneficial rains to some areas, the western periphery experiences a strong increase in fire potential with subsidence, drying of fuels, low relative humidity, and strong winds. This is exactly the situation created by recent Tropical Storm Lee which drove several fires to exceed 10,000 acres in a very short period of time.

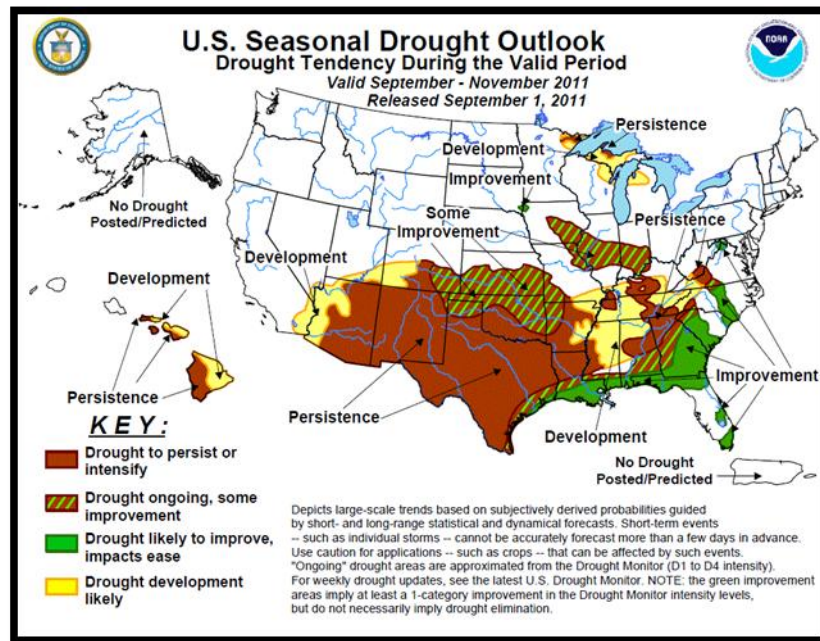
The Appalachian Mountain area is typically a concern during a dry fall. However, we expect frontal activity to provide periodic rains to eastern Kentucky, eastern Tennessee, western North Carolina, and western Virginia. While these areas will have the best prospects for fall precipitation (and eventually snow), overall rainfall in some areas will remain anemic. The Appalachian Mountain fire season is intimately tied to the frequency, not the amount, of rain received. Rainfall that comes every three to five days will prevent a fire season from developing in the Appalachian Mountains. Rainfall that comes at five to ten day intervals will allow for some fire activity in days seven through ten, but the fires will generally be small. If the frequency of rainfall goes beyond ten days, then the risk of fires dramatically increases and some of them will become large and /or exhibit difficulty of control. If the rainfall frequency goes beyond 18-21 days, then large incidents are a near certainty that often require the mobilization of Incident Management Teams or other resources from outside the state and local area. There are times when resources must be brought in from outside the Southern Area to manage fires under these low rainfall frequency conditions.

Central and southern Florida have seen ample precipitation to keep fire potential fairly low. However, ground water levels are historically low going into the winter dry season, and any ignition source will be problematic during the coming fall and winter months. The Florida panhandle continues to experience dryness, a condition that extends into southeast Georgia. The drier pattern of the last two weeks has caused the large Honey Prairie fire to become active again. Low water tables remain in place despite the robust rain from Irene. Winter is typically the dry season for Florida.

Most fires that occur in the fall season are human caused, although lightning will occasionally ignite a fire. Lightning occurring wherever there is record drought will likely create ignition, with extremely low relative humidities and high winds typical after cold front passage adding to control difficulty. In areas with very deep and dry organic soils, lightning strikes can still produce ignition and will, therefore, still pose a significant threat. Lightning occurring with mostly "dry" weather fronts are fairly common in September and October and can continue in November. Mild temperatures in October are expected to give way to some dramatic cold in November and December. The fall of 2011 will be colder than average, which normally reduces human activity and will ultimately help reduce human-caused fire. October and November are climatologically the driest months for much of the southern United States.

The strengthening La Niña signature in the tropical Pacific is just one of several large scale ocean-atmosphere cycles that will impact the southeast and contribute to a drier than average weather pattern for much of the region through the upcoming fall and winter. Abysmally low solar output will also play a significant role which is not yet well predicted or completely understood. Generally speaking, low solar output creates a condition that promotes the southward movement of Arctic air into the southern United States. The presence and strengthening of La Niña, among other signals, will contribute to a drier than average condition for much of the southeast as we move toward the end of the calendar year.

The seasonal drought outlook maps indicate increasing drought for much of the region to extend into December. There will likely be no break between the fall fire season and the traditional spring season across much of the region. While a return to an El Niño or a more neutral condition is expected by June, it will likely be weaker than those of the last twenty years. In addition, there is a small possibility that the La Niña cycle could extend later into the year. If so, the dramatic drought that is in place would actually worsen.



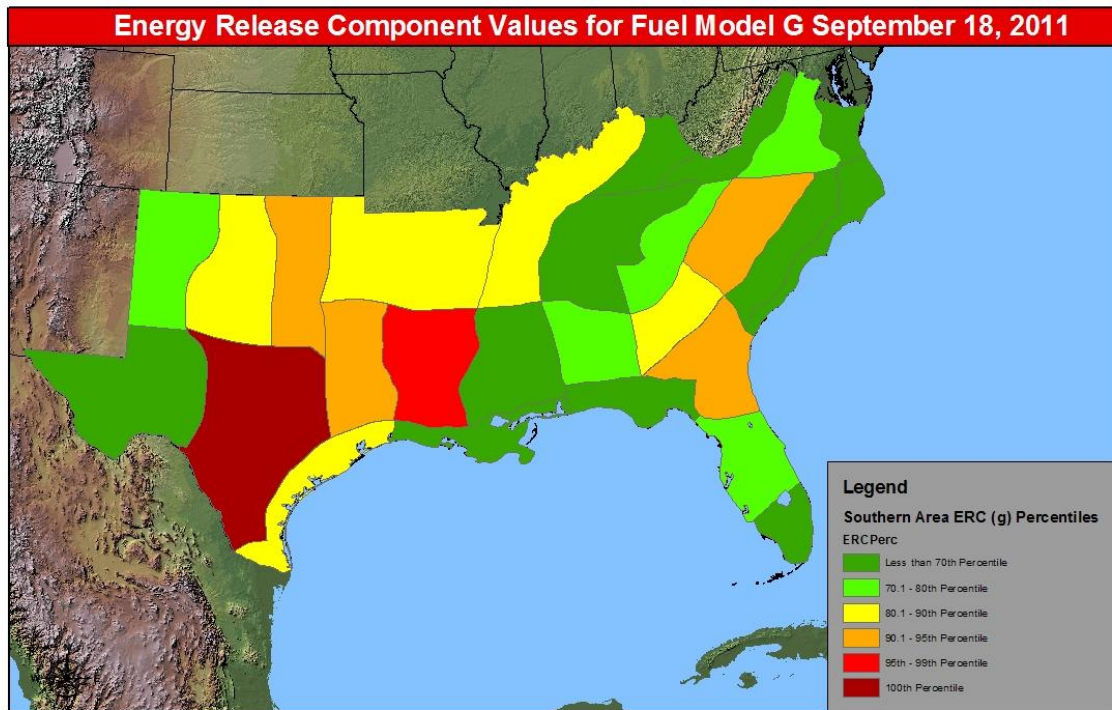
Fuels and Fire Danger

Long-term drying conditions have been in place for much of the region since the spring of 2011. The effect of this long-term moisture deficit has produced historically low fuel moisture levels across much of the south during the late summer and early fall of 2011.

Generally, extreme fire behavior can exist when two conditions are present. One of those conditions is the long term drying of fuels, which now exists across the majority of the Southern Area. The second is daily fire weather conditions (low humidity, high temperatures, and high winds), which can lead to large fire growth. This second condition is likely to develop based on the forecasted weather

for the next several months. Also, due to the long term drying of fuels, the critical fire weather thresholds normally used may be reached at more benign weather conditions. In other words, under normal fuel moisture conditions, firefighters might see elements of extreme fire behavior when relative humidity values drop below 30%. However, due to the long term drying of fuels, extreme fire behavior may begin at humidity values of 35 to 40%. 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 this fire season across the Southern Area. ERC for each Southern Area Predictive Service Area can be calculated based on weather measurements taken at Remote Automatic Weather Stations (RAWS).

The ERC map below illustrates the current dryness of fuels for the region. Large areas of Texas, Oklahoma, Louisiana, Arkansas, Georgia, South Carolina, and North Carolina are currently being impacted by high fire danger.



Energy Release Components for fuel model G, expressed as a percentile of their historical value. High values indicate areas where current ERC values are meeting or exceeding historical values for that area.

Fire Behavior

The combination of long term drying of fuels and the expected weather over the next several months indicates a significant probability of extreme fire behavior and long duration burning for much of the of the southern and western portions of the region. Without a significant change in weather conditions, firefighters could see unprecedented fire behavior as leaf fall occurs and grasses continue to cure.

Many fires will likely exhibit extreme rates of spread along with short and long range spotting. Active burning during the night will decline as humidity recovers with nocturnal cooling. Due to deep burning conditions, mop up times will likely be longer and fires will need to be checked for multiple days before being declared out. All these conditions lead to more resources being needed for fire suppression for both initial and extended attack.

It is also worthwhile to keep in mind the human triggers during the period of interest. Hunting season, fall agricultural burning, and the traditional Halloween fire period will add additional risks to the fire potential.

Summary Findings

- It will take an increase in precipitation over an extended period to erase fuel and soil moisture deficits.
- Following short duration precipitation events the potential to return to a period of high fire danger resulting in more Initial Attack and larger fires could occur fairly quickly (within 3 days).
- Daily low relative humidity values in the drier areas will result in continued high fire danger even with some precipitation unless rainfall returns to normal or above normal levels. This scenario should be expected as cold front passages become more frequent.
- Live fuels are currently entering their dormant phase in most of the Southern Area. Leaf drop will add fuel to the fuel bed and wind reduction will decrease inside of timbered areas. This will add to intensity and spread of fires, especially on slopes.

Conclusions

Most Likely Scenario High Confidence

The dryer weather pattern continues with infrequent significant precipitation observed and time between rain/precipitation events exceeds 10 days. Moderately windy conditions along with post cold front low humidity (10-25%) reaching critical levels will escalate fire behavior. The drought deepens with the fall fire season extending into the winter months. Fire danger indicators stay high to extreme, perhaps setting records for the winter months. A high level of localized extended attack

wildland fire activity occurs, as does the expected number of incidents needing Incident Management Teams. Outside assistance is required for teams and other suppression resources, high need to support Type I and Type II incidents. Implementation of prescribed fires will likely be negatively affected.

Best Case Scenario Low Confidence

Periodic significant rainfall and widespread cooler temperature during the fall months will keep fire activity to normal levels for this time of the year. Precipitation events frequency is in the 7-10 day range. Drought severity waxes and wanes with the drier, highest threat areas moving throughout the southern area.

Worst Case Scenario Low Confidence

Extreme drought takes hold across the entire region through December. Little if any rainfall takes place for an extended amount of time. NFDRS indices continually break records creating new historic highs. Extreme fire behavior and fire activity takes hold across the vast majority of states. Extended attack incidents are common. Area command teams will be needed.

Recommendations

- The Decision Support Team currently operating at the Southern Area Coordination Center should be maintained until region drops below Preparedness Level 3 or as conditions warrant. The Team should be augmented as needed to provide Fire Behavior, Fire Danger, GIS Analyst, and WFDSS specialists to support incidents and fire managers to assist in making decisions, and in assisting with predictive services.
- Supplement local and state initial attack resources earlier than normal.
- Additional aviation assets may be needed in areas which air tankers have not traditionally been utilized.
- Obtain and provide for detailed ongoing updates of current and forecasted fuels conditions.
- Issue fuels and fire behavior advisories as needed to communicate to fire managers the areas where extreme fire behavior is possible. If conditions persist this product should be updated within a 45 day period.
- Fireline tactics should be altered to provide for firefighter and public safety, and fire managers in areas with critical fire danger should be alerted to consider logistical needs for extended attack fires.
- Develop a product which integrates with the 7-day outlook product currently produced by predictive services, to predict fire potential for the upcoming 7 day period.

Assessment Team

Barry Garten, USDA Forest Service, Regional Office

Denver Ingram, National Park Service, SACC

Kevin Scasny, U.S. Fish and Wildlife Service, SACC

Jon Wallace, U.S. Fish and Wildlife Service, A.R.M. Loxahatchee NWR