Focusing on Structure Details to Help Homes Survive Wildfire


With tens of thousands of structures burned and hundreds of human lives lost in recent California wildfires, it has become more urgent to understand how to avoid such losses in the future. Syphard and Keeley accessed public records of wildfire structure losses (CAL FIRE Damage INSpection Program data) to answer three crucial questions: 1) How important was defensible space in protecting homes? 2) What structure characteristics increased the likelihood of homes surviving fire? And, 3) How did these patterns vary by region?

They analyzed the effectiveness of Home Ignition Zone (HIZ) characteristics for about 40,000 California buildings to determine which were the most important features in preventing structure loss between 2014 and 2018 (Fig.1). Most of the structures studied were affected by high-severity fires, with strong winds or other extreme fire behavior. After sorting the buildings into “survived” (about 10%) and “destroyed” (about 90%), statistical comparisons of the two groups showed that “hardened home” details were more important than defensible space distance to surviving wildfire across California during the period of study. For all of California closed eave structure was the most important feature for surviving fire, followed by multiple pane windows. Within geographic regions, fire-resistant siding was found to be important in the San Francisco Bay Area, while the presence of vent screens was very important in Southern California.

Defensible space, as defined within this study (sorted into coarse, 30m distance categories), was not a significant factor in preventing structure loss (Fig.1, orange). The authors highlight that defensible space closest to the home (especially the 0-5ft zone) may still be a determining factor, but was not tested here given the course 30m categories. Information on defensive actions from firefighters or civilians was only available for north-interior and Southern California and was found to be moderately important statewide.

Management Implications
- Hardening homes was strongly correlated with structure survival in the Wildland Urban Interface. The best ways to "harden homes" are to: enclose eaves and use multiple pane windows; use fire-resistant exterior siding, composite deck materials, and fine-mesh vent screens.
Figure 1. Deviance explained for building inspection variables statewide in three California regions. Defensive action and structure age were only available for North-Interior and Southern California.