

What is Wildfire Intensity?

News reports often use the term “intensity” to describe the danger associated with an ongoing wildfire event. But what does this term really mean? In highly technical terms a wildfire’s intensity is determined by the amount of heat energy generated over a unit of time per length of fire front. The amount of fuel available to feed the combustion process in combination with how fast the fire is spreading are obviously important factors governing a fire’s intensity.

A wildfire’s intensity definitely affects fire behavior and is a critical factor in determining the dangers firefighters face and therefore the suppression strategies that are reasonable to employ. In more practical terms, a fire’s intensity can generally be observed by the height or length of the flames generated. The greater the length of the flames, the higher the intensity and the greater the danger to firefighters. The table below describes how flame length affects the strategies firefighters’ employ to contain and control a wildfire.

Flame Length and Approaches to Fire Control	
Flame Lengths	Fire Suppression Strategy
Under 4'	Fire can be directly attacked on the perimeter of the burning area using hand tools and hose streams to douse the flames and construct a containment line.
4' to 8'	Heat is too intense for a direct attack on the flames by crews using hand tools; larger equipment such as bulldozers, fire engines, and aircraft dropping retardant will have to be utilized and containment lines will need to be wider.
8' to 11'	Fires may present serious control problems. Flames may spread into the tops of trees and move rapidly through brush and similar fuel. Construction of containment lines will focus on the sides of the fire while efforts to slow the flame front may be ineffective. There is a high risk of spot fires ignited by blowing embers and firebrands. Taking advantage of favorable changes in fuel, topography and/or weather conditions may be only way to control the flame front.
Over 11'	Control efforts on the flame front will be ineffective. Flames spreading through tree tops and rapidly through brush, spot fires occurring long distances from the main fire (perhaps a mile or more) and periods when flame spread is very fast are probable. Deliberately set backfires will be used to consume unburned fuel between the containment lines and the sides of the main fire. Back fires may be set in front of the main flame front using roads or similar barriers to hold the backfire. Favorable changes in fuel, topography and/or weather may be the deciding factor in controlling the flame front.



An example of a high intensity fire.
Photograph courtesy of the U.S. Forest Service.



A wildland firefighter fights a low intensity fire. Photograph courtesy of the U.S. Forest Service.

While weather conditions are not subject to deliberate modification, the character of the fuel available for burning can be changed. Removing and/or altering the character of hazardous fuels by employing defensible space principles can lower flame length and therefore fire intensity. This will allow firefighters to employ more aggressive control strategies and do so safely. Go to www.livingwithfire.info for detailed information on preparing yourself, your home, and the surrounding landscape to survive wildfire.