Kansas Flint Hills Smoke Management Plan: Fire Practices for Smoke Management

The following is a slightly edited transcript of the fourth in a series of K-State's Agriculture Today radio broadcasts on the Kansas Flint Hills Smoke Management Plan. This is an interview with Walt Fick, K-State Range Management Specialist, conducted by Eric Atkinson of the K-State Radio Network. Podcasts of all Agriculture Today interviews on the Flint Hills Smoke Management Plan can be found at:
http://ksfire.org/p.aspx?tabid=21

Q: What are the basic tenets of smoke management in regards to prescribed burning?

A: The key words are "avoiding," "diluting," and "reducing." In a fire management plan, the goal is basically to reduce the negative impacts on air quality: visibility, safety, and health. Those are all important issues. The approach is that by avoiding smoke movement into sensitive areas, we try to dilute any effect of smoke concentrating at high levels. And then there may be some management practices we can use to reduce the amount of smoke that is given off.

Q: Let's talk about those one-by-one then. Are there any fire management tactics that will help avoid air quality problems?

A: The key thing is to watch our weather conditions and try to avoid burning when smoke dispersal is going to be bad. Or another way of saying that is that managers should select days when smoke dispersal will be good. The weather is a key factor in that. We've always looked at temperature, humidity, and wind speeds. But for smoke dispersal, other key factors include mixing height. As we watch smoke rise into the atmosphere, it will get up to a certain level then start mixing with the atmosphere above. We like to see that at a minimum of about 1,800 feet. That gets the smoke off the ground where you don't have to worry about visibility at ground level.

Associated with that are the transport winds at that elevation. We like those to be about 8 to 20 miles per hour. Also, clouds play a role. If it's a completely cloudy day, that holds the smoke down. About 30 to 50 percent clouds is okay in terms of the impact it has on smoke dispersal. Most of this information is available on our website ksfire.org, or on the National Weather Service website at nws.org/topeka or nws.org/wichita, or whatever location you want. You can find all that information on those sites.

Q: The second part of this that you mentioned are the diluting effects that one can strive for in fire management. That gets back to the time of the burn?

A: Yes. It really gets back to the time that everybody's burning. If everyone burns the same day, or within the same few days, that's when we've had the problems. Normally, the burning is more spread out. In the southern Flint Hills they're typically starting in mid- to late-March, then the burning works its way north. If it would proceed like that year after year, we probably wouldn't have any problems with smoke concentration. But when everybody burns within a short period of time, all that smoke is up there at the same time. So

one way of diluting it is to spread out burning dates. That's easier said than done because people are waiting for the right timing based on their objectives. When the right conditions come around, then what's good for me is probably good for my neighbor. But we could reduce the amount of smoke if we could have a little more widespread planning, but that's maybe down the road if we don't do something different.

Q: The third facet of this is reducing the smoke emissions themselves. Can a pasture manager achieve that in the way they manage the fire?

A: I think so. At least they can take it into consideration. One thing that affects the amount of smoke is the quantity of material being burned. The type of grazing system we're using, whether the land is being grazed at all, the total number of acres that we burn – all of that has a big impact. Even the kind of vegetation has an impact. If you have a lot of woody vegetation, it takes a lot of heat to get it ignited but then it burns a long time. You're going to have a longer period of time with smoke coming off. The more frequent burning helps keep the woody plants down. But if you're burning every year, you may be contributing to regional smoke problems. Reducing the quantity of fuel that is burned is one thing we can do and have an impact.

The other thing to consider is how efficiently the fuel itself is consumed, or burned. Some people use back fires, and some use head fires. A back fire, that is going into the wind, does a more thorough job of burning but it takes a longer time. One way to reduce the amount of smoke produced is to get the fire over with quickly. As long as I can get a burn done safely in the shortest period of time, that's usually what I would like to do. In terms of the amount of smoke, though, we may be producing more smoke that way. The bottom line is that there are some differences between back fires and head fires.

Q: So it comes down to producers becoming more aware of how their practices affect smoke management?

A: I think so. We're going to burn for the same reasons we've always burned. I've always said that if you tell me what your goal is then we can talk about what the proper time might be and if there are some alternative times that would accomplish the same thing. If one of those alternatives is outside the month of April, I'd say go ahead and do it that way because we've got a lot of burning going on in April. So when you're deciding when to do a burn, take into account not only the effects it may have immediately on what you're trying to accomplish or the smoke concentration immediately around the burn site. We're just asking producers to think about where that smoke is going to go downwind.

One of the tools we're trying to add on our website is a model that should help predict where the smoke is going to go. It's going to be very user friendly. It will have a map so you can see where the plume of smoke is predicted to go. If it happens to be headed toward a metropolitan area like Wichita or Kansas City, all we are asking is that if you have another day that you could burn, then consider doing that so we don't get these problems with air quality in those cities.

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