

Critical, New Firefighter Safety Zone Research (July 11, 2014)

The JFSP has funded the wildfire safety zone work of Bret Butler at the Missoula Fire Sciences Laboratory for many years. Bret is a research engineer and has developed flat terrain safety zone recommendations for firefighters. As a result of his initial work, the JFSP funded Bret's additional research which focuses on safe separation distances on slopes. Although results are preliminary and subject to change, this new research should be used to provide an extra margin of safety for all wildland fire personnel. U.S. Forest Service scientists Russ Parsons and Ruddy Mell collaborated on the project, providing assistance formulating and running the computer simulations that form the basis of the modified rule. *The calculation is based on vegetation height rather than flame height!*

[Firefighters watch for future releases and check the date of the table you are using.](#)

New Preliminary Proposed Safety Zone Rule (July 2014)			
Calculating a Safe Separation Distance (SSD)			
SSD = 8 * Slope wind Factor * Height of the surrounding vegetation			
SLOPE-WIND FACTOR			
Wind Speed	Flat 0% Slope	20% Slope	>30% Slope
Light 0-10 mph	1	2	3
Moderate 11-20 mph	2	3	5
Strong > 20 mph	3	5	6
Notes			
<ol style="list-style-type: none"> 1. For a 20-person crew, add 10 feet of radius and for a vehicle add another 5 feet of radius. 2. The area in red requires large natural openings or construction by mechanized equipment. 3. The proposed rule is to be used for flat ground rather than the existing flame height rule. 4. Also consider additional lookouts on the ground and in the air to monitor fire activity with early egress to escape routes and safety zones. 5. At 30% or greater slopes, hot gases tend to stay close to the ground. 			

Example from Existing Safety Zone Rule

Flames are 6 feet tall, wind speed is 10 miles per hour, slope is 20 percent and sagebrush is 3 feet tall.

Radius of the safety zone = 4 * flame height = 4 * 6 feet = 24 feet

Note: this work was based on flat terrain and no wind!

Example of Preliminary Proposed Rule

Wind speed is 10 miles per hour, slope is 20 percent, and sagebrush is 3 feet tall

From the table the slope wind factor is 2.

Radius of the safety zone = 8 * slope wind factor * vegetation height = 8 * 2 * 3 feet = 48 feet.

In these two examples, with slope, wind, and vegetation height remaining the same, the calculated safe separation distance of the proposed rule is double the distance of the existing rule. The difference is due to the influence of wind and slope on fire intensity.

Read the article in the International Journal of Wildland Fire

Butler, BW (2014) Wildland firefighter safety zones: a review of past science and summary of future needs. *International Journal of Wildland Fire* **23**, 295-308.

<http://www.publish.csiro.au/nid/114/paper/WF13021.htm>

Disclaimer: This proposed safety zone rule should be considered preliminary because it is based on limited data and analysis and subject to increase or decrease based on additional data.

It is presented for release this fire season with the intent of increasing firefighter safety and reducing risk of injury. It is likely that an updated rule will be released in the next year.

Monitor these websites for updates

www.firelab.org and www.firescience.gov

