

BRETT FRENCH Of The Gazette Staff | Posted: Tuesday, July 7, 2009 12:00 am |



Courtesy photo

Ruins of two homes in the Trails community burned during the Witch and Guejito fires in 2007. To reduce structure losses from future wildland urban interface fires, NIST has reconstructed a timeline of the fire events, including the defensive actions taken by first responders.

Why does one home in a subdivision burn during a wildland fire while others surrounding it remain unscathed?

That's part of what researchers at the National Institute of Standards and Technology documented during the first of a three-part study. The first portion of the study released last month examined in great detail the 2007 Witch fire north of San Diego.

Part of what researchers Alex Maranghides and Ruddy Mell found was that two-thirds of the 74 homes destroyed in the Witch fire were ignited directly or indirectly by embers from the wildland fire or other burning structures or vegetation.

"This is an important finding because current guidelines to make structures more fire-resistant offer little guidance on how to make structures more resistant to an ember attack," Maranghides said in a statement.

Carried aloft by winds, firebrands started falling in the San Diego neighborhood of The Trails about an hour and a half before the main fire - which was five miles away - reached the subdivision. Although the main fire's arrival consumed the majority of the homes destroyed, the early ember fall ignited three structures and some vegetation.

While a home on the perimeter of the development next to brush would seem a likely target to burn as a wildland fire advanced, nearly half of the homes destroyed were in the interior of the community.

The report found that "out of the 74 destroyed structures, 38 were on the perimeter and the remaining 36 in the interior of the community."

"Forty percent of homes on the perimeter were destroyed, compared to 20 percent in the interior. ... In the interior of the community, structure losses were a result of exposure to embers generated from burning wildland and residential vegetation and structural fuels," according to the report.

Veteran wildland fire researcher Jack Cohen of the Missoula Fire Sciences Laboratory in Missoula said the study confirms what he has known and suspected since 2000 about firebrands being the principal ignition source for structure fires.

"In general what they're finding is consistent with what I found in the past," he said. "They've been more systematic and taken more time to collect specific information. But it's the first instance they've examined."

He said the same principles apply to fires in Montana.

"The bottom line is the physics of fire is common in both places," he said. "Every wildfire presents a somewhat different set of conditions - nevertheless, the same principles apply."

As part of the NIST study, ignition points for partially burned structures were documented. Of the 16 structures that were only damaged in the fire, five of the fires started on decks, and another five started on detached garages or outbuildings. The homes were protected by firefighters; they might otherwise have been consumed in the blaze.

The NIST study's objective is to develop tools for improved risk assessment and risk mitigation in wildland urban interface communities in the next four years. The communities account for the most expensive portion of the nation's firefighting costs, as well as some of the most dangerous.

According to a study by Headwaters Economics, Montana ranks third in the nation for homes in the wildland urban interface, with the potential to add many more.

The second paper in the NIST study will look at the flammability of different construction materials and landscaping and their effect on a structure's survival. A third report will use a computer-generated virtual community to test the fire behavior predicted by different fire models and compare the results to the observed fire behavior.