



# Wildfire & Weather


## General Information

The principal factors that greatly influence the start and spread of wildfires are **weather, fuel** and **topography**. Of these three factors, weather is the most variable and impacts fire behavior most often. The main weather factors that have an effect on fire behavior are **temperature, wind** and **relative humidity**.


Wind increases the rate and the direction of fire spread. Relative humidity and temperature mainly affect fuel moisture. 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 wildfire behavior. It is critical that firefighters understand the relationship of weather to fire behavior and keep abreast of any weather changes.

## National Fire Danger Rating System (NFDRS)


The NFDRS is a system that takes various weather factors and produces fire-related indices. The purpose of the NFDRS is to translate the effects of weather, topography, and fuel types into four index numbers that relate to the fire control problem in a particular area. The main indices are:

 **Burning Index: (BI)** A number related to the contribution of fire behavior to the effort of controlling the fire. A BI of 40 means that the flame length will be about four feet at the head of the fire.


$\text{Burning Index}/10 = \text{flame length at head}$

 **Ignition Component: (IC)** Probability rating that a firebrand (heat source) will cause a fire requiring suppression action. An IC of 35 indicates that 35 out of 100 firebrands will cause a fire requiring action.

$\text{Percent of firebrands igniting fires requiring action}$

 **Spread Component: (SC)** A rating of the forward spread of a head fire. A SC of 45 indicates the head of a fire will spread 45 feet per minute. The higher the rating the higher the potential for fires.

$\text{Number feet/minute head will spread}$

 **Energy Release Component: (ERC)** A number related to the heat energy released per square foot within the flaming front of a fire. The higher the ERC the more difficult fires will be to control.

$\text{Energy Release Component}/10 = \text{Btu/sq. ft. at the fire head}$



These indices are predictions of what the conditions will be like and **are not** intended to describe the fire behavior of a specific fire. The NFDRS indices indicate conditions that exist when a fire starts; they do not describe the on-going behavior of a fire. This will depend on the weather, fuels and topography as the fire burns.

## Class Day

In Kentucky the BI and IC are used to obtain an adjective rating that is referred to as the **CLASS DAY**. The Class Day is used by the Kentucky Division of Forestry to determine the amount of personnel and equipment that will be available for fire duty. Outlined below is a table showing the relationship between the BI and IC and the CLASS DAY.

## Kentucky Interagency Coordination Center Staffing Classes

Burning Index	Ignition Component				
	0 - 20	21 - 45	46-65	66 - 80	81 - 100
0 - 7	L	L	L	M	M
8 - 15	L	M	M	M	H
16 - 18	M	M	H	H	V
19 - 22	M	M	H	H	V
23 - 25	M	M	H	H	V
26 - 29	M	M	H	H	V
30 - 32	M	H	V	V	E
33 - 35	M	H	V	V	E
36 - 42	H	V	V	E	E
43 - 50	H	V	V	E	E

L	M	H	V	E
Low	Moderate	High	Very High	Extreme
Class I Day	Class II Day	Class III Day	Class IV Day	Class V Day