

OK-FIRE Basics for *PRESCRIBED BURNING*

(<http://www.mesonet.org/index.php/okfire>)

Fire Weather and Dispersion Variables:

| | | |
|-------------------------------|---------------------|--|
| Relative Humidity: | > 85% | Fire may not spread as fuels too moist; possible heavy smoke production |
| | 35-85% | Normal range for prescribed burning; however, consult your prescription for your fuel type |
| | 20-35% | Containment becomes difficult; suitable only if wide firebreaks are in place; not suited for volatile fuels; spot fires increasingly likely |
| | < 20% | Spot fires likely; burn with extreme caution |
| Wind Speed: | < 5 mph | Generally unsuitable as winds are too light to carry the fire consistently in a given direction; at such low speeds, winds are variable in direction. Suitable for brush piles |
| | 5-15 mph | The normal range for prescribed burning; however, consult your prescription for your fuel type. Wind direction should be consistent during the burn |
| | 15-20 mph | A threshold range; consult your prescription |
| | > 20 mph | Winds increasingly problematic for prescribed burns; higher gusts cause even more problems, leading to spot fires |
| Temperature: | >= 35F | Prescribed fire can take place under a wide range of temperatures; however, to keep water from freezing, keep to temperatures of 35F or higher |
| Dispersion Conditions: | >= MG (4) | If sensitive areas are downwind of the burn, burn only when dispersion conditions from the Oklahoma Dispersion Model are "Moderately Good" (MG = 4) or better (green colors on the maps) |

With respect to just temperature and relative humidity, a general rule of thumb (60:40 rule) for those with **limited** experience in prescribed burning is:

*Burn when temperatures are <= 60F **and** relative humidity is >= 40%.*

However, ***even with suitable weather conditions, the success of a prescribed burn depends on the surface FUEL properties*** – the fuel moisture levels of the live and dead fuels as well as their loads. Generally, a certain amount of dead fuel needs to be present to maintain and carry the fire. Looking at just weather and fuel factors, a general equation for a successful prescribed burn is:

Appropriate Fire Weather + Suitable Fuel Conditions = Successful Prescribed Burn

Dead Fuel Moisture (DFM):

A variable which is directly related to dead fuel is “dead fuel moisture”. In particular, 1-hour dead fuels (fine fuels like dead grasses and leaves) are critical, followed by 10-hour fuels (about ½” diameter), since their moisture contents respond quickly to changing weather conditions. In OK-FIRE dead fuel moisture is calculated from weather variables using the Nelson model.

| <u>1-h Fuels</u> | <u>10-h Fuels</u> | <u>Fire Behavior</u> |
|-------------------------|--------------------------|--|
| > 20% | > 15% | Fire may not spread as fuels too moist; possible heavy smoke production |
| 7-20% | 6-15% | Normal range for prescribed burning of 1-h and 10-h fuels |
| 5-7% | 5-6% | Containment becomes difficult; not suitable for volatile fuels; spot fires increasingly likely |
| < 5% | < 5% | Spot fires frequent; burn with extreme caution |

Again, one needs to check the condition of the fuels to be burned; one can have suitable dead fuel moisture for a prescribed burn, yet if the fuels are too green, the burn will not be successful.

Key OK-FIRE Products for Prescribed Burning:

CURRENT values of Relative Humidity, Wind Speed and Direction, 1-h and 10-h Dead Fuel Moisture, and Dispersion Conditions (*Mesonet station table(s) and regional maps on Home Page; “Current Station Conditions”; “Current Maps”*)

FORECAST (*NAM Model*) Maps, Charts, and Tables of the above (*12-hr forecast charts on Home Page; also in “Current Maps”, “Past & Forecast Animated Maps”, and “Past & Forecast Charts/Tables”*)

Fire Prescription Planner (check for time periods meeting prescribed values of weather, dead fuel moisture, and dispersion conditions through the 84-h forecast period)

As a check on the NAM model weather predictions, consult National Weather Service forecast products (site-specific chart and table forecasts for Mesonet sites); links to these can be found in the left menu section for the primary (default) Mesonet station on the home page.

For beginners, the following represents a safe set of conditions to execute a prescribed burn:

| | | |
|---------------------------|----------------------------------|-----------------|
| Air Temperature: >= 35F | Wind Speed: 5-15 mph | 1-h DFM: 8-20% |
| Relative Humidity: >= 40% | Dispersion Conditions: >= MG (4) | 10-h DFM: >= 7% |
| Heat Index: <= 90F | 1-h Precipitation = 0.00” | |

NOTE: *These are the variable values which are inserted into the prescription table of the Fire Prescription Planner when “Use Conditions for Beginning Burners” at the upper left of the table is selected.*