Mesonet's OK-FIRE Program

article revised October 2014

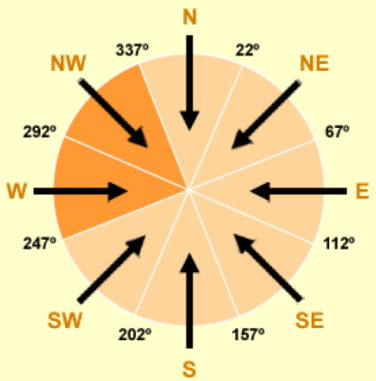
Introduction

Oklahoma's weather can bring a bad combination of heat, wind, and fires. OK-FIRE (http://okfire.mesonet.org) is a weather-based decision support system developed for wildland fire managers throughout Oklahoma. OK-FIRE products utilize the Oklahoma Mesonet and the National Weather Service's 84-hour North American Mesoscale (NAM) model.

OK-FIRE has a three-fold emphasis: (1) a comprehensive suite of products for fire weather, fire danger, and smoke dispersion which incorporate an 84-hour forecast; (2) the OK-FIRE wildland fire management website; and (3) regional training and customer support for users.

Prescription Forecast Element	Lower Limit	Upper Limit
Air Temperature (F)	35	
Relative Humidity (%)	40	
Wind Speed (mph)	5	15
1-hour Precipitation (inches)		
Heat Index (F) [heat stress]		90
Dispersion Conditions	Moderately Good	
1-hour Dead Fuel Moisture (%)	8	20
10-hour Dead Fuel Moisture (%)	8	
Burning Index (10*ft)		
Ignition Component (%)		
Spread Component (ft/min)		
Energy Release Component (BTU/ft2)		
KBDI (0-800)		

Wind Direction



click on the sectors you wish to prescribe

Fire Prescription Planner

The "Fire Prescription Planner" in OK-FIRE allows fire managers to specify lower and/or upper limits for variables pertaining to weather, dispersion conditions, dead fuel moisture, and fire danger. After the prescribed values are entered, the user can choose the Mesonet site closest to the burn unit. A table will be produced showing hours when all input criteria are met versus hours when the forecast falls outside the criteria ranges.

In the Planner, select "Lower" and "Upper Limits" for weather variables that are appropriate for the prescribed fire. Lower and/or Upper Limits can be entered for one, all, or any combination of the Fire Prescription Planner variables. Variables include air temperature (Fahrenheit), relative humidity (percent), average wind speed (miles per hour), one-hour precipitation (inches per hour), wind direction, heat index, dispersion conditions, and other fire danger variables. In the example on the left, the Fire Prescription Planner is using conditions for beginning burners, which you can select at the bottom of the Planner selections.

The Planner, as is the case with other OK-FIRE products, is based solely on one particular forecast model (the North American Mesoscale model or NAM). As with all forecast models, the NAM, while a good model, is never perfect and users are strongly encouraged to check the official National Weather Service (NWS) forecasts for any discrepancies with the NAM.

Oklahoma State University · Mesonet · University of Oklahoma

Fire Danger Variables

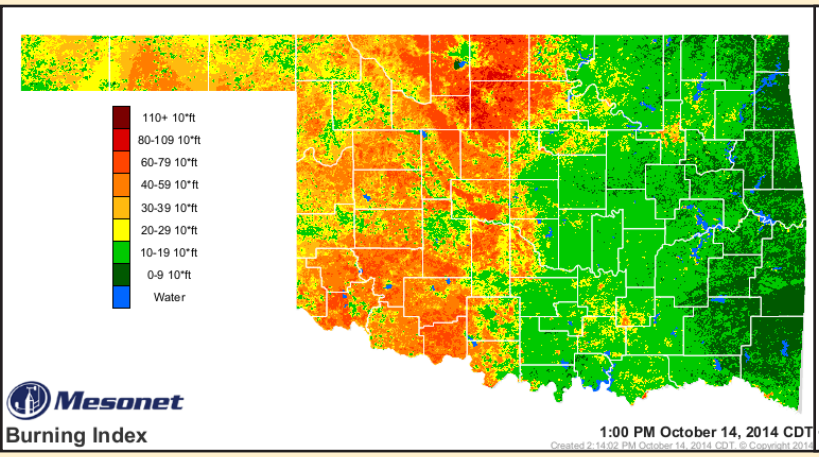
You can get a brief summary of current conditions and the fire danger for your selected Mesonet site on the homepage of the OK-FIRE website. This includes variables like temperature, relative humidity, burning index, spread component, and 1-hr fuel moisture.

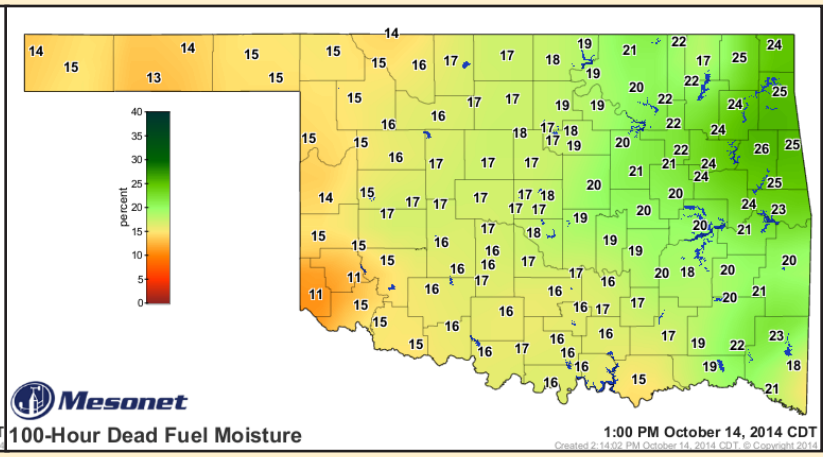
The most important fire danger index produced by the Oklahoma Fire Danger Model is Burning Index (BI), which relates to the intensity of the headfire and its flame length. To get the flame length in feet, divide BI by ten. Besides being a function of weather and dead fuel moisture, BI is also strongly influenced by the type, amount, and greenness levels of the native surface fuels being modeled.

Dead fuels are those wildland fuels whose moisture contents are controlled exclusively by changing weather conditions. Examples include dead herbaceous fuels, dead roundwood, fallen dead leaves and needles, and the litter of the forest floor. For purposes of fire behavior modeling, dead fuels are divided into four “timelag” categories: 1-hour, 10-hour, 100-hour, and 1000-hour fuels. The shorter the timelag, the more responsive the fuel is to changing weather conditions. For example 1-hour fuels only take on the order of one hour to respond to changing weather conditions, which explains why fire danger can be very high even right after a heavy rain if the subsequent weather conditions allow the 1-hour fuels to dry out.

Dead fuel moisture is calculated from observed and forecast weather data. Model calculations of 1-hour, 10-hour, 100-hour, and 1000-hour fuel moisture are made every hour at all Oklahoma Mesonet weather tower sites and can be found in the “FIRE” section of OK-FIRE under “Current Fire Danger” and “Forecast Fire Danger”, as can all other fire danger variables such as burning index.

Minco	**Fri 10/17/14**
Weather	**1:30 pm CDT**
Temperature:	**75°F**
Relative Humidity:	**33%**
10-m Wind:	**NNE 18 mph G23**
24-h Rainfall:	**0.00"**
Dispersion:	**Moderately Good**
Fire Danger	**1:00 pm CDT**
Current Fire Danger:	**HIGH**
Burning Index:	**47**
Spread Component:	**45**
Ignition Component:	**30%**
NFDRS Fuel Model:	**T**
1-hr Fuel Moisture:	**6%**
10-hr Fuel Moisture:	**12%**
KBDI:	**469**
Relative Greenness:	**39%**
Sunrise: **7:39 am**	Sunset: **6:56 pm**





Our Story

The Oklahoma Mesonet is a world-class network of environmental monitoring stations. The network was designed and implemented by scientists at the University of Oklahoma (OU) and at Oklahoma State University (OSU).

The Oklahoma Mesonet consists of 120 automated stations covering Oklahoma. There is at least one Mesonet station in each of Oklahoma’s 77 counties.

At each site, the environment is measured by a set of instruments located on or near a 10-meter-tall tower. The measurements are packaged into “observations” every 5 minutes, then the observations are transmitted to a central facility every 5 minutes, 24 hours per day year-round.

For help with this or other Mesonet products, please call 405-325-3231, or email us at operator@mesonet.org.

Mesonet
Oklahoma’s Weather Network