



Research Brief for Resource Managers

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How Much Defensible Space is Needed to Reduce Home Losses in Chaparral?

Syphard, A.D., T.J. Brennan, and J.E. Keeley. 2014. The role of defensible space for residential structure protection during wildfires. International Journal of Wildland Fire 23:1165-1175.

For the past 50 years about 500 homes have been lost each year from wildfires on the chaparral-dominated landscapes of southern California. However, since the year 2000, this number has doubled and it's expected to continue rising with the onset of climate change and increasing housing growth.

One of the key concerns at the wildland-urban interface is the extent of vegetation treatment needed to produce "defensible space" around homes. On these landscapes the goal is to produce cost-effective defensible space that reduces fire risks for homes and yet does not result in unnecessary habitat loss, which can increase invasive weed growth and soil erosion.

Syphard, Brennan and Keeley asked how the size of the defensible space zone affected fire outcomes using a dataset of 687,869 homes with their property boundaries. The data included 4315 homes destroyed by major fires between 2001 and 2010 in San Diego County. They randomly selected one thousand homes that were destroyed by fire and 1000 homes that survived the same fires. Using

Management Implications:

- The most effective measures to reduce structure losses are to "reduce the percentage of woody cover up to 40% immediately adjacent to the structure and to ensure that vegetation does not overhang or touch the structure."
- There is no additional structure protection provided by clearing beyond 30m (100'), even on steep slopes, and the most important treatment zone is from 5-20m (16-58').
- The amount of cover reduced is as important as the fuel modification distance; however complete removal of cover is not necessary. The term "clearance" should be replaced with "fuel modification" to emphasize this fact.
- Ornamental vegetation in wildland settings can contribute to structure loss and should be managed in the same way as native vegetation in the defensible space zone.
- This study does not address the distance necessary to protect fire fighters which should be considered as a separate problem.

Google Earth aerial imagery, burned homes were examined in the year prior to the fire to determine the size of “defensible space” created by fuel treatments. Both property line measurements and effective distance measurements were gathered for all 2000 homes, along with the percentage cleared land, number of sides of structure with touching or overhanging vegetation, vegetation cover type, housing density, percent slope, and distance to the next road (Fig.1).

These variables were analyzed by four different methods to show that “defensible space increased the likelihood of structure survival during wildfire.” However, the distance required was never more than 30m (100 ft.), even on steep slopes, and was most effective between 5-20 m (16-58 ft.) from the home. The effect of the percentage of cover was as important as distance and was

effective when 60% of cover remained. Other important variables contributing to structure loss were ornamental vegetation and overhanging vegetation touching the structure.

While the results clearly show that new standards are needed to provide optimal defensible space around individual homes, the finding that “landscape factors such as low housing density and longer distances to major roads *were more important than distance of defensible space for explaining structure destruction*” is just as significant. This result emphasizes that reducing future wildfire losses depends on both better land use planning and appropriate mitigation methods.

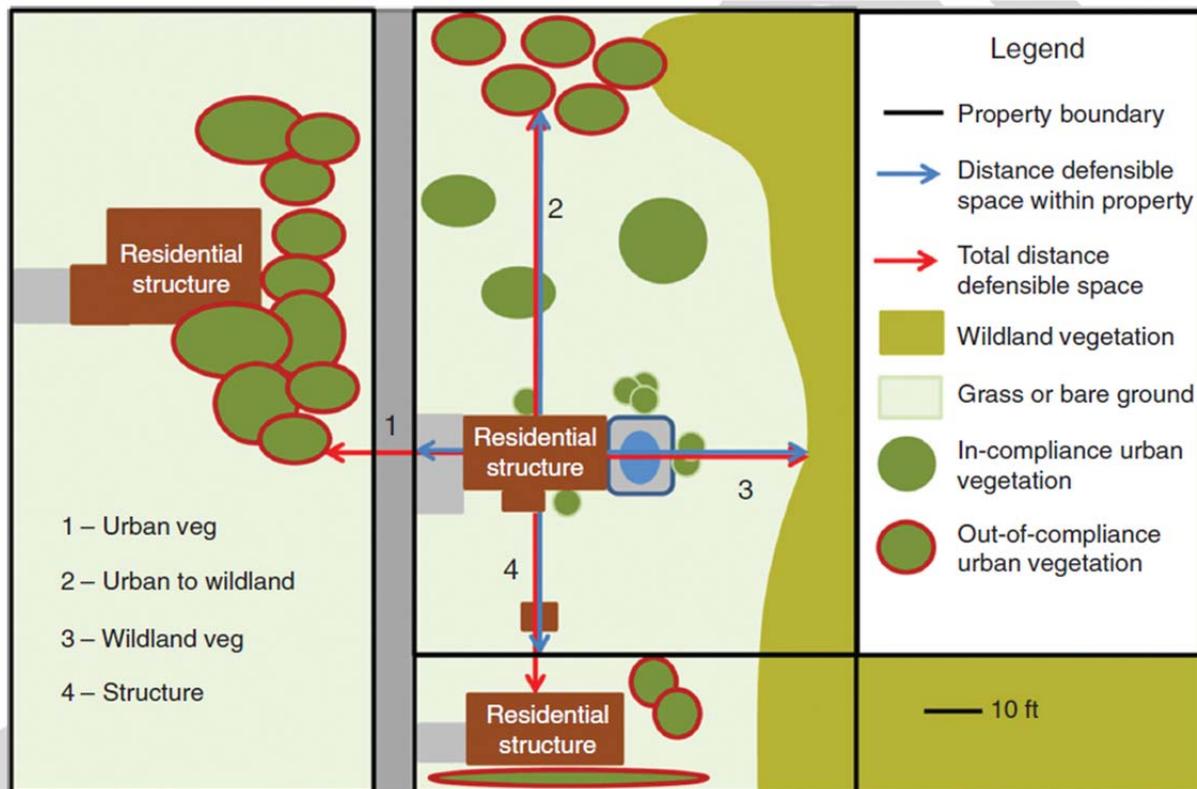


Fig. 2. Illustration of defensible space measurements. See Table 1 for full definition of terms.