

Fire Behavior

Courtesy of the National Park Service

Fire is influenced by many factors, like geography, climate, weather, and topography.

Time Matters

The time of year influences the effects of fire. For example, wildland fire season in the western U.S. is June through October, while March through May is the fire season in the southeastern U.S. Most fires occur in the New England states in late fall. During some seasons, more moisture is present than in other seasons, thus reducing fire threat, this varies by geographic region.

Fuel

A fuel's composition, including moisture level, chemical makeup and density, determines its degree of flammability. Moisture level is the most important consideration. Live trees usually contain a great deal of moisture while dead logs contain very little. The moisture content and distribution of these fuels define how quickly a fire can spread and how intense or hot a fire may become. High moisture content will slow the burning process since heat from the fire must first eliminate moisture.

In addition to moisture, a fuel's chemical makeup determines how readily it will burn. Some plants, shrubs and trees contain oils or resins that promote combustion, causing them to burn more easily, quickly or intensely than those without such oils. Finally, density of a fuel influences its flammability. If fuel particles are close together, they will ignite each other, causing the fuel to burn readily. But, if fuel particles are so close that air cannot circulate easily, the fuel will not burn freely.

Soil types also must be considered because fire affects the environment above and below the surface. Soil moisture content, the amount of organic matter present and the duration of the fire determine to what extent soil will be affected by fire.

In many cases, fuels located on steep hillsides burn more quickly. Fire is able to travel up a hill or mountain faster than along flat ground because radiant heat warms up the fuel ahead of the fire, allowing it to ignite more rapidly.

Weather

Weather conditions such as wind, temperature and humidity also contribute to fire behavior. Wind is one of the most important factors because it can bring a fresh supply of oxygen to the fire as well as push the fire toward a new fuel source.

Temperature of fuels is determined by the ambient temperature since fuels attain their heat by absorbing surrounding solar radiation. The temperature of a fuel influences its susceptibility to ignition. In general, fuels will ignite more readily at high temperatures than at low temperatures.

Humidity, the amount of water vapor in the air, affects the moisture level of a fuel. At low humidity levels, fuels become dry and, therefore, catch fire more easily and burn more quickly than when humidity levels are high.