

By Diana Olszowy

Wildfire is one of the most destructive natural forces known to humankind. “Wildfire” is the term applied to any unwanted and unplanned fire burning in forest, shrub, or grass. Wildfires can be ignited by a variety of occurrences, such as an occasional lightning strike, but human-related activities start the majority of our fires every year. Nine out of 10 wildfires in Kentucky are caused by humans. Unattended or out-of-control campfires, debris burning, intentionally set arson fires, or even equipment use can set off a blaze, especially during extreme drought conditions, like those we are experiencing this year.

Once a wildland fire has started, many factors contribute to its spread and intensity:

- fuel, such as leaves, needles, grass, branches, and logs;
- weather, including temperature, humidity, precipitation, and wind;
- topography, including percent slope, aspect, and shape of the landscape.

Fuel

Forestland fuels are separated into four categories: grass, brush (briars, shrubs, etc.), forest debris (leaves, small twigs, etc.), and slash (left over after a timber harvesting operation, windstorm, etc.). Each category has its own set of characteristics and can result in different fire behavior.

Small and fine fuels (grass, shrubs) burn hot and quick (flashy fuels); while larger fuels (large branches and logs) burn more slowly and often smolder after the fire has passed. An old stump can actually burn for

several days after a fire has been safely controlled. These burning remains, called snags, are often the cause of fires restarting. Special fire-fighting tactics must be utilized when dealing with snags.

Weather

Weather is the most variable factor and affects fire behavior most often. Wind increases the rate and direction of fire spread. Relative humidity and temperatures mainly affect fuel moisture content. Changes in the weather, such as an approaching cold front, can greatly affect wind speed and direction, temperature, and relative humidity, which in turn can greatly affect fire behavior. Wind affects fire behavior by bringing the flame closer to the fuels, basically driving the fire in a particular direction.

In periods of extreme drought like this year, fire behavior is extremely erratic, causing dry roots of even living trees to easily ignite and burn underground and, unfortunately, under fire control lines. It can be very difficult to extinguish a fire that is clearly visible, but a fire burning below ground is almost impossible to control. Understanding the relationship of weather to fire behavior is the most critical issue that firefighters face.

Photos courtesy: Kentucky Division of Forestry



Where There's Smoke There's Fire

Topography

The topography of the site consists of percent slope (steepness of the hillside), aspect (direction the slope faces in relation to the sun), and the shape of the landscape (narrow hollows or broken cliff lines, etc.).

- The *slope* of the hill determines how fast a fire can advance uphill. When a fire travels uphill, its heat, with the help of wind, “preheats” the fuel and drives off moisture in front of the flame, making those fuels easier to ignite and increasing the rate of spread. Basically, the steeper the slope, the faster the fire travels.

- A south-facing *aspect* receives the greatest amount of sunlight and therefore is hotter and drier than other aspects. Fuel types are usually different as well, with drier site species prevalent. North-facing slopes are typically moister and cooler and often forested, and fuels will take longer to ignite with the fuel moisture content higher.

- The *shape* of the landscape (lay of the land) can change the wind flow and cause the heat to concentrate into a hol-



low, causing a chimney effect for the wind and flames to maximize its speed uphill. Narrow hollows and saddles (ridges between two peaks) can channel wind and fire at more than twice the speed up the hill. These areas are extremely dangerous for firefighters because the smoke and flames can over-

come them before they have time to react or escape.

You can't outrun a wildland fire, and it's very difficult to outthink one, but you can protect your home and family by paying attention to the factors that affect fire behavior. For more information on how to become “firewise,” please visit www.forestry.ky.gov/programs/firewise/.

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