OK-FIRE WORKSHOP - LAB EXERCISE #2

SMOKE DISPERSION Products and FIRE PRESCRIPTION PLANNER

CURRENT DISPERSION CONDITIONS

Go back to the Home page (click the OK-FIRE logo at the top of the page where you are at).

For your primary (default) Mesonet site, what are the most recent surface dispersion conditions (from the Oklahoma Dispersion Model)? *(see Weather data table)*

Click on "Dispersion" in that table to get to the most current map of dispersion conditions and winds across Oklahoma. You can also access this map in the "Current Maps" section of the OK-FIRE website.

a) Where are the worst smoke dispersion conditions currently in the state (if at all)? *Note that 6 = excellent, 5 = good, 4 = moderately good, 3 = moderately poor, 2 = poor, and 1 = very poor.*

b) In what direction would a smoke plume move if a fire were in your county? *Use the wind vectors (arrows) to answer this question.*

FORECAST DISPERSION CONDITIONS

Note, as with the fire weather and fire danger variables, forecast charts and tables of dispersion conditions are available in the "Past & Forecast Charts/Tables" section. Let's look at the forecast dispersion chart for your default Mesonet station.

Click on "Past & Forecast Charts/Tables" in the left menu section. "Forecast" and "Charts" are already the defaults on this page, so nothing need be changed there. In the "Variable(s)" pull-down menu select "Dispersion and Wind Conditions" and then "Get Data".

Look at the forecast over the next 84 hours.

a) When are dispersion conditions expected to be at their worst?

b) What are the forecast wind speeds and directions during those times?

Note: During very poor to poor dispersion conditions, winds are variable in direction and very light to calm due to a surface temperature inversion. Under such conditions, forecasted wind directions can be unreliable as topographical effects come into play. Smoke near the surface will move with the heavier, colder surface air toward lower elevations due to cold air drainage.

FIRE PRESCRIPTION PLANNER

Click on “Fire Prescription Planner” in the left menu section. In the prescription table that appears, note that you can click on the name of each variable in the table to learn more about it.

Note that you can either enter your own prescriptions for your burn or use pre-set prescriptions if you’re a beginning burner. To do the latter, click on “Use Conditions for Beginning Burners” at the upper left of the table. If you enter your own values, note that you need not enter all the variables listed, just the ones in your prescription. Likewise, you need not enter both Lower and Upper Limits; use only one if desired. To erase all the values you’ve entered, you can hit “Reset Values” above the table.

Let’s take a simple case, which represents conservative burning conditions -

Air Temperature between 35F and 85F, Relative Humidity between 40% and 80%, and Wind Speed between 4 and 15 mph

Enter 35 as the “Lower Limit” and 85 as the “Upper Limit” for Air Temperature; 40 as the “Lower Limit” and 80 as the “Upper Limit” for Relative Humidity; and 4 for the “Lower Limit” and 15 for the “Upper Limit” for Wind Speed.

At the bottom of the prescription table, there are options for how far you wish to go through the forecast (the default in the “Show” pull-down menu is for the full 84 hours of the forecast) and whether to include all non-prescribed variables in the resulting forecast table. The default is to show just the prescribed variables (along with one or more variables, if not prescribed, which we deem important), but if you wish to show ALL non-prescribed variables in the forecast table, you can check that box. Note that you can also change the Mesonet station to a different one than the default station. Just click the green oval containing the station name at the bottom left of the table, and change to another Mesonet station. When you have finished everything on this page, click “Get Data” in the green oval at the bottom right of the prescription table.

The first column after the “Date/Time” column in the resulting forecast table is the “Criteria Met?” column. For those hours when ALL of your criteria are met (in this case the three variables - temperature, relative humidity, and wind speed), the cells in that column will be shaded in bright GREEN and contain “Yes”; those times not meeting all criteria will be shaded in bright RED and contain “No”.

Note that for each hour of the forecast period, each prescription variable’s cell is shaded either muted green or muted red, depending on whether its criteria were met or not at that hour. To be able to get a green cell in the “Criteria Met?” column, all prescription variables must have their cells green for that hour.

a) Are there any extended continuous times (at least three hours in a row) during the 84-h forecast period when all your criteria are met? Are the wind directions consistent (no major shifts) during these periods?

b) If so, what days/times are indicated as “windows of opportunity” for your prescribed burn? Do these periods occur during the daytime and are they of sufficient length to finish your burn?

Now let's do a more sophisticated prescription. Click "Change Prescription or Site" at the upper left of the forecast table, or use your browser back button. When you're back at the initial page, hit "Reset Values" above the prescription table, which will clear all your data fields. Let's put in the following prescription:

Wind Speed >= 4 mph (Lower Limit) but <= 20 mph (Upper Limit)
Dispersion Conditions >= Moderately Good (Lower Limit)
1-h Dead Fuel Moisture >= 7% (Lower Limit) but <= 20% (Upper Limit)
KBDI <= 650 (Upper Limit)
Wind Direction from the SW, SSW, S, SSE, or SE sectors

Enter the above values in the table (click on the five adjoining wind direction sectors) and observe the results (click "Get Data") for the same station. Note, in contrast to the last prescription, that we're not using relative humidity (rather, 1-h dead fuel moisture), allowing higher wind speeds between 15 and 20 mph, and also factoring in dispersion conditions, KBDI, and wind directions. So results will likely be different.

c) Are there any extended continuous times during the 84-h forecast when all these criteria are met? Do these periods occur during the daytime and are they of sufficient length to finish your burn?

Let's keep everything in the above prescription the same, but now specify:

Wind Direction from the NW, NNW, N, NNE, or NE sectors

Use your browser back button (or click "Change Prescription or Site") to get back to the prescription table. Deselect the existing specified wind direction sectors and select the new ones. Run the new prescription.

d) Has anything changed? Are there more suitable hours for your burn?

Note that we also have pre-set conditions for beginning burners that can be selected at the upper left of the prescription table. Click on "Use Conditions for Beginning Burners" and run the Planner. Choose a different Mesonet location this time. Also, this time CHECK the "Include All Non-Prescribed Variables" box to see how the resulting forecast table changes in its appearance.

e) Are there any extended continuous times during the 84-h forecast when all these criteria are met?

NOTE: *The forecast table in the Fire Prescription Planner, as with other OK-FIRE products, is based solely on output from the latest 84-h NAM forecast. As no weather forecast model is perfect, users are encouraged to check the official forecasts of the National Weather Service (NWS) for consistency or discrepancies in the weather variable portion of this forecast. In particular, consult the "NWS Forecast Chart (station name)" or "NWS Forecast Table (station name)" links in the left menu section. These provide the NWS hourly forecasts for your primary (default) station. To see these forecasts for another station, you'll have to temporarily change your default station to the other Mesonet station of interest. Finally, also remember that the further one goes out into the forecast period, the greater the uncertainty.*