

Script – Mod 1 – Understanding Wildfire Threat to Homes

SCREEN 01:

Understanding the Wildfire Threat to Homes explores the importance of wildfire mitigation and the vital role that residents play in wildfire risk reduction.

Wildfire preparedness is understanding the concepts of wildfire behavior, the conditions that influence how and where a fire spreads, and the primary sources of ignition.

Select the Begin button to get started.

SCREEN 02:

Upon completion of this course you will be able to:

- Describe the threat of wildfire to homes and communities.
- Explain the three things that can affect the speed and intensity of wildfire.
- And; identify the primary sources of ignition for a home during a wildfire.

Knowing the basics of fire will help you understand how homes ignite during a wildfire.

SCREEN 03:

To navigate through this lesson, simply use the next and previous buttons located in the bottom right corner of your screen.

The menu icon, located in the upper right corner of your screen, allows you to view your current progress or review previous slides.

You may also exit the course at any time by closing the window. Upon exiting, your progress will automatically be saved. When you return it will begin at the same point where you left off.

SCREEN 04:

The first thing we'll take a look at is the threat that exists to homes and communities built in or near wildfire prone ecosystems; and how the fuel feeding a wildfire can transition from trees and surrounding vegetation to homes and other structures.

SCREEN 05:

Factors that put homes at risk from wildfire include:

- Homes built adjacent to natural fuels;
- A lack of, or insufficient, building, fire, and planning codes and their regulations;
- Misconceptions about how structures ignite; and
- Overgrown vegetation and/or persistent drought conditions

SCREEN 06:

A wildfire disaster resulting in the loss of homes and perhaps lives is almost always the result of worst-case scenario conditions. This includes severe weather (hot, dry, and windy), topographical conditions (steep slopes) and ample fuel (living and dead vegetation), that carry fire quickly. These conditions allow wildfire to spread rapidly and build in intensity.

As the intensifying fire spreads, homes become an additional fuel source and simultaneous ignitions can occur; in many instances, burning homes ignite other homes. Firefighter response can be quickly overwhelmed due to limited equipment, personnel, and water. Fire protection effectiveness is reduced when firefighters must use their available resources to extinguish or contain structure fires. Dozens, even hundreds of homes could be damaged or destroyed.

SCREEN 07:

The threat of wildfire to homes and communities is often mistaken as an issue limited to California and the west; however, history shows us that wildfires pose a risk throughout the United States. While some of these areas don't burn to the magnitude of fires typically portrayed by the media, they have the potential to be just as destructive and deadly.

We don't have to look far to identify a few major wildfires of our recent past that reflect the geographical diversity of wildfire risk.

Select each image to learn more.

SCREEN 08:

Roughly 2300 wildfires burned across north and central Florida in 1998. These fires forced the evacuations of thousands, damaged or destroyed hundreds of homes, and caused a huge economic loss as a result of destroyed timber. Thankfully, no lives were lost.

SCREEN 09:

In 2015, much of the Pacific Northwest experienced record high temperatures, leading to one of the most destructive seasons experienced in that region. More than 1.6 million acres burned, resulting in the evacuation of thousands and the loss of hundreds of homes, and the tragic loss of three firefighters.

SCREEN 10:

During November and December of 2016, areas in Tennessee near the Great Smoky Mountains National Park experienced devastating wildfires; thousands of homes and businesses were damaged or destroyed, along with a significant loss of lives.

SCREEN 11:

A series of fires in March of 2017, throughout the Southern Plains ignited more than 1.5 million acres; burning homes, ranches, farms, and causing seven fatalities. The agriculture industry suffered catastrophic economic impacts from the loss of livestock, fencing, and feed.

SCREEN 12:

Let's see what you've learned! History tells us that the risk of wildfires threatening homes may be on the rise. Can you identify the concerns related to the expansion of homes in wildfire prone areas?

SCREEN 13:

Identify the factors that put homes at risk. Use the word bank to choose the best answer for each blank. Drag and drop your answer to the correct location (order does not matter).

SCREEN 14:

The question is, what can be done to protect our homes and communities from wildfire? Perhaps, the biggest myth is that nothing can be done to reduce the risk of loss or damage.

This is simply not true! Individuals living in wildfire prone areas are not only responsible for reducing the risk on their property, they have an important role to play in their community's preparedness strategy.

Throughout this course, you will gain the knowledge to implement actions and that increase survivability for your home and community in a wildfire.

SCREEN 15:

In contrast to the wildfire disaster scenario presented earlier, what if we could improve the number of homes that survive? It's at this pivotal moment where the role of residents is so important!

When home ignitions are diminished through wildfire risk reduction activities such as removing vegetation and using ignition-resistant construction techniques, then fire protection resources can be applied to containing the wildfire rather than fighting structure fires. A better allocation of resources means fire protection efforts can be more effective. As a result, there is a greater opportunity to control the wildfire and have less damage.

If homes don't ignite, they don't burn!

SCREEN 16:

To reduce the risk of ignition to their home and property, residents need to develop a basic understanding of the physical factors of how wildfires spread. There are three key factors that contribute to how a wildfire burns – weather, topography, and fuels.

Temperature, humidity, precipitation and wind are all important weather variables that influence the intensity and spread of fire. For example, during hot and dry weather vegetation can dry out quicker and ignite easier.

Wind increases the supply of oxygen to a fire and causes pre-heating of fuels in front of the fire, which dries vegetation and speeds up the rate of spread.

SCREEN 17:

Topography also affects fire behavior. Steep slopes carry fire uphill at an increased rate of spread, while canyons can act as channels for wind to spread fire. Slope orientation plays a role as well. For example, slopes that face south or southwest have greater exposure to afternoon sun, resulting in lower humidity and higher temperatures. While we can't change topography, being aware of how it influences fire spread is important.

SCREEN 18:

Potential fuels in a wildfire are living and dead vegetation, homes and outbuildings. Flammability depends on size, density, moisture content, and chemical properties (some plants ignite faster and burn more readily than others).

Fuel classifications include:

- Fine fuels like grasses and needles ignite easily and burn quickly, these fuels tend to carry and spread the fire.
- Ladder fuels are typically shrubs or small trees. They help carry the fire from the surface up to the tops of trees.
- Heavy fuels, like trees, large limbs, downed logs, large shrubs, homes and outbuildings require more energy to ignite, but burn longer and produce more heat. They tend to loft more embers into the air.

Of the three fire behavior factors, fuel is where residents can affect the greatest change.

SCREEN 19:

Residents can influence fire behavior by thinning trees and shrubs, pruning lower branches, removing flammable plants that are in close proximity to the home, and creating fire breaks with features such as walking paths or driveways. These actions decrease available fuels.

Examples of highly flammable plants include Junipers, saw palmetto, arborvitae arbor-vi-tee (*check pronunciation*), wax myrtle, and eucalyptus. To find out more about the vegetation in your area that may pose a threat and for suggestions on fire-resistant plants and materials, contact your local forestry, natural resources, or conservation agency, or extension agent.

SCREEN 20:

Let's see what you've learned! Understanding fire behavior is a key part of preparedness. Can you explain the primary factors that affect the speed and intensity of wildfire?

SCREEN 21:

Examine each picture and identify potential risks of wildfire. Record your observations in the provided space below.

SCREEN 22:

Now that we know the elements that determine how a fire spreads, let's look at how fuels actually ignite through the process of combustion and heat transfer.

Combustion is the process of burning something, for it to occur, three essential factors are required.

They are:

- Fuel - in the form of the home, vegetation, and anything flammable immediately around the home.
- Heat – as a result of the encroaching wildfire.
- Oxygen

All must be present in the right combination for combustion to occur.

SCREEN 23:

To better understand combustion, let's take a closer look at heat, more specifically, heat transfer (which is how a wildfire actually moves and spreads).

There are three primary mechanisms of heat transfer:

- Radiation
- Convection
- Conduction

SCREEN 24:

Radiation is the heat energy released in all directions from a burning object.

An example of radiation is the heat you feel when standing by a campfire.

In a wildfire heat moves ahead of the flames to heat up and ignite fuels. The amount of heat produced and how far it travels depends on the size of the fuels that are burning. Larger fuels burn hotter than smaller fuels. Heat diminishes over distance.

SCREEN 26:

n/a

SCREEN 26:

Convection is the transfer of heat by the movement of rising hot air or gasses.

During a wildfire, burning materials on the surface create convection currents that preheat leaves, branches, and/or structural surfaces above them. They also lift materials such as embers into the air that can land on unburned vegetation, homes, or adjacent flammable materials; enhancing the likelihood of new or additional ignitions outside of the main fire.

SCREEN 27:

The third and final mechanism of heat transfer is conduction. Conduction is the process by which heat is transferred through direct contact.

During a wildfire the processes of heat transfer typically happen simultaneously.

SCREEN 28:

Understanding the basic science behind heat transfer demystifies how a wildfire spreads. Fire doesn't engulf everything in its path, it only advances to locations that meet the requirements of combustion. By altering the type, size, quantity, and spacing of vegetation and other fuels, residents can influence the movement of a wildfire and decrease its potential to ignite homes.

Next, we'll explore structural ignition sources.

SCREEN 29:

Homes and their surroundings are vulnerable to three potential types of ignition sources:

- Crown fires
- Surface fires
- And; Embers

Select each icon to learn more!

SCREEN 30:

Crown Fires are an extreme type of wildfire that burn in the tops of trees. They spread by radiation and convection and are heavily influenced by wind. Crown fires generate embers that can travel more than a mile and create spot fires beyond the main fire.

SCREEN 31:

Surface Fires can be low or high intensity fires that burn through live or dead grass, ground debris, and small trees and shrubs. They can ignite houses and attachments like fences, decks, and porches.

SCREEN 32:

Embers are burning pieces of airborne wood and/or vegetation that can be carried more than a mile through the wind. They can cause spot fires, ignite homes, debris and other objects. It is possible for embers to penetrate and smolder in woodpiles, patio/deck items, vents, roofs and debris filled gutters.

SCREEN 33:

Let's see what you've learned! Can you identify the primary sources of ignition for a home during a wildfire?

SCREEN 34:

Match the ignition source with the correct description. Drag and drop the icons next to the description that best defines them.

SCREEN 35:

The images commonly shown when depicting wildfire tend to focus on surface and crown fires. It's important to recognize that a large number of destroyed and damaged homes are the result of wind-blown embers.

SCREEN 36:

Embers generated from burning structures and structure-ignited vegetation (particularly trees), illustrate how home ignitions and fire can continue for hours after the main fire has passed.

The following video demonstrates just how dangerous embers can be.

SCREEN 37:

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SCREEN 38:

Regardless of wildfire intensity and the distance of embers, research shows home ignitions are determined by the home and its immediate surroundings.

It's not where the home is located that necessarily determines risk, it's how ignitable the home is.

SCREEN 39:

Take for example the image here; two neighboring houses with differing levels of wildfire preparedness.

House 1 was constructed with a flammable wood roof and next to dense vegetation. Embers have ignited surface fires and the home's roof.

This is a stark contrast to House 2, which has notably avoided ignition through actions such as installing a non-combustible roof, reducing vegetation adjacent to home, and removing other flammable materials.

SCREEN 40:

Similarly, actions the resident took played a big role in the home surviving a wildfire. If location was the only contributing factor, its placement would have made it susceptible to ignition from embers. Yet, it survived.

The structure itself is sufficiently ignition-resistant with a non-flammable roof and large timber construction. The surrounding area has also been modified to minimize the likelihood of ignition during a wildfire.

SCREEN 41:

There are proven methods for homeowners to prepare their homes and withstand the threat of wildfire.

By limiting the amount of flammable vegetation, choosing fire-resistant building materials and construction techniques, along with periodic exterior maintenance, residents can prepare their home to withstand embers and minimize the likelihood of flames or surface fire touching the home or any attachments.

SCREEN 42:

n/a

SCREEN 43:

This concludes the Firewise USA online course - *Understanding Wildfire Threat to Homes*.

We would like to thank Dr. Jack Cohen, whose research influenced the recommendations and guidance presented in this course; as well as the Insurance Institute for Business and Home Safety and the USDA Forest Service, Southern Research Station.

SCREEN 44:

We would also like to thank you for your participation! Remember, improving your home's chances of surviving a wildfire begins with you!

When you are ready, you may exit the course by closing the window.