Wildland-Urban Fire Destruction and Opportunities for Preventing Disaster

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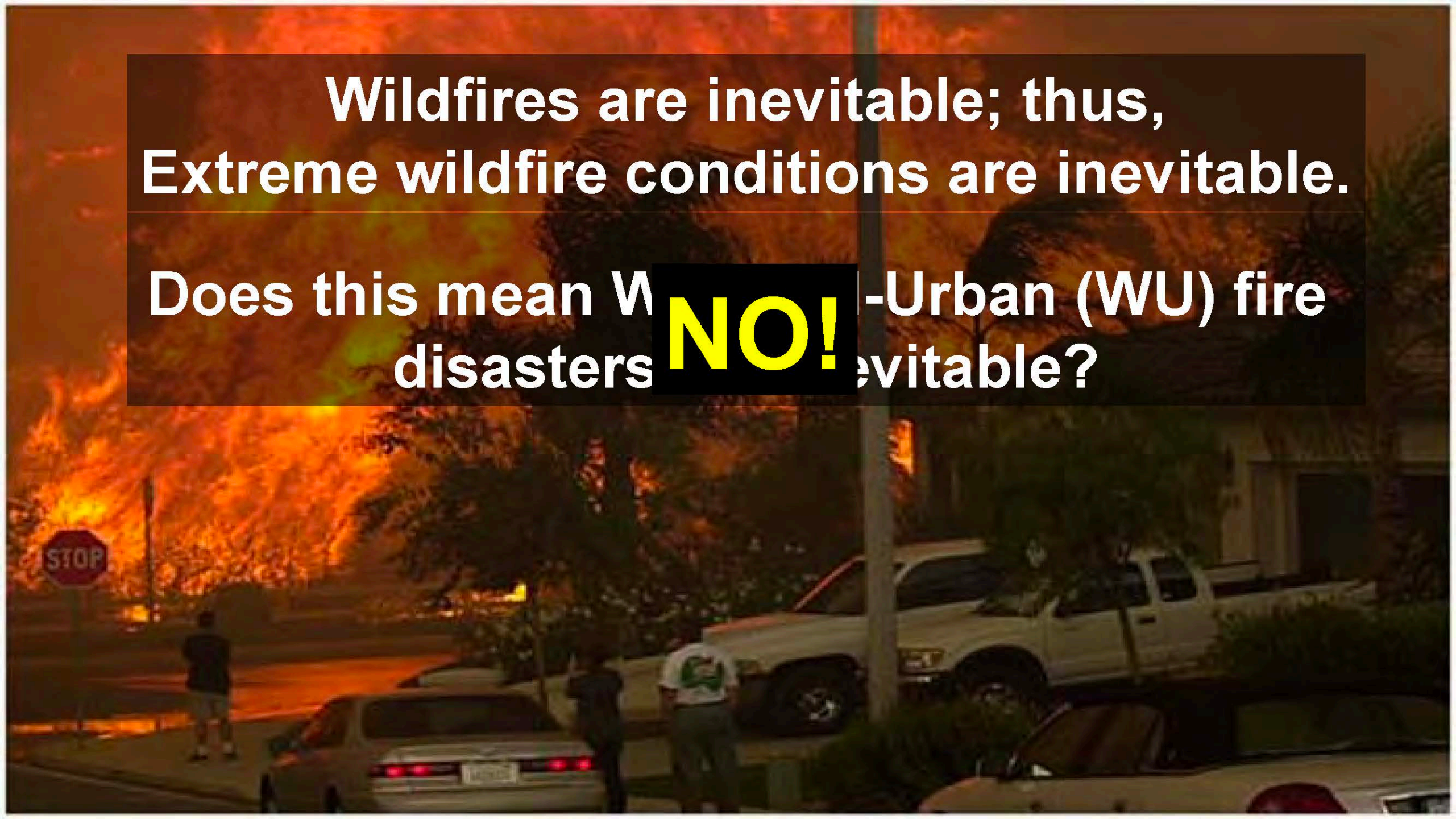
<u>Wildland-Urban (WU) fire disaster</u>:

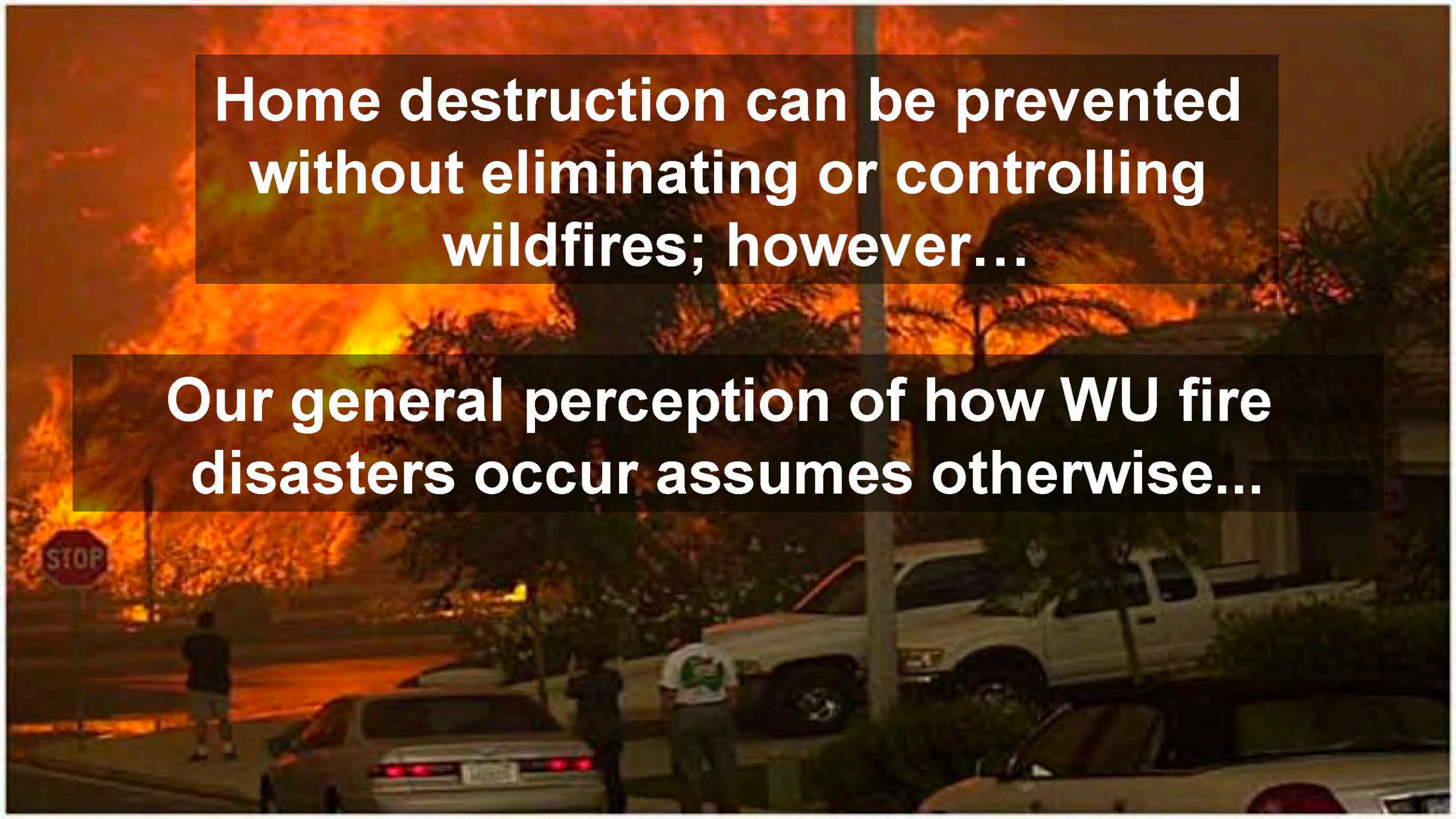
Many homes and businesses burn to total destruction during extreme wildfire conditions.



Wildfires are inevitable; thus,
Extreme wildfire conditions are inevitable.

Does this mean W -Urban (WU) fire disasters evitable?

NO!


Home destruction can be prevented without eliminating or controlling wildfires; however…
Our general perception of how WU fire disasters occur assumes otherwise...
STOP


“The wildfire swept through the community with a tsunami of flame.”

However…

Typical patterns of WU fire destruction do not support "*walls of flame sweeping*" through communities.


California 1993
Miracle Vegetation?!
What else didn't burn?!
without protection.


California 1980
These homes ignited from lofted burning embers (firebrands) not wildfire flames!

Los Alamos, NM 2000

Homes burning hours after the wildfire passed the community.

Intense wildfire never spread to this residential area.

Houses are burning but not the tree canopies.

Total home destruction next to green vegetation!

Los Alamos, NM
2000

NFPA

Unconsumed tree canopies amid total home destruction indicate wildfire flames did not spread though the community and burning trees did not ignite the homes.

The burned trees adjacent to the homes ignited because of the burning homes.

California 2007

The WU fire continued as an urban conflagration hours after the wildfire had ceased significant activity near the community.


California
2018

Commonly communities burn by fire spreading through residential fuels – the vegetation and structures within the community.

Homes ignite and burn hours after significant wildfire activity has ceased at the community edge.

The community continues to burn without the wildfire!

What do unconsumed vegetation and homes adjacent to total destruction indicate?

Wildfire does not spread through the community like a tsunami that "explodes houses in flame" leaving total destruction in its wake…

Intense, simultaneous heating across wide areas of structures does NOT occur.

Local conditions determine home ignitions.

Although initiated largely by firebrands from intense wildfires, burning residential fuels – homes and vegetation – continue the fire spreading within the community.

Counterintuitive:

The flames of intense wildfires do not heat objects to ignition over large distances!

Local conditions were not sufficient for ignition.

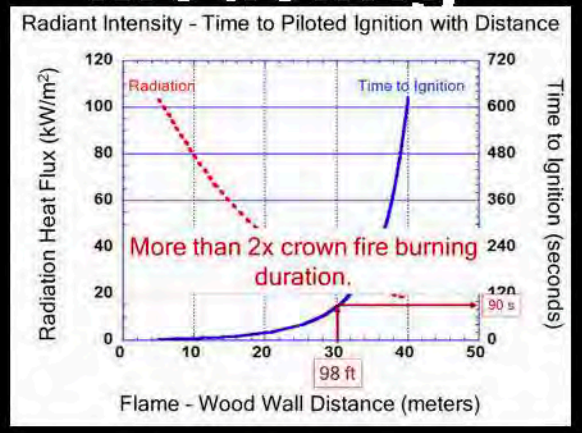
Local conditions were sufficient for ignition.

How far is *local*?


Maximum Distance for Wood Ignition
from Flame Front Exposure

WU Fire Research Results

Modeling



Experiments

Examinations

The conditions within 100 feet of a home principally determine home ignitions during extreme wildfires.

Home ignitions during extreme wildfires are principally determined by the ignition characteristics of a home in relation to burning objects within 100 feet of a home.

This area is called the *home ignition zone* – the HIZ.

Firebrands – Principal Ignition Mechanism

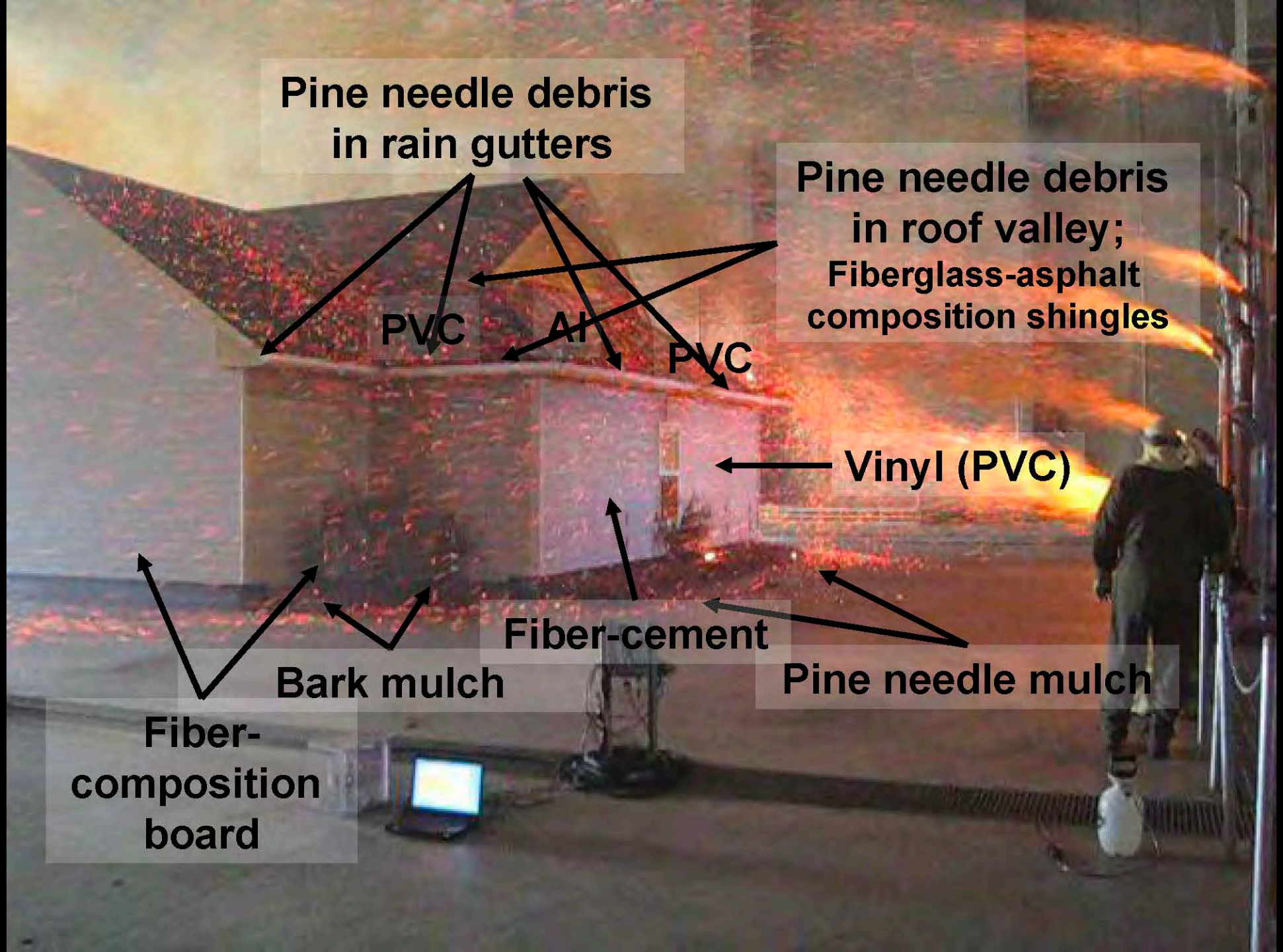
Firebrand exposures are inevitable during extreme wildfires.

Firebrands ignite structures and vegetation within communities at distances of ½ mile and more during extreme wildfires

Regardless of the distance lofted from the wildfire, firebrands only generate ignitions at their location of accumulation.

Firebrand Ignition Experiments

Conducted at the IBHS Research Center
(Insurance Institute for Business and Home Safety)

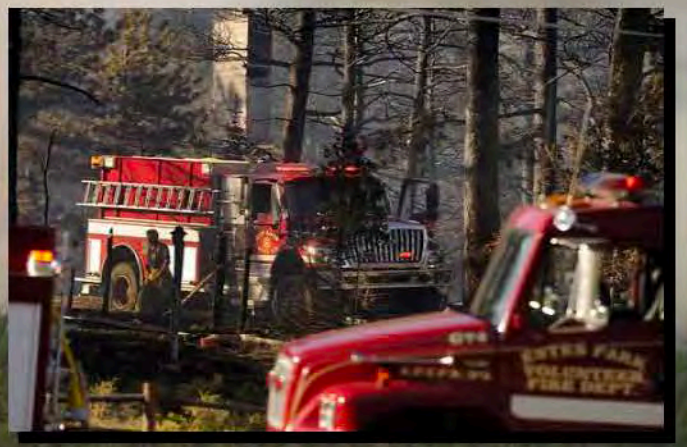

Pine needle debris
in rain gutters
Pine needle debris
in roof valley;
Fiberglass-asphalt
composition shingles
PVC
Al
PVC
Vinyl (PVC)
Fiber-cement
Bark mulch
Pine needle mulch
Fiber-
composition
board

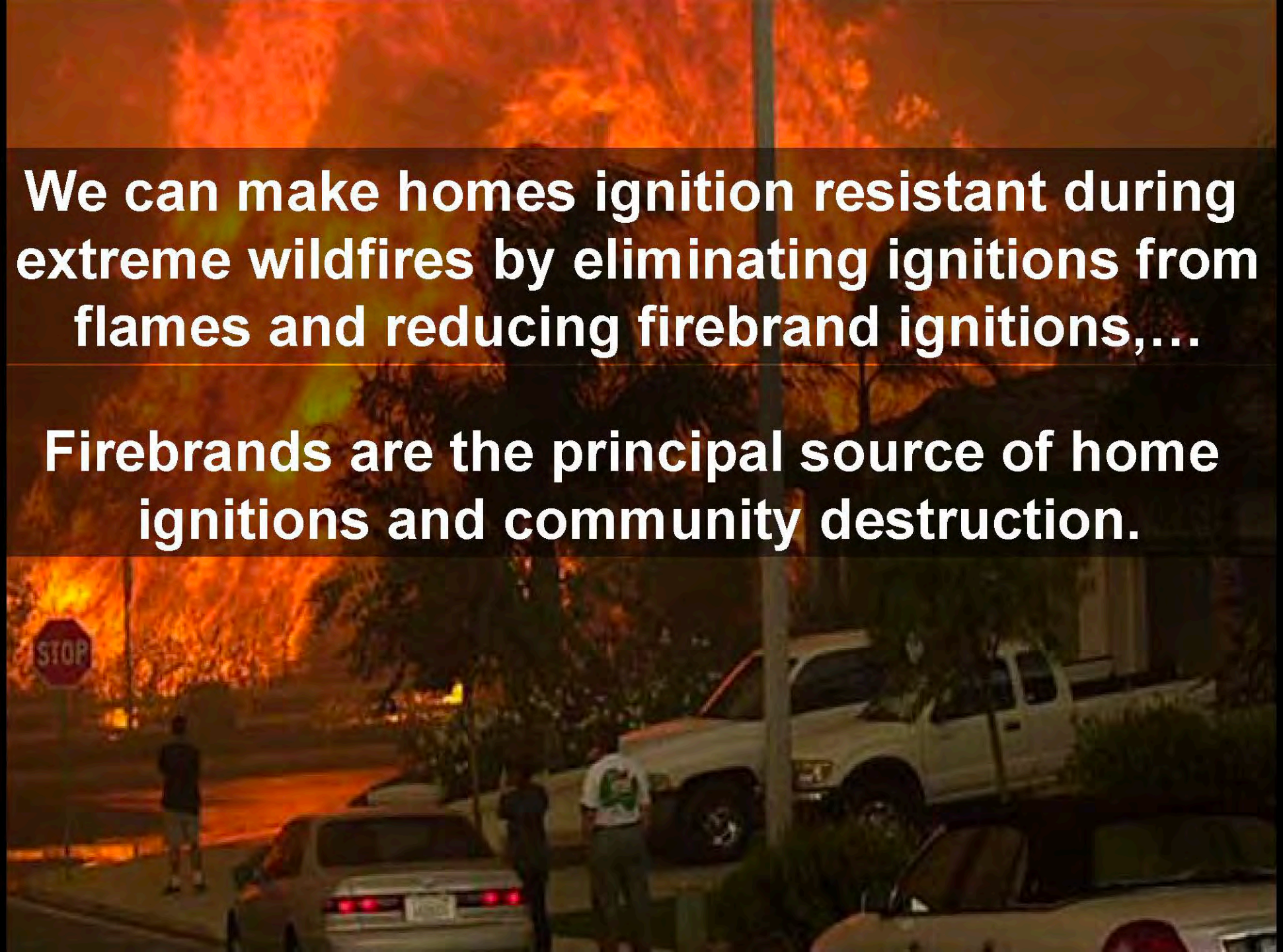
WU fire disasters have only occurred during extreme wildfire conditions.

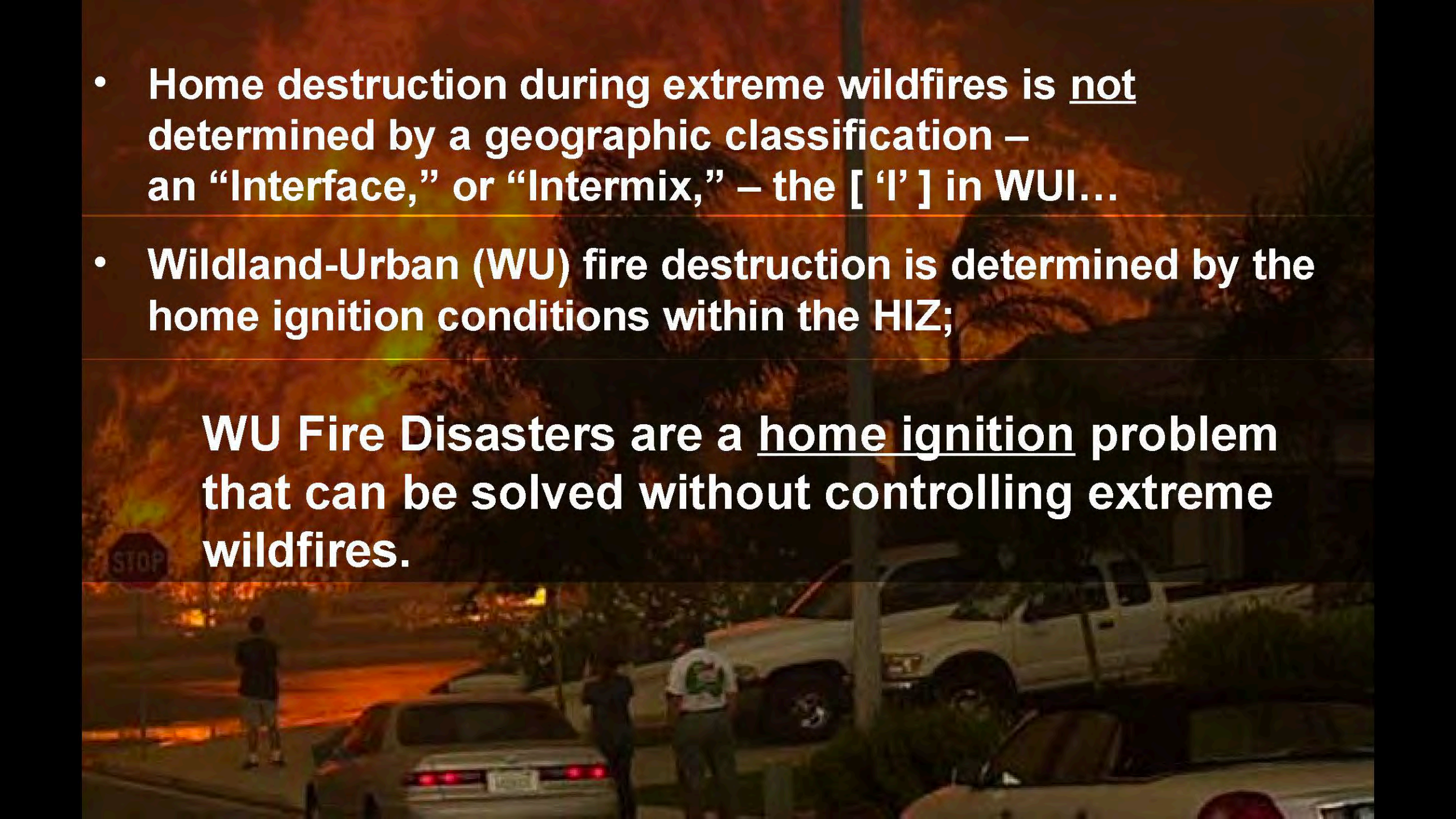
How we have attempted to prevent WU fire disasters in the past?

Wildfire Suppression - Emergency Response...

And this fails to prevent WU fire disasters during extreme WU fire conditions!




We can make homes ignition resistant during extreme wildfires by eliminating ignitions from flames and reducing firebrand ignitions,...
Firebrands are the principal source of home ignitions and community destruction.
STOP



- Home destruction during extreme wildfires is <u>not</u> determined by a geographic classification – an “Interface,” or “Intermix,” – the [‘I’] in WUI…
- Wildland-Urban (WU) fire destruction is determined by the home ignition conditions within the HIZ;

WU Fire Disasters are a <u>home ignition</u> problem that can be solved without controlling extreme wildfires.

Making our homes ignition resistant means…

Montana 2003

having extreme wildfires without WU fire disasters.


We can live with fire.