CERT WILDLAND URBAN INTERFACE – PART C

CITIZEN WILDLAND FIRE PREPAREDNESS & BASIC CONCEPTS

Community Emergency Response Team
WUI: Part C

In this unit you will:

- **Learn About What Influences The Wildland/Urban Fire:** How a fire in the WUI grows large and travels so quickly.
- **Understand The Relationship Between the Fire and Its Environment:** What are the key elements in successfully defending a structure against this type of fire.
- **Learn What Steps to Take In Preparing Your Home:** Urgent reparation in advance of a Wildland Fire can make the difference.
- **Learn About Pre-Treating Your Home:** There are suggested methods to take to allow your house a better chance of survival.
- **Become Aware of the Danger of Staying to Defend:** Evacuation orders should be followed by all. Understanding what the significant dangers are will assist you in feeling good about leaving.

Citizen Wildland Fire Preparedness & Basic Concepts

OBJECTIVES

At the conclusion of this unit, the participants should be able to:

- Define the factors that influence fire behavior in the WUI
- Explain the relationship between fire, fuels and structure survivability
- Identify urgent fuel modification methods
- Explain the methods available to "Pre-Treat" a building
- Understand the associated risks of ignoring an evacuation order and staying to defend a home in the WUI.

SCOPE

The scope of this unit will include:

- Introduction and Unit Overview
- Explanation of the Factors Influencing Fire Behavior in the WUI
- Understanding the Relationship Between Fire, Fuels and the Survivability of Structures
- Fuel Modifications that can be achieved urgently
- Identifying methods of pre-treatment of any building
- Understanding the dangers of staying to defend your home
- Unit Summary

ESTIMATED COMPLETION TIME

75 Minutes

TRAINING METHODS

Due to the complex nature of the subject of Wildland/Urban Interface fires, it is vitally important that the instructors of this module be very familiar with the following topics:

- Wildland Fire Behavior
- Vegetation types in the area
- Fire History of the area
- Local Vegetation Management practices (including restrictions)
- Knowledge of local politics as they relate to fire services, water, etc.

It is therefore highly recommended that a Fire Service professional, knowledgeable in the above topics, instruct this module!

The Instructor will review how a fire behaves in the WUI, emphasizing the importance of how the understanding of fire behavior is critical in determining its travel and potential.

Then the Instructor will present an overview of how a fire travels and spreads in the WUI. The Instructor will discuss the relationship between the fire, fuels and the susceptibility of structures to destruction by wildfire, emphasizing mitigation methods.

The Instructor will review the steps taken in creating "defensible space" and

then present ideas to the students on additional measures that can be taken (with additional training and equipment) to further protect the structure through fuel modifications.

Next, the Instructor will discuss 3 pre-treatment methods commonly available to help prepare the building to withstand the wildland fire.

A discussion will then take place on the importance of following evacuation orders. The safety aspects of "stay and defend" will be reviewed.

Finally, the Instructor will summarize the information reviewed, and explain the importance of the information contained in Parts A, B and C.

RESOURCES REQUIRED

- *Community Emergency Response Team* Instructor Guide
- *Community Emergency Response Team* Participant Manual
- Visuals C.1 through C.31

EQUIPMENT REQUIRED

In addition to the equipment listed at the front of this Instructor Guide, you will need the following equipment for this unit:

- A computer with PowerPoint software
- A computer projector and screen
- CERT WUI Part C program

Note to Instructor:

This module was created as a generic template for use in Southern California. However, there are many slides in the Powerpoint presentation that should be tailored to a local setting.

Before presenting this module, please review the following slides and customize as you see fit to make this class meaningful to your audience:

Visual C.5; C.6; C.7; C.8; C.9; C.10; C.17; C.18; C.20; 21; C.22; C.23; C.24; C.25; C.26; C.27; C.28; C.29; C.30.

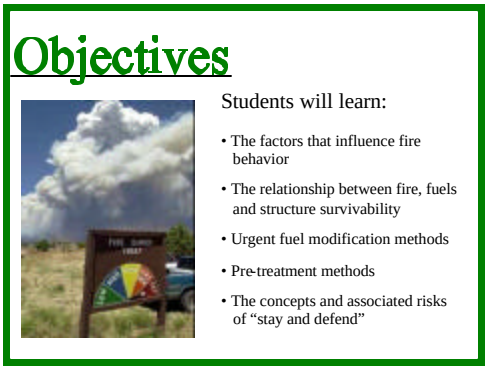
CITIZEN WILDLAND FIRE PREPAREDNESS & BASIC CONCEPTS

VISUAL C.1

Why Citizen Awareness? A WUI fire can grow rapidly to the point that local fire resources cannot protect every home and every neighborhood threatened. There are many steps that citizens can take in defending their property *ahead of the fire.*

The CERT concept lends itself to this function. A Team can quickly and effectively assist in giving the community a chance to survive a WUI fire with very little assistance from the emergency services.

VISUAL C.2



In this unit, we will cover:

- The factors that influence fire behavior
- The relationship between fire, fuels and structure survivability
- Urgent fuel modification methods
- Pre-treatment methods
- The concepts and associated risks of "Stay & Defend"

FACTORS INFLUENCING FIRE BEHAVIOR

VISUAL C.3

In the previous units, we learned about the importance of the "Fire Triangle," and how a WUI Fire spreads.

ASK QUESTION:

Can someone give me the three parts of the Fire Triangle? (Fuel, Heat, Oxygen)

We also discussed how important the weather is in the spread of a WUI Fire.

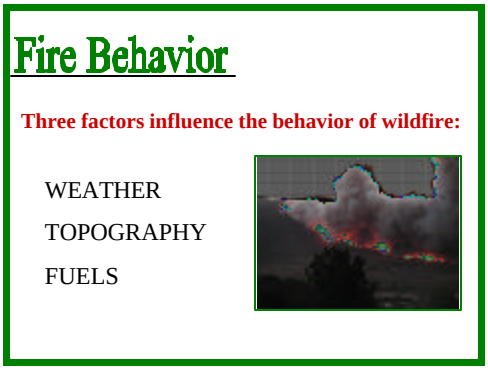
ASK QUESTION:

Can anyone name three weather factors that aid in the spread of the Fire? (Temp, RH, Wind,)

Remember that these factors, when combined with Topography can not only determine how a fire travels but also how intensely it will burn.

FACTORS INFLUENCING FIRE BEHAVIOR

VISUAL C.4



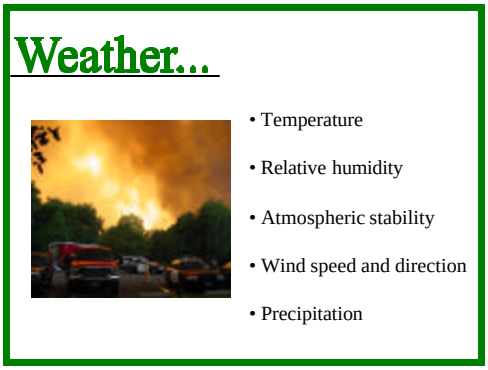
How the fire acts before and during its travel is very important to us. Once we understand it, we can better predict *where* it will travel and *how fast* it will move. These three factors will assist us in understanding Fire Behavior in the WUI.

INSTRUCTOR'S NOTE:
(for Visual C.4)

We will not expect the student to become a Fire Behavior Analyst. However, if they understand the *concepts* of fire behavior, they will be better able to review their home and community to see where they are susceptible to a Wildfire.

FACTORS INFLUENCING FIRE BEHAVIOR

VISUAL C.5



Weather plays a key factor for many reasons. First, it is critical in determining *if* a wildfire starts. You have all seen television footage of a lightning strike in the forest. If that lightning storm is accompanied by rain, a large fire is not likely. But a dry storm often produces the start of a large forest fire. The same is true in our WUI. A fire start with high humidity and no wind is not likely to spread quickly.

Secondly, weather can determine the direction, and intensity of the fire when coupled with other factors.

FACTORS INFLUENCING FIRE BEHAVIOR

VISUAL C.6

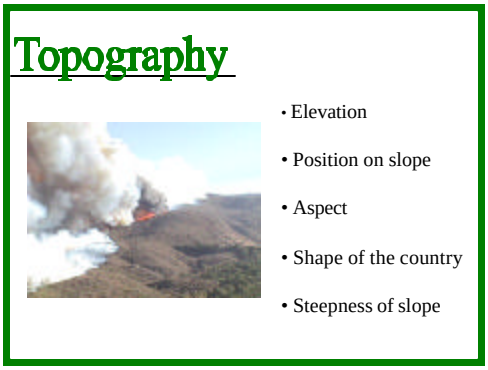
Time becomes an important factor for a few reasons. First, time of day often determines local weather changes. Does a breeze change directions in your neighborhood at a certain time of day? Do the winds generally subside at dusk? We live in areas that are definitely effected by the time of day. Often in Southern California during the Autumn months, the winds may begin the day as "off-shore" (going east to west) only to turn "on-shore" in the early afternoon. This condition generally brings moisture back to the area, raising the relative humidity.

Elevation also has a part. Due to proximity to the coast or the desert, the temperature and RH can differ significantly at various elevations. "Inversion layers" can also occur which may influence how weather changes at certain elevations.

It is good to know what the "norm" is for your community, based on seasons and time-of-day. Your local Weather Service office may be able to help you, but keep in mind we have many "micro-climates" in the area, and your neighborhood may be different than others. Ask around and you may find some long-term residents of your community that can tell you more about your weather patterns.

FACTORS INFLUENCING FIRE BEHAVIOR

VISUAL C.7



Topography definitely helps influence fire behavior. In the earlier units, we learned how *Slope, Aspect* and *Terrain* are factors.

Elevation once again plays a part in this puzzle of Fire Behavior, because it influences what type of vegetation and how much vegetation will grow normally.

ASK QUESTION:

Do you remember the discussion about Aspect? Does a fire typically burn faster uphill? Can anyone tell me why a Southern Aspect slope will usually burn faster? (*South aspect gets more direct sun, fuels drier and less dense)*
Where would you expect to find the *heaviest* accumulation of fuels? (*North)*

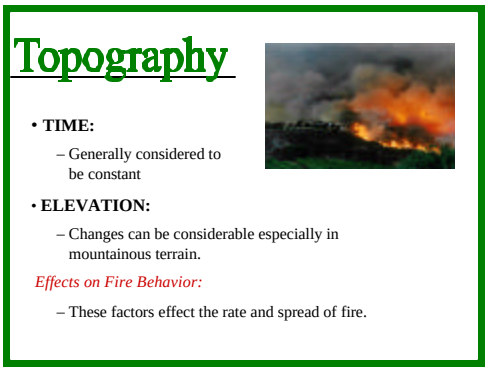
Elevation once again plays a part in this puzzle of Fire Behavior, because it influences what type of vegetation and how much vegetation will grow normally.

We also know that the shape of the country, or Terrain will influence fire behavior. We have discussed the influences of chimneys, ridges and valleys, etc.

FACTORS INFLUENCING FIRE BEHAVIOR

Steepness of the slope also figures into the formula. The more vertical the slope, the faster the fire travels.

VISUAL C.8

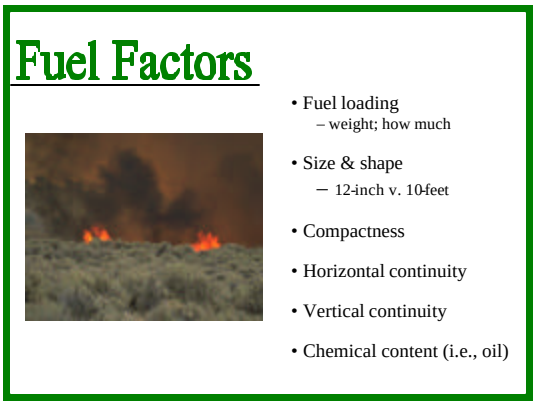


Once again, Time may have an influence. Because of changing weather patterns, the time of day can change how a slope reacts to a fire. It is possible to get "down-slope, down-canyon" winds at certain times which would be contrary to your expected fire behavior pattern. Knowing these typical anomalies is a must!

Elevation changes effect topography in subtle ways. A sheer cliff at upper elevations or sea level can mean no vegetation. A gentle slope on a north aspect can mean heavy accumulation of chaparral, changing the intensity and movement of a Wildland fire.

FACTORS INFLUENCING FIRE BEHAVIOR

VISUAL C.9



Fuel loading is the amount of vegetation on the land in a given area. The fuel loading affects both the rate of ignition and the rate of spread. In other words, an acre of grass will have a different *fuel load* (lighter) than an acre of chaparral. Likewise, an acre of chaparral on a south slope will likely have a smaller fuel load than an acre of the same chaparral on a north slope. Fine fuels are easier to ignite and can travel rapidly. Larger or coarse fuels are more difficult to ignite, but once ignited produce more heat.

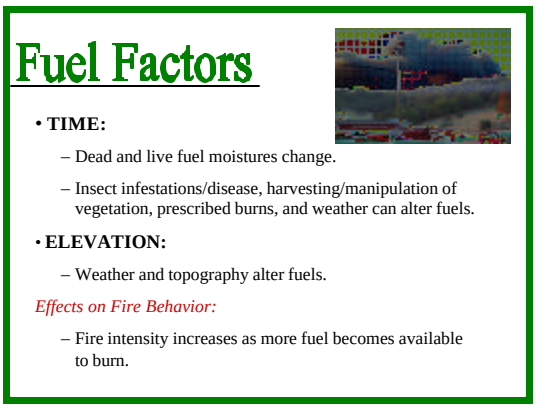
The compactness of the fuels, or *density* also is a factor in fuel loading. Brush often has horizontal continuity. That is, the fullness of one plant touches or nearly touches other plants. This arrangement allows the fire to travel plant by plant easily.

In vertical continuity, the tops of smaller plants reach up ant touch the larger plants, and so on and so on. This allows the heat and flame to travel all the way up and consume the entire strata of plant life. Remember the discussion on ladder fuels?

The type or species of plant can certainly be a factor, also. For instance, eucalyptus trees have a high oil or resin content. This means that the amount of heat generated by a tree of this species on fire may be higher than another species of equal size.

INFLUENCING FIRE BEHAVIOR FACTORS

VISUAL C.10



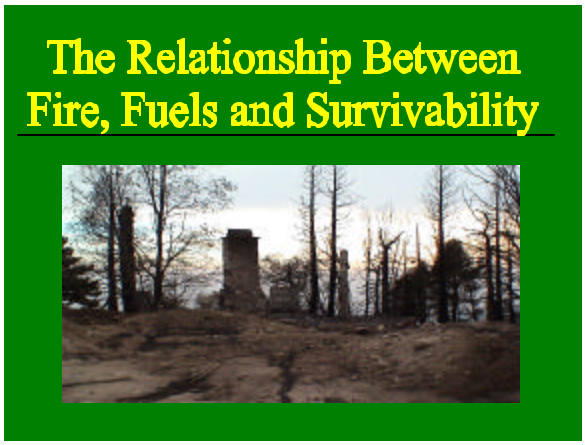
The amount of moisture retained in plants, whether dead or alive, changes throughout the day. It is dependant upon the Relative Humidity and amount of radiated sunlight, along with the wind. The drier the air, the drier the plant life, hence the easier they burn.

ASK QUESTION:

Have you ever noticed that firewood that has been sitting next to your fireplace, after a night or two of having fires, is easier to light? That is because the fact that you have a fire going is drying out the room a little at a time.

STRUCTURE SURVIVABILITY

VISUAL C.11



If we understand a bit more about Wildland Fire, and how it behaves when it is influenced by fuels, the land and weather, then we can better understand what we have to do to make sure that structures in the WUI can survive.

VISUAL C.12

We know that weather can be very hard to predict. But we know that the heat of the fire can produce local winds. We also know that heat rises, and that will cause atmospheric instability. Cumulus clouds can develop over the fire providing erratic conditions.

We also know that the temperature of the fuels have a lot to do with how easily a fire will ignite and how it will travel, just as the amount of moisture in the fuels will contribute to these factors.

STRUCTURE SURVIVABILITY

VISUAL C.13

In earlier sections, we discussed the dangerous conditions when the fire starts "spotting." This actually occurs when the material being burned allows smaller fragments to be lifted in a convection column and then carried a distance only to be deposited somewhere else.

VISUAL C.14

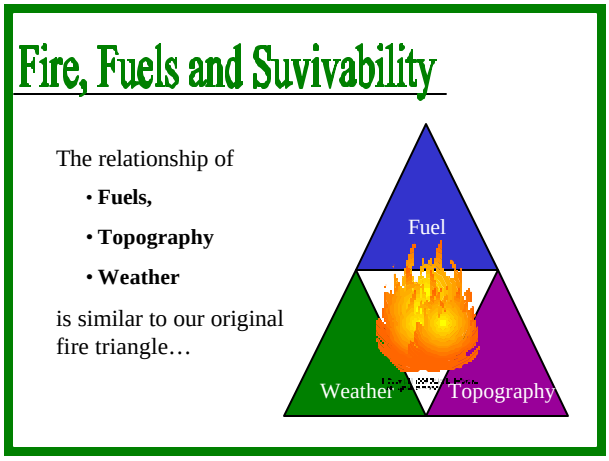
The burning fire brands don't necessarily have to travel "up" to be carried. A strong wind can carry the brands horizontally. Combine convection with the wind and the brands can travel up to a mile away.

STRUCTURE SURVIVABILITY

VISUAL C.15

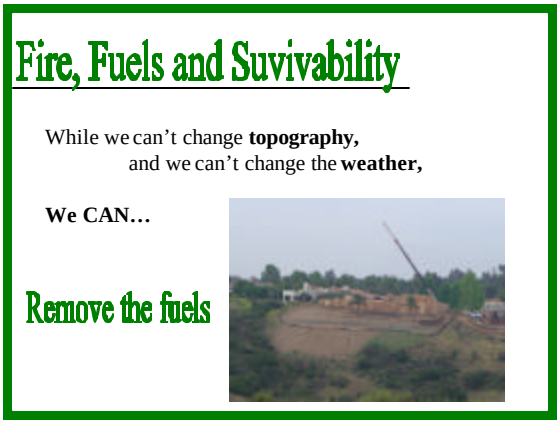
Oddly enough, gravity also can play a role in how a fire spots. Rolling material on fire can spread the fire downhill, just as large fire brands can travel downhill if there is not a strong convected current or wind.

VISUAL C.16



STRUCTURE SURVIVABILITY

VISUAL C.17



If you remember the discussion of the fire triangle: take away any of the three sides and the fire goes out. The same can apply to this new triangle regarding the susceptibility of structures to Wildfire.

VISUAL C.18

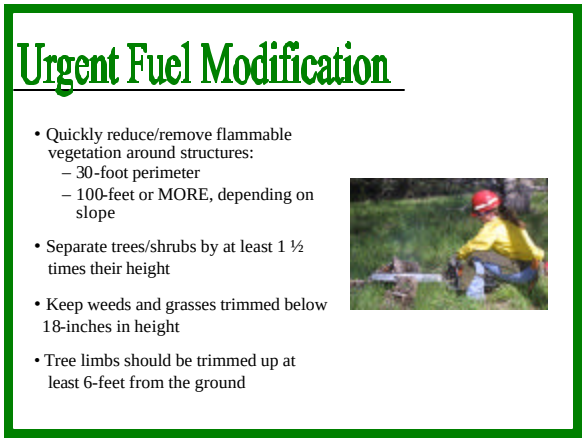
There are dozens of case studies that show the removal or modification of adjacent fuels can affect the survivability of a structure. So why don't we remove the fuels so that all structures in the WUI can survive? The same reason people use building materials and designs that are incompatible with fire survival in the WUI: personal desire and aesthetics.

STRUCTURE SURVIVABILITY

VISUAL C.19

In nearly all communities in California, there are pockets of structures in which little or nothing has been done to modify the fuels. These are areas that will eventually experience a wildland fire. Whether or not it becomes a major conflagration depends on timing, and LUCK!

VISUAL C.20

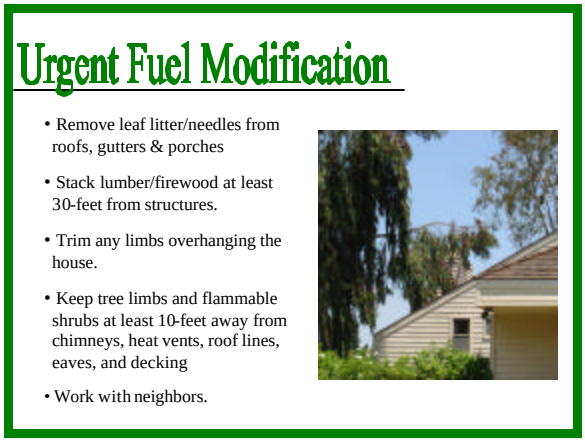


Some portions of our state may require that fuel modifications be completed more than once a year, due to

rainfall or long growing seasons. Keep in mind that just because you have been proactive and completed the clearing process, once you are aware of a Wildfire you need to go out and review if your property needs further or additional attention.

STRUCTURE SURVIVABILITY

VISUAL C.21



The fuel modifications suggested here and to be carried out now, while simple, can make a great distance in the survival of your home.

VISUAL C.22

We emphasize that you should always operate within the scope of your training. If you've never operated a chainsaw before, now is not the time to safely learn! Wear all of your safety equipment!

INSTRUCTOR'S NOTE:
(for Visual C.22)

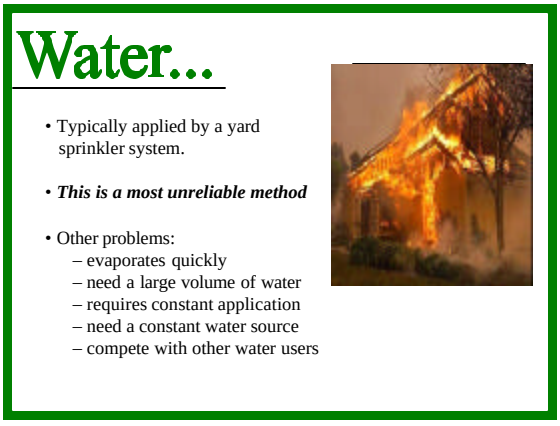
Suggest that the students create a check list of last minute tasks contained here, to be used as reference when needed.

PRE-TREATMENT METHODS

VISUAL C.23

You may have time to pre-treat your home or those of others before you have to evacuate. Depending upon the method you use, you may be able to do this 2 hours or more before you have to leave.

VISUAL C.24



The reference to water here is only because that is the first thing citizens think of. However, if water was to be effective at blocking both embers and radiated heat from starting a house on fire, the entire structure would need to

be "blanketed" with water. Sprinklers and other methods are not effective, because of the winds and also because the source may run out before the fire is actually upon your property.

PRE-TREATMENT METHODS

INSTRUCTOR'S NOTE:
(for Visual C.24)

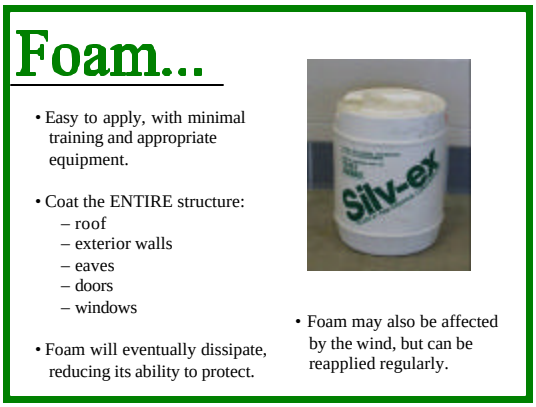
In some communities, this is a very volatile subject. Stress to your students that even in the best of communities, if everyone turned on there sprinklers at the same time, pressure would be so low it would make them ineffective, and soon the town would run out of water.

VISUAL C.25

Foams that are available are made specifically for this purpose. They are easy to apply for a citizen with the proper equipment. However, if applied too early, the foam may be ineffective as the fire approaches the house.

PRE-TREATMENT METHODS

VISUAL C.26



Remember that with foam, there may be environmental restrictions on the use of it (depending on the brand). Research this information before you invest in a system.

VISUAL C.27

Relatively new on the market, several manufacturers of firefighting gel market directly to homeowners.

PRE-TREATMENT METHODS

VISUAL C.28

Gels also are easy to apply with the right equipment. If a home is coated too early with a gel, a light mist of water can be applied over the gel which reactivates the fire resistive qualities. Remember, in order for these treatments to work, the ENTIRE structure must be coated!

INSTRUCTOR'S NOTE:
(for Visual C.28)

Manufacturers and distributors of foams and gels will put on training sessions for anyone who purchases. Make it a point to have some of their brochures on hand in order to pass these out to interested citizens.

VISUAL C.29

This says it all. People perish who either do not or cannot get out in time. You will occasionally hear about someone who stayed behind and saved their home with a garden hose, but these are the extremely lucky ones. Even the vendors who instruct people on the use of home protection systems always advise that once

PRE-TREATMENT METHODS

you've applied the product, LEAVE! This is the safest and best method!

Instructor's Notes
(for Visual C.29)

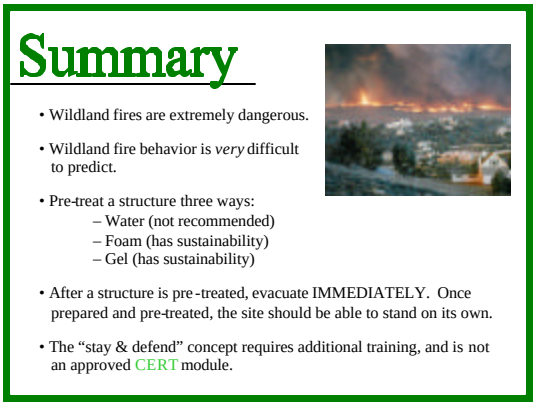
This is a *highly controversial* subject. Only include this slide if your local fire agency approves of the discussion.

Should you include this topic, stress these points:

- **It is *very* dangerous to refuse to evacuate.**
- **Professional, trained Wildland Firefighters die each year in these fires.**
- **To survive, you must be *trained and equipped* for this type of fire.**

SUMMARY

VISUAL C.30



INSTRUCTOR'S NOTE:
(for Visual C.30)

To summarize, go over the key points listed on this slide.

INSTRUCTOR'S NOTE:

Ask now if anyone has any questions about this or the other two units?

VISUAL C.31