CALIFORNIA FIRE SCIENCE CONSORTIUM

JOINT FIRE SCIENCE PROGRAM

Research Brief for Resource Managers

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How to Reduce House Exposure & Sensitivity to California Wildfire

Syphard, Alexandra D. and Jon E. Keeley. 2020. Why are so many structures burning in California? Fremontia 47(2): 28-35.

California's reputation for ruinous wildfire has been building for decades, starting with iconic images of Nixon hosing down his Bel Air house in 1961 and more recently in the record-breaking structure-loss numbers of 2017 and 2018. Long-term fire data shows an increase in structure loss through the 20th century California (Fig.1), with an average of 2700 homes lost per year from 2000-2018. But why and what can be done?

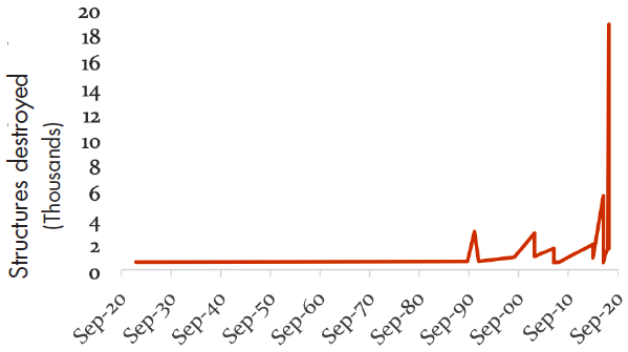

Figure 1. Annual number of structures destroyed in wildfires in California from 1920 to 2018. Source: California Department of Forestry & Fire Protection

Overall, there are two things at play here: an increase in the number of larger wildfires, in association with an increase in rapid **wildland urban interface (WUI)** development. Although the causes of the fires vary by ecoregion and require location- and driver-specific management tools, there are effective ways to reduce both structure exposure and structure sensitivity to fire across all of California. Specifically, the reduction of low-density, exurban development that places structures into the path of fire would significantly reduce structure exposure.

Further, the adoption of the homeowner mitigation variables that reduce ember impact and penetration would reduce structure

Management Implications

- To avoid exposing new development to wildfire throughout California, planners should avoid low-density exurban housing designs on highly variable topography and ridgelines.
- To reduce structure sensitivity to fire, builders and homeowners should close eaves (Fig.6), use fire resistant materials, screen vents, and clear vegetation up to 5-20m (16-66ft; Fig.4).
- The variables affecting the wildfires themselves, like behavior, activity, climate change and vegetation change, varied too much between ecoregions to apply one-size-fits-all management rules.

sensitivity to fire (e.g., Fig.6). Such "home hardening" features include closed eaves, screened vents, the use of fire resistant materials, and the creation and management of defensible space around homes (Fig.4).

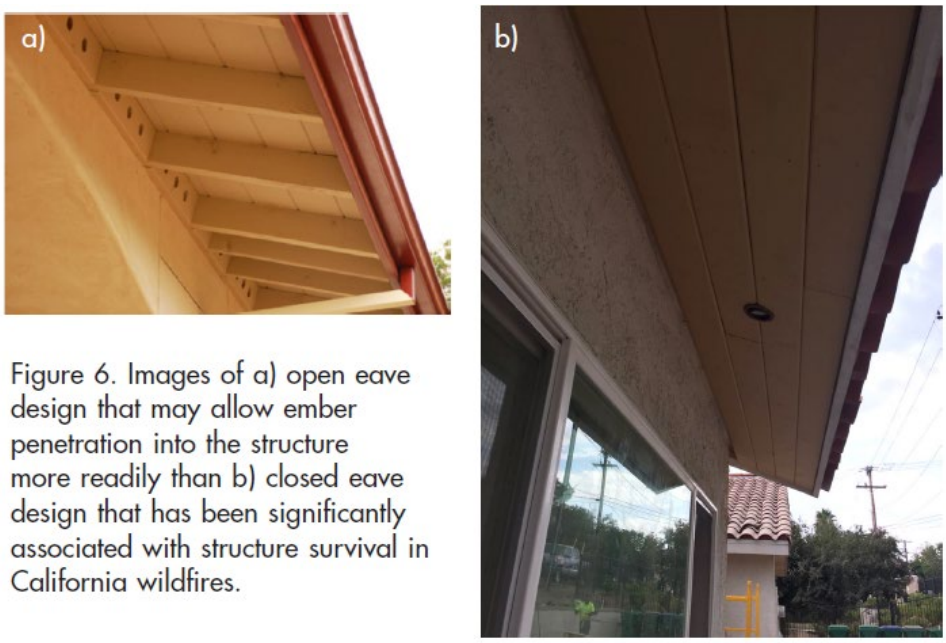

Figure 6. Images of a) open eave design that may allow ember penetration into the structure more readily than b) closed eave design that has been significantly associated with structure survival in California wildfires.

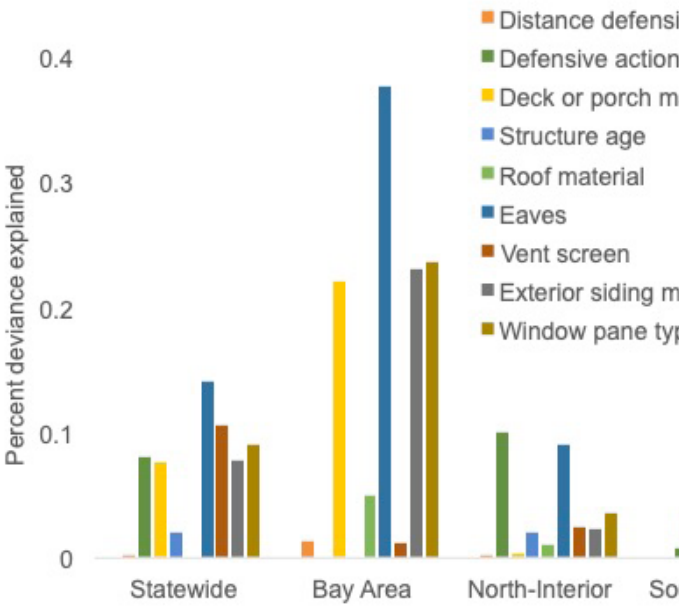

Figure 4. Relative importance (percent deviance explaine defensible space distance and structural characteristics ex structure loss to California wildfires from 2013–2018 for state and broken into three broad regions. *Figure modified Syphard and Keeley (2019).*