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Housing Location Factors Determine Risk of Structure Loss from Wildfires in Southern California

Wildfire risk reduction efforts in southern California focus primarily on fuel reduction and less so on house characteristics and homeowner responsibility. However, the extent to which land use planning could alleviate wildfire risk has been largely missing from the debate, despite large numbers of homes being placed in the most hazardous parts of the landscape.

A *PLoS ONE* study authored by Conservation Biology Institute ecologist Alexandra Syphard, USGS fire ecologist Jon Keeley and colleagues from the University of Wisconsin examined how housing location and arrangement affects the likelihood that a structure will be lost when a wildfire occurs. Researchers developed an extensive geographic dataset of structure locations, including more than 5,500 structures in the San Diego region and Santa Monica Mountains region that were destroyed or damaged by wildfire since 2001, and identified the main contributors to structure loss.

The arrangement and location of structures strongly affected their susceptibility to wildfire. Structure losses were greatest in areas with a history of frequent fire. Losses also were higher when structures were surrounded by wildland vegetation, and were higher in herbaceous fuel types than in higher fuel-volume woody types. Housing arrangement was also important, as destruction was most likely at low to intermediate structure densities.

Researchers also tested fire hazard maps developed using housing pattern and location against traditional maps based on the assumption that fuel distribution is the primary determinant of hazard. The fuel-based maps correctly identified general patterns of fire hazard across the state. However, at the regional scale, fuel-based maps did not predict structure loss as well as maps developed using a combination of factors that included housing arrangement and location.

Management Implications

- Land use planning and housing development policies should be important components of fire risk management plans for southern California's wildland-urban interface.
- Housing location factors, such as surrounding vegetation type and history of frequent fire, highlight the need to reexamine existing policies on fuel load reduction. Woody fuel clearing may increase highly ignitable and flashy herbaceous fuels, which were correlated with structure loss in Ventura and Los Angeles counties.
- Traditional fire hazard maps based primarily on fuel distribution do not predict structure loss at the regional scale compared to fire hazard maps that incorporate multiple variables, including housing arrangement and location.

THIS BRIEF REFERS TO:

Syphard, AD, JE Keeley, A Bar Massada, TJ Brennan, VC Radeloff. Housing arrangement and location determine the likelihood of housing loss due to wildfire. *PLoS ONE* 7(3): e33954. doi: 10.1371/journal.pone.0033954

<http://www.werc.usgs.gov/seki>

<http://www.werc.usgs.gov/ProductDetails.aspx?ID=4692>

The strong importance of housing arrangement and location indicate that land use planning may be a critical tool for reducing fire risk, but it will require reliable delineations of the most hazardous locations.



Jon Keeley/USGS

Housing location can determine the likelihood of structure loss due to wildfire.