

Kansas Flint Hills Smoke Management Plan: The impact of weather conditions on smoke movement

The Kansas Flint Hills Smoke Management Plan is entering its second year in 2012. This comprehensive plan is designed to minimize the movement of concentrated smoke plumes into large metropolitan areas through voluntary participation. All Flint Hills landowners and managers who conduct prescribed burns should know what is in this plan.

To help educate all those affected, a series of radio interviews is being broadcast weekly each Monday on K-State's *Agriculture Today* talk show. These programs will explain the many aspects of the new plan. *Agriculture Today* is part of the K-State Radio Network. The broadcast interviews are podcast online at www.ksre.ksu.edu/news/DesktopDefault.aspx?tabid=66.

The following is a slightly edited transcript of the fourth in the 2012 series of *Agriculture Today* radio broadcasts on the Kansas Flint Hills Smoke Management Plan. This is an interview with Kris Craven, meteorologist with the National Weather Service office in Topeka, conducted by Eric Atkinson of the K-State Radio Network.

Q: Weather is a keystone to the whole thing, isn't it?

A: Absolutely. In terms of where the smoke goes and how it behaves, weather is integral to the process.

Q: What do we know in a general sense about how weather impacts smoke?

A: There are a lot of variables that go into how smoke moves through the environment. Obviously wind plays a role. And not just wind at ground level, but wind 2000 or 3000 feet up into the atmosphere. You need to think about where the smoke will go once it reaches those levels. Relative humidity has an effect. The lower the relative humidity, the more effective the burn will be as the grasses will be dried. The speed of the wind in the mixing layer will help determine how far the smoke will travel. Temperature will affect how deeply the atmosphere mixes. There are a lot of things that affect smoke movement.

Q: How does cloud ceiling affect smoke movement?

A: The general recommendation is that you burn when there is no more than 30 to 50 percent cloud cover. That should give you enough sunshine to allow the surface of the earth to heat up and to allow the atmosphere to get to a good mixing depth. We actually put out forecasts on that – the depth to which we think the atmosphere will mix on a given day. For relative humidity, the recommendation is in the 30 to 50 percent range. If it's higher than that, the fuel won't burn. If it's lower than that, conditions get dangerous.

Q: If you have high humidity, this will also affect the density of the smoke, correct?

A: Certainly. The greener the material you are burning, the more smoke it will produce. We're trying to spread out the period of time in which burning is conducted so that it's not all done on the same day or two in any one location.

Q: What can people expect to find of the ksfire.org web site in terms of weather information?

A: Since 2008 we have had been doing fire weather forecasts on the National Weather Service web site, listing parameters such as wind transport speed and mixing height wind speed. That information is on the weather.gov/topeka web site, or you can go to ksfire.org and click on the “Weather” link. The National Weather Service site has a “fire weather” page. There is information on that page in both Word form and tabular form. The tabular form is quite popular because it lists the weather by the hour. It is also in graph form. There is also an “activity planner” so that you can put in the weather conditions you want for a specific activity and it will let you know when those conditions are predicted to occur. Let’s say you want north winds and you want it to be 30 to 50 percent relative humidity and less than 50 percent cloud cover, it will spit out a bar graph and show you when all those criteria are likely to occur.

Q: So you don’t have to sort through a lot of information to find the guidance you’re looking for?

A: True, especially with the tabular data and the activity planner. You can just pick what you want to plot. If you don’t care about certain elements of the forecast, you can just choose not to plot those.

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