



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

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 key concern 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.

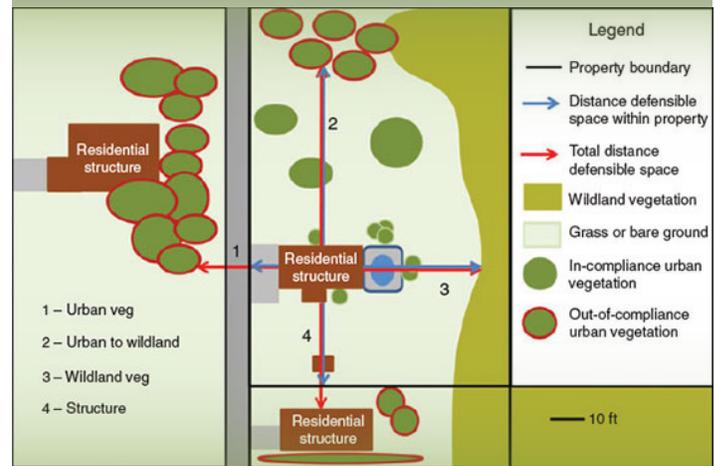
USGS and Conservation Biology Institute researchers analyzed how the size of the defensible space zone affected fire outcomes for homes. They used a dataset of 687,869 homes, including 4,315 homes destroyed by major fires between 2001 and 2010 in San Diego County. Researchers randomly selected 1,000 homes that were destroyed by fire and 1,000 homes that survived the same fires. Using aerial imagery, burned homes were examined in the year prior to the fire to determine the size of their "defensible space". Both property line measurements and effective distance measurements were gathered for all 2,000 homes, along with 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.

Researchers found 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; treatments were effective when 60% of cover remained. Other 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, study also found 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. This suggests that reducing future wildfire losses depends on both better land use planning and appropriate mitigation methods.

This Brief Refers To:

Syphard, AD, TJ Brennan, JE Keeley. 2014. **The role of defensible space for residential structure protection during wildfires.** *International Journal of Wildland Fire* 23:1165-1175. <http://www.werc.usgs.gov/ProductDetails.aspx?ID=5138>



An illustration of defensible space measurements used to analyze the role of defensible space for home protection in San Diego County. Figure 2 from Syphard et al. 2014.

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 ft), even on steep slopes. The most important treatment zone is from 5-20m (16-58 ft).
- 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.

RESEARCH CONTACT

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