

North Texas wildfires spark historic federal-state collaborative study

August 3 2011



A member of a joint NIST-Texas Forest Service study team collects data on a Amarillo, Texas, building damaged by wildfires in February 2011. Credit: NIST

Two wildland-urban interface (WUI) fires earlier this year outside of Amarillo, Texas, that destroyed 70 homes, burned more than 25,000 acres of land, and caused nearly \$6 million in property damage. But thanks to a collaborative effort between the National Institute of Standards and Technology (NIST) and the Texas Forest Service (TFS), they are now the most thoroughly investigated and scientifically evaluated events of their kind.

During a three-week reconnaissance following the start of four fires in the Amarillo area on Feb. 27, 2011, a NIST-TFS study team—for the

first time in an actual fire situation—used a NIST-developed, two-tiered WUI data-collection methodology to acquire approximately 163 gigabytes of data and more than 29,000 photographs to document two of the blazes, now known as the Willow Creek and Tanglewood Complex fires.

This massive amount of accumulated information is the foundation of a NIST-TFS study assessing the impact of the two wildfires on structures in the region.

"We gathered as much data as possible to document the topographical features of the region, detail the types and construction of structures that were impacted or endangered by the fires, identify defensive actions taken, and develop a timeline of the fires' movement and spread," says NIST fire protection engineer and Amarillo study team leader Alex Maranghides. "This will allow us to understand why some structures burned to the ground while others close by did not. That knowledge could help us build more fire-resilient buildings in the future."

Fortunately, Maranghides had trained TFS field investigators last fall on the use of the NIST data collection methodology, so they were in the field employing the two-tiered system within 48 hours of the start of the Amarillo fires. The first tier—a survey for recording broad observations of damage across the entire fire perimeter—provides input for the second tier. The latter includes a kit with tools designed to capture the specific details needed for developing a precise fire timeline, building computer models to study a fire's behavior in depth, and most importantly, identifying and assessing all of the factors that determine the response of different structures to a WUI fire (such as the types and amounts of combustibles on or around a structure). Maranghides and colleague Glenn Forney traveled to Texas in early March 2011 to assist the TFS investigators with their reconnaissance and to evaluate how the NIST data-collection system performed in the field.

"The level of detail that can be obtained with our system is a vast improvement over traditional data-collection procedures that focus simply on the number of structures damaged or destroyed, without taking into account the underlying factors that actually cause the destruction," Maranghides says.

The fact that TFS staff had canvassed the Tanglewood Complex last October to assess its susceptibility to a wildfire event was an added bonus for the NIST-TFS study. "This gave us the unique advantage of having data collected about the area before, during and after the fire," Maranghides says.

The Amarillo study is part of a broad NIST program to study WUI fires around the nation to gain a better understanding of their behavior; develop and standardize data collection and computer modeling tools; and facilitate the creation, testing and implementation of innovative [fire](#) protection and prevention methods. These research efforts will lead to improved standards, codes and practices to address WUI fires in the United States.

More information: [www.nist.gov/manuscript-public ...
ch.cfm?pub_id=908719](http://www.nist.gov/manuscript-publication-search/?pub_id=908719)

Provided by National Institute of Standards and Technology (NIST)

Citation: North Texas wildfires spark historic federal-state collaborative study (2011, August 3) retrieved 26 June 2024 from <https://phys.org/news/2011-08-north-texas-wildfires-historic-federal-state.html>

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