VSMOKE Web Instructions

[VSMOKE Web Link](#)

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Explanation of the Input Fields of VSMOKE Web:

1. Location Lat/Lon: Pick the location on the map or use known latitude and longitude in decimal degree format. Don't forget that longitude is negative in the western hemisphere.

2a. Fire Size – Acres: Acres you plan to burn, from the burn plan. **Duration**: Estimate of duration of active, flaming fire.

2b. Ignition Method: There are only two options, **Head/Aerial**, and **Backing/Spot**. **Backing/Spot** is the default choice and is the most commonly used ignition method for prescribed fires. **Backing/Spot** ignition method usually produces moderate intensity fires. **Head/Aerial** will generate intense heat and as a result, most of the smoke will be lifted to the mixing height and will not be dispersed on the ground.

3. Fuel Type: The options are **Grass, Shrub, Litter, and Slash** which are cross-referenced with **Light, Moderate and Heavy** for a total of 12 types. For each fuel type, a default "**Tons/Acre**" is assigned. These are total tons/acre. If you have more detailed tonnage information, you may enter it in the "**Tons/Acre**" field, and it will take precedence.

4. Fuel Consumption: The options for Fuel Moisture Scenario are **Very Dry, Dry, Damp, and Wet**. Each Fuel moisture scenario has a default **% consumed**. If you have more detailed information, you may enter it in the **"% consumed"** field and it will take precedence.

5a. Emissions- PM 2.5 Emission Factor: The default is 27 lbs./ton. If you prefer other values, you may enter it here. It will affect "**Particulate Emission Rate**" in a linear fashion.

5b. Emission – Particulate Emission Rate: It is dependent **on PM 2.5 Emission Factor, % Consumed, Tons/Acre, Acres and Duration.**

5c. Heat Release Rate: It is related to the amount of fuel burned. Therefore, this value is dependent on **% Consumed, Tons/Acre, Acres and Duration**. A higher Heat Release Rate means more smoke will be lifted to the mixing height.

6a. Mixing Height: Smoke from fires will disperse better under higher mixing height. This value may be obtained from [fire weather forecasts](#) and will vary by location and time.

6b. Transport Wind: Smoke from fires will disperse better under strong transport wind speed. Transport wind direction will drive the smoke downwind. So, a northerly wind will bring smoke to the South. Transport Wind Speed and Direction values may be obtained from [fire weather forecasts](#) and will vary by location and time.

6c. Stability Class (**Pasquill, Turner or Pasquill/Gifford/Turner**): The more unstable the atmosphere, the better smoke will disperse. The atmosphere is progressively unstable from **Neutral (D or 4) , Slightly Unstable (C or 3), Moderately Unstable (B or 2) and Extremely Unstable (A or 1)**. This value may be obtained from [fire weather forecasts](#) and will vary by

location and time. VSMOKE does not allow entry of a Stability Class that is more stable than **Neutral.**

7. Run Model: Once all fields are entered correctly, click the "Run Model" button to run the model.

Optional Inputs

8a. Background PM2.5: Default value is 5ug/m3, but it could be as low as 1-2 ug/m3. It could be higher, especially in more populated areas. This value can be found for some locations at AirNow NC Map

8b. Plume Rise Fraction: This value varies from -1.0 to 1.0. The numerical value indicates the portion of smoke that will lift to the mixing height. A positive number means that the lifted smoke will rise straight up without curtaining. A negative number means that the lifted smoke will curtain as it rises. Because of the expected moderate heat from simple prescribed burns, smoke from prescribed burns is expected to curtain as it rises. Therefore, plume rise fraction usually has a negative value for prescribed burns. -0.5 is the default plume rise fraction in this application. If you feel that more 75% of the smoke from your burn is lifted up, you may enter -0.75. If you feel that only 25% of the smoke from your burn is lifted, you may enter -0.25.

9. HYSPLIT Info. Total Emission (PM2.5)= Particulate Emission Rate X Duration.