

Understanding the Fire Environment



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A fire environment is defined as the “surrounding conditions, influences, and modifying forces that determine wildfire behavior.” Firefighters recognize three components that affect the likelihood of a fire start: wildfire intensity, the speed and direction of travel, and the ability of firefighters to contain and suppress a wildfire. Topography and weather cannot be altered, but fuels (vegetation) can be modified. As a result, many of our opportunities to diminish the threat of wildfire lie in the appropriate removal and modification of vegetation.

Fuel is a requirement for any fire to burn. Fuels for wildfire almost always consist of living vegetation such as trees, shrubs, wildflowers, and grass, as well as dead plant debris such as dead trees, fallen branches, pine needles, dried grass, etc. When wildfire enters the wildland/urban interface, homes and cabins also become a source of fuel. When you create your defensible space, remember that size, amount, moisture content, arrangement, and other characteristics play a key role in ease of ignition, length of flames produced, rate of fire spread, and other fire behaviors.

Low relative humidity and hot, windy weather increase the chances of the occurrence of a major wildfire. Drought conditions further intensify the possibility of a wildfire start. These conditions allow easier ignition, cause fuels to burn more rapidly, and increase the intensity of wildfire. Strong winds, in particular, can quickly convert a small, easy-to-control fire into a catastrophic disaster in a very brief span of time.

Steepness of slope is the single most influential topographic feature to affect fire behavior. A wildfire will spread faster as the degree of slope increases. Narrow drainages (known as chimneys) can significantly increase the rate of fire spread. It is also important to note that south and southwest-facing slopes usually experience more fires. It’s something you should consider when selecting a location on your property to build your home.

Actually, there is a fourth component that affects the fire environment – humans. Increasingly, people are moving into high-risk fire environments. Narrow roads, poor access to property, lack of fire wise landscaping, inadequate water sources, poorly planned subdivisions, untreated wood shake and shingle roofs, etc., are prime examples of increasing the risk of wildfire in the wildland/urban interface zones.

Jack D. Cohen, a research physical scientist at the Fire Sciences Laboratory in Montana, wrote the following summary of his examination of the famous Cerro Grande Fire destruction incurred at Los Alamos, New Mexico in 2000.

“My examination suggests that the high ignitability of Los Alamos was principally due to the abundance and ubiquity of pine needles, dead leaves, cured vegetation, flammable shrubs, wood piles, etc., adjacent to, touching and/or covering the homes. Discussion with the Los Alamos Fire Department indicated that few wood roofs existed and thus were not a significant factor.”

Wildfire is a natural part of our Southwestern forests and grasslands. These natural landscapes were burning long before people inhabited places like Payson, Pine, Strawberry, or Christopher Creek. In 1999, the federal government spent \$591 million to fight fires that burned 605,000 acres in the USA (a light fire year compared to the national average of 1.1 – 10 million acres burned each year).

Many people build homes in this fire environment with little regard for wildfire. As populations increase in these wild lands, the likelihood of fire ignitions will also increase. Early in the 21st century, forests in the Southwest, depending on location, may carry up to several thousand trees per acre and can be several hundred times more dense than a century or more ago. The moisture, nutrient reserves, and growing space needed to sustain the explosive growth and biomass increase of the past 90 years or so does not exist in Southwestern forests ---- and it never has.

The overly dense forests of the 21st century are far more likely to burn with high intensity and thus, are far more difficult to contain and suppress. The result will be an increased potential for loss of human and animal life, increased property losses, damage to natural resources, wildlife habitat, and watersheds, as well as enormous amounts of money that will be needed to fight catastrophic wildfires.