

The Wildland/Urban Interface



Part A: The Fire Behavior and the Wildland-Fire Environment

(Rev. 12/1/2004)

Objectives

Students will learn:



- About California's wildland fire problem
- To understand the wildland fire environment
- Factors influencing wildfire behavior
- How to prepare homes for wildfire
- About special considerations for evacuation

The Wildland Fire Problem

California has one of the most severe wildland fire problems in the world because of:

- Population



The Wildland Fire Problem

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- Population
- Vegetation



The Wildland Fire Problem

California has one of the most severe wildland fire problems in the world because of:

- Population
- Vegetation
- Topography



The Wildland Fire Problem

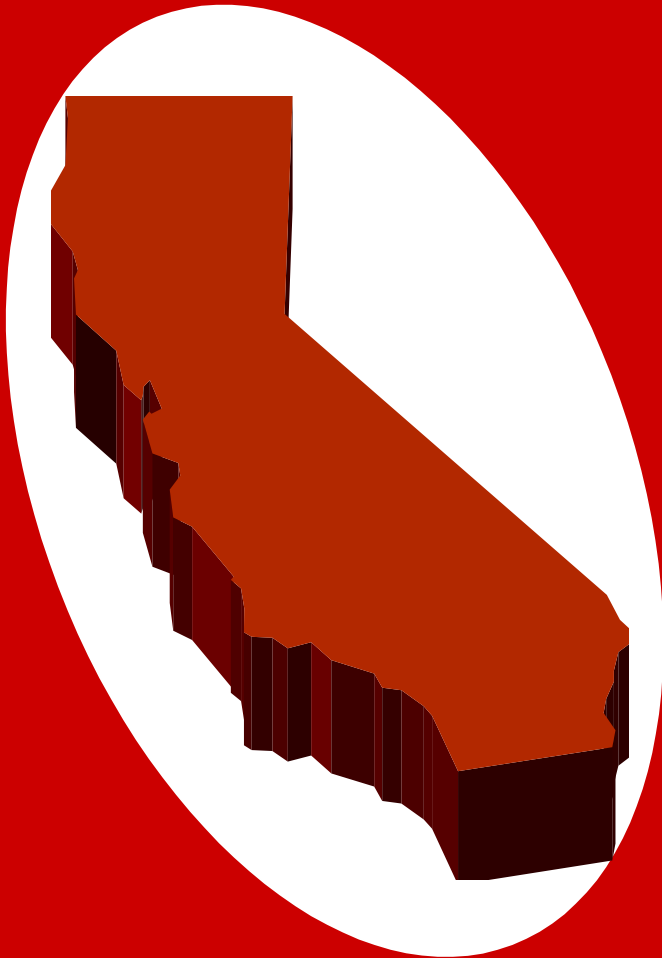
California has one of the most severe wildland fire problems in the world because of:

- Population,
- Vegetation,
- Topography, and
- Climate



In wildland/urban interface areas, wildfire isn't a matter of "IF," it's a matter of "WHEN."

Local Conditions



In California, thousands of people choose to build homes within or near wildland areas.

These areas are covered with flammable, native vegetation.

This environment may be desirable for some, but it comes with consequences.

Local Conditions

VEGETATION = FUEL



California's native plants and shrubs are among the most flammable in the world.

Chamise, buckwheat and sage are referred to as *chaparral*.

Local hillsides and canyons are covered with these flammable plant materials.

Local Conditions

VEGETATION = FUEL

In mountain areas, forests with large meadows are predominant.

Fire danger exists in this environment, as well.



The Wildfire Environment



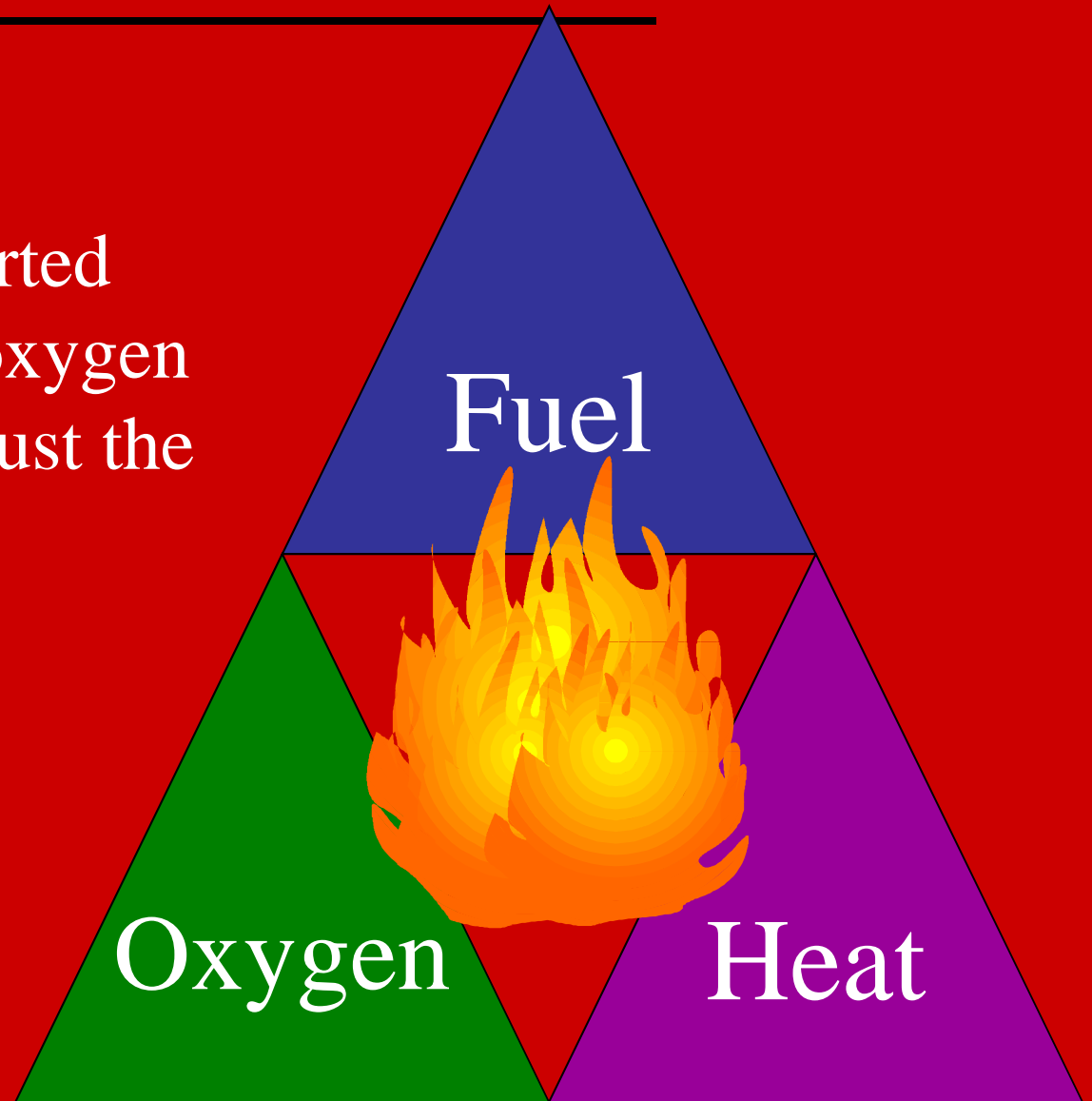
How a Fire Burns...



The act of burning is
COMBUSTION

How a Fire Burns...

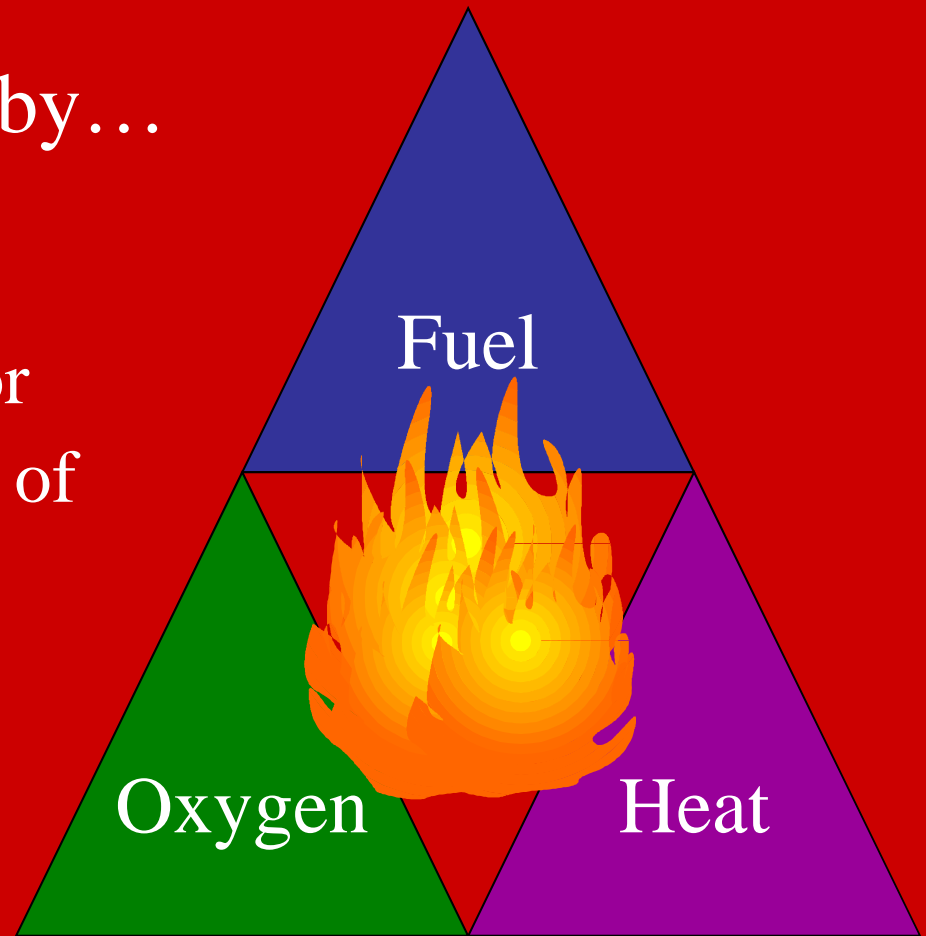
Combustion is supported when fuel, heat and oxygen (air) combine in the just the right amounts.



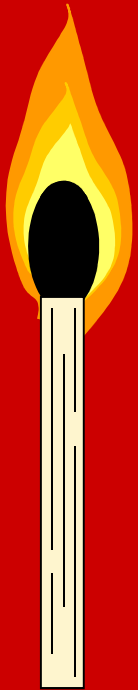
How a Fire Burns...

Combustion is interrupted by...

- Removing the fuel, or
- Removing the oxygen, or
- Cooling the temperature of the fuel

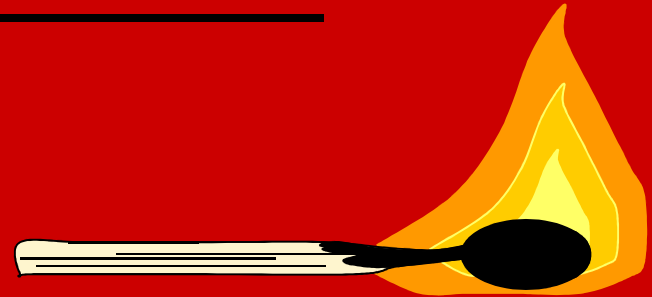


How a Fire Spreads...



Transfer of heat
by contact

Conduction
Slowest



Conduction and Radiation

Transfer of heat by contact
& through the air



**Conduction, Radiation,
and Convection**

Fastest

Transfer of heat by contact,
air and direction (rising)

How a Fire Spreads...

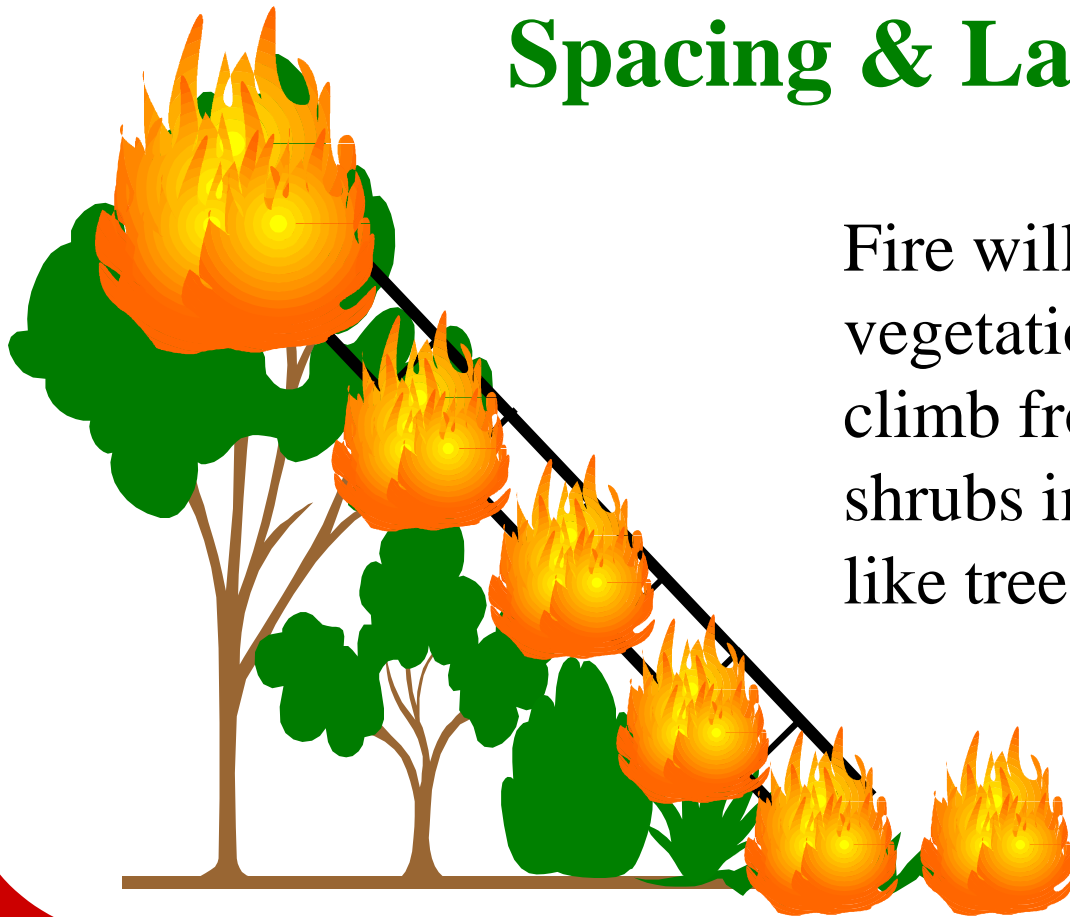
Factors that influence ignition and fire spread:

- ✓ Fuels
- ✓ Fuel moisture
- ✓ Fuel size
- ✓ Fuel continuity
- ✓ Vertical spacing
- ✓ Horizontal spacing



How a Fire Spreads...

Spacing & Ladder Fuels

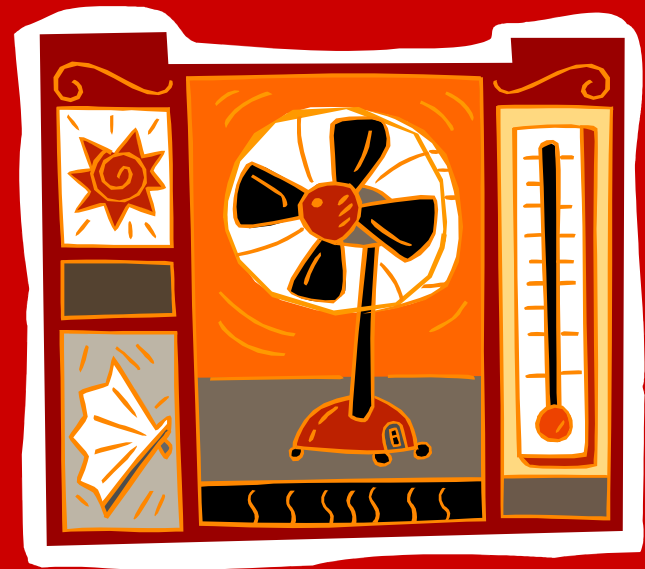


Fire will use tightly-spaced vegetation as a “ladder” to climb from surface plants and shrubs into aerial vegetation, like tree canopies.

Weather & Wildfire...

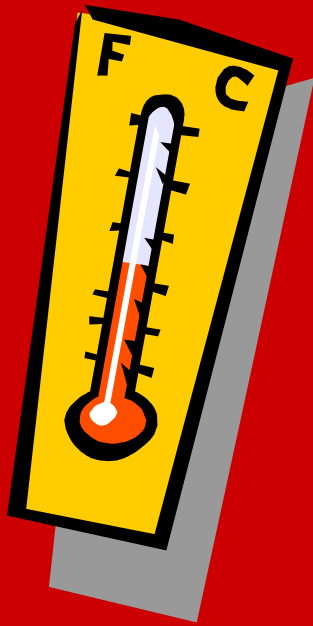
Three fundamental parts of weather have a significant impact on wildfire:

- Temperature
- Relative Humidity
- Wind



Weather & Wildfire...

Temperature:



- Preheats fuels
- Preheats the ground
- Affects air currents
- Reduces firefighter endurance
- Reduces moisture in the air:
 - The higher the temperature, the lower the relative humidity

Weather & Wildfire...

Relative Humidity:



- Water vapor in the air
- Expressed in a percentage
- Hot temperature = reduced humidity
- Cool temperature = increased humidity
- Higher humidity = higher fuel moisture
- Fires usually burn more rapidly during the day due to lower humidity

Weather & Wildfire...

Wind:



- Has the greatest influence on rate and direction of fire spread
- “Bends” flames close to fuel
- Generally: blows up-slope during day
blows down-slope at night
- Unpredictable
- Hazardous to firefighters

Topography...

Topography = the configuration of the land

- Topography has significant affect on RATE and DIRECTION of fire spread.
- Three fundamental parts of topography:

SLOPE

ASPECT

TERRAIN

Topography...

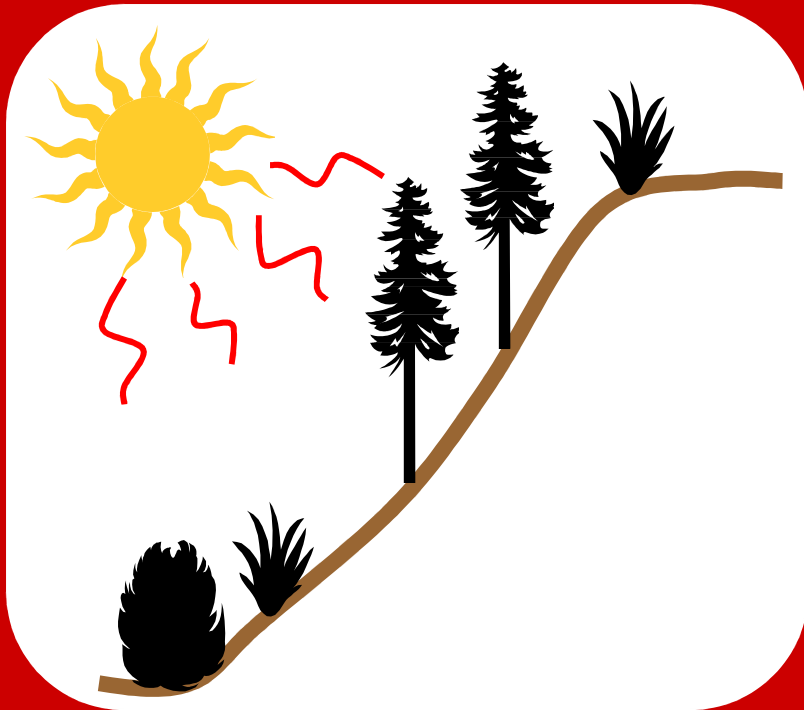
Slope



- The steeper the slope, the faster the fire will move
- Slope influences fire by preheating fuels
- Wind currents usually flow uphill
- Convected heat causes a draft
- Burning material can roll downhill

Topography...

Aspect



- The direction a slope faces (N, S, E, W) affects the spread of fire
- Southern aspect:
 - receives more direct radiation
 - fuels are usually drier, but less dense
 - receives a stronger slope wind

Topography...

Terrain



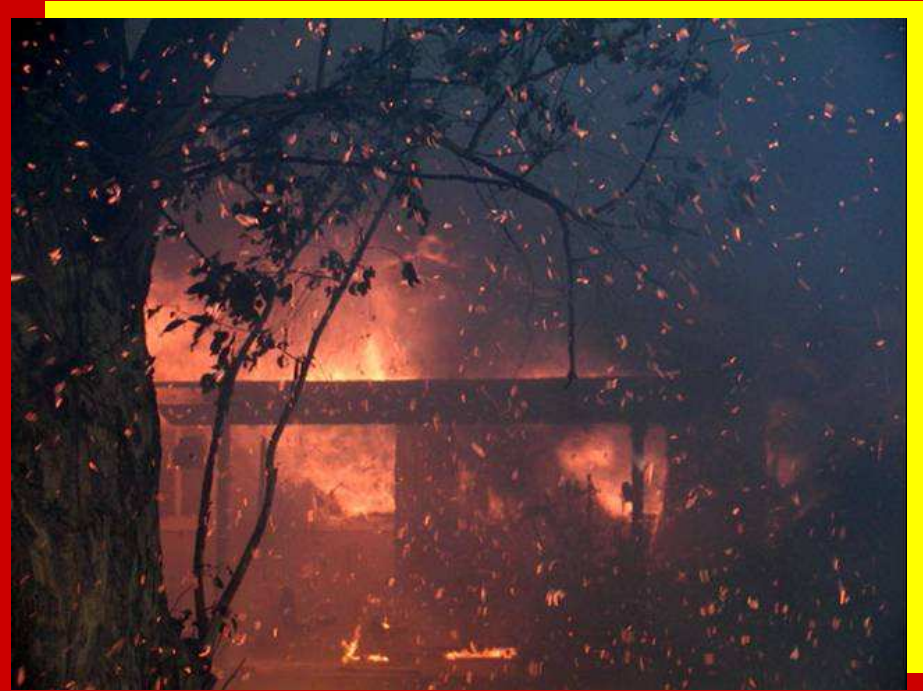
- The “lay of the land”
- Obstructions include ridges & canyons
- Cause wind turbulence & erratic fire behavior
- Fires in canyons or steep drainages are **DANGER ZONES!**

Spot Fires: Fire Brands & Embers

CONVECTION:

Pieces of burning material are lifted into a convection column.

Embers settle on homes and vegetation far ahead of the fire-front.



Spot Fires: Fire Brands & Embers

WIND:

Causes short-range spot fires ahead of fire-front.

The combination of convection & wind can carry brands considerable distances, causing long-range spotting.





Summary...

- The Elements of Fire:
 - *Fuel, Heat, and Oxygen*
- Fire Spread:
 - *Convection, Radiation, Conduction*
- Weather and Wildfire:
 - *Temperature, Humidity, and Wind*
- Topography:
 - *Slope, Aspect, and Terrain*

Fire in the Wildland/Urban Interface



This is looking west from the area of Tavern Road in Alpine as the fire jumps Interstate 8 and marches up through the communities Harbison Canyon and Crest.

Beware & Prepare

Defensible Space & Zones

The “Small Things”

Access & Egress

Special Considerations

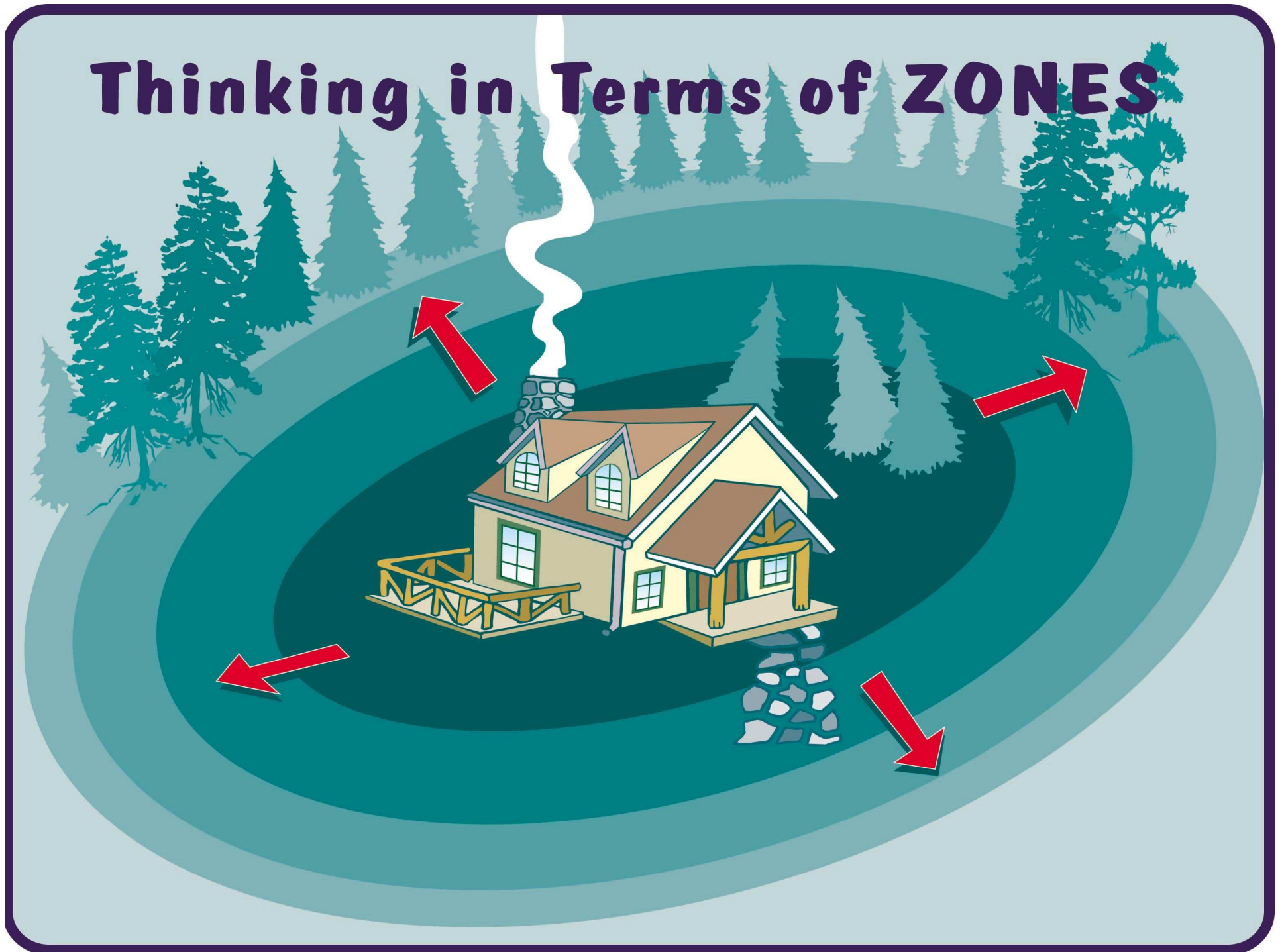


Defensible Space

An area surrounding structures that allows firefighters and equipment the space to defend against an approaching wildfire.



Thinking in Terms of ZONES

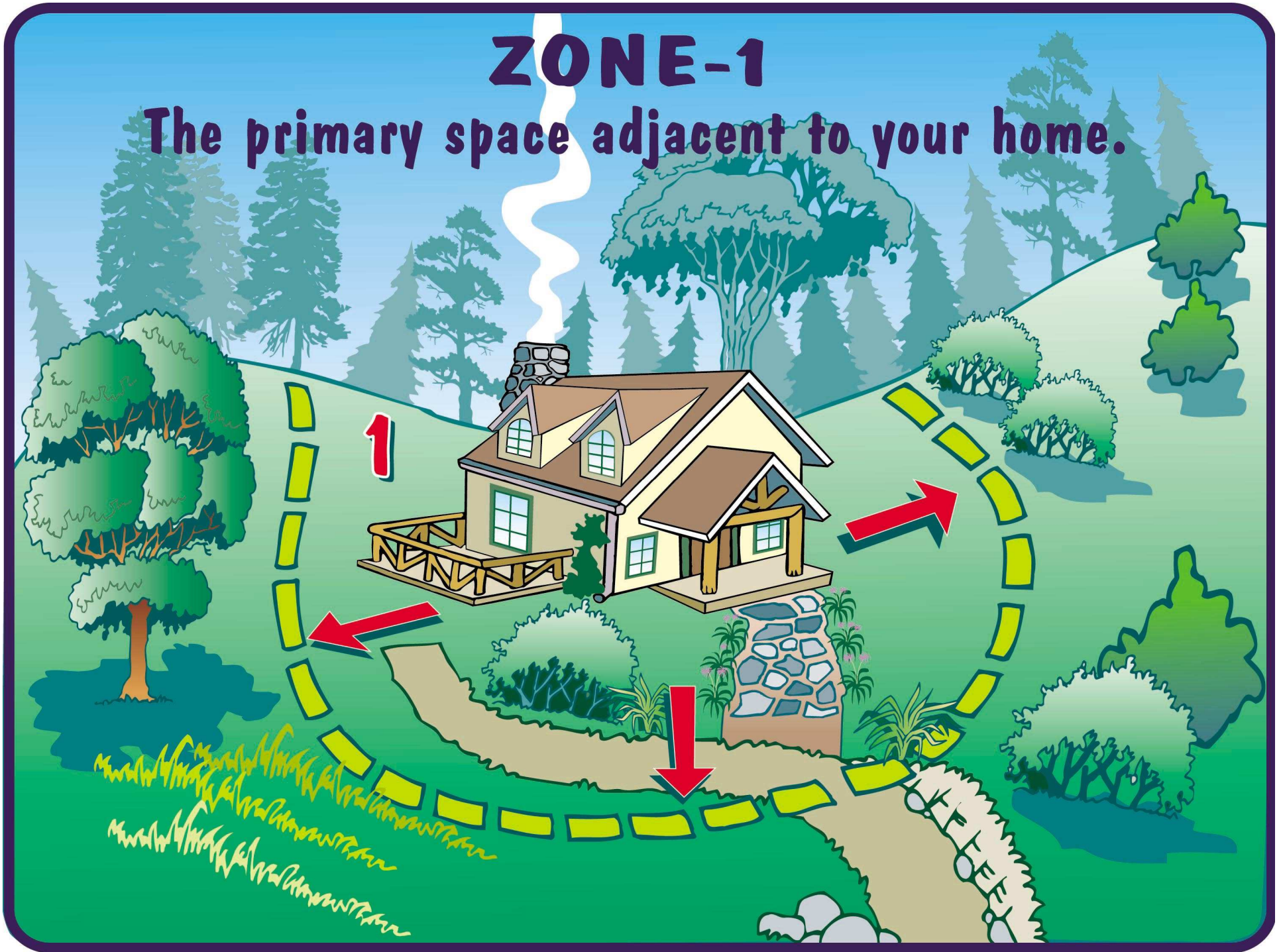


YOUR HOME



ZONE-1

The primary space adjacent to your home.



ZONE-2

Secondary buffer area.



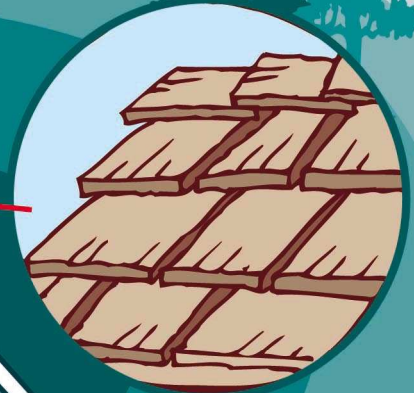
The "Small Things"



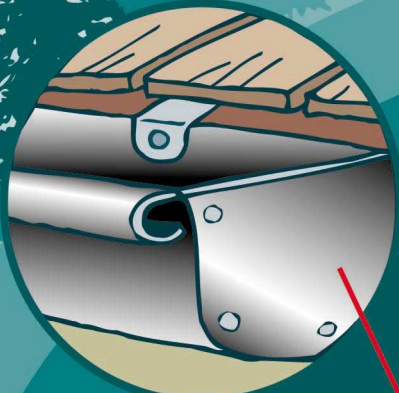
YOUR HOME



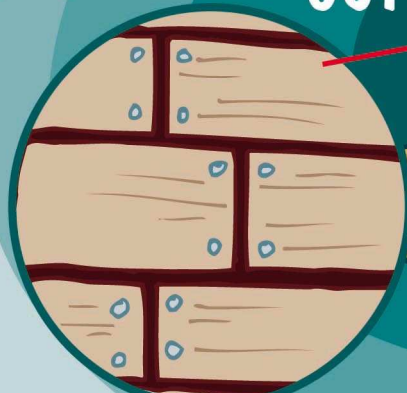
CHIMNEY



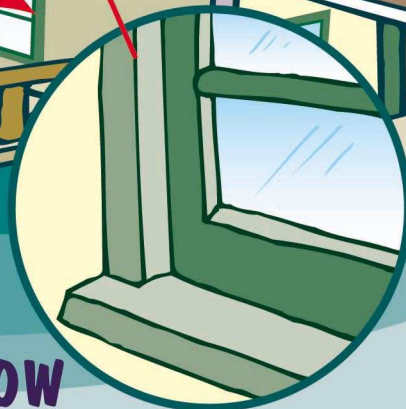
ROOF



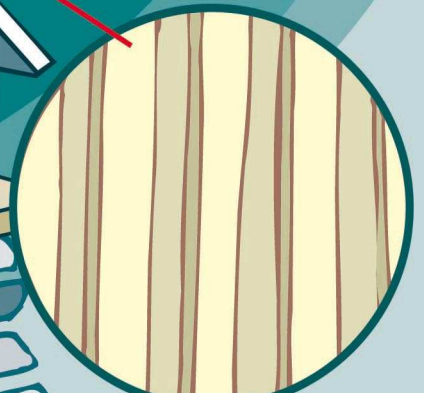
GUTTERS



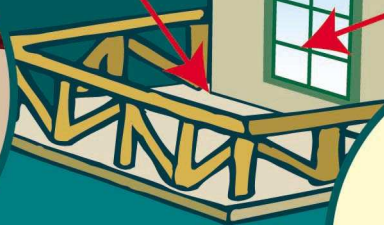
DECK



WINDOW



SIDING



IT'S THE SMALL THINGS



IT'S THE SMALL THINGS



SLOPES, CHIMNEYS & SADDLES



FIREBRANDS

**Slope with
Ladder Fuels**

Saddle

Chimney

Dangerous Areas

INDIRECT: Flying embers (FIREBRANDS) coming to rest on your home.

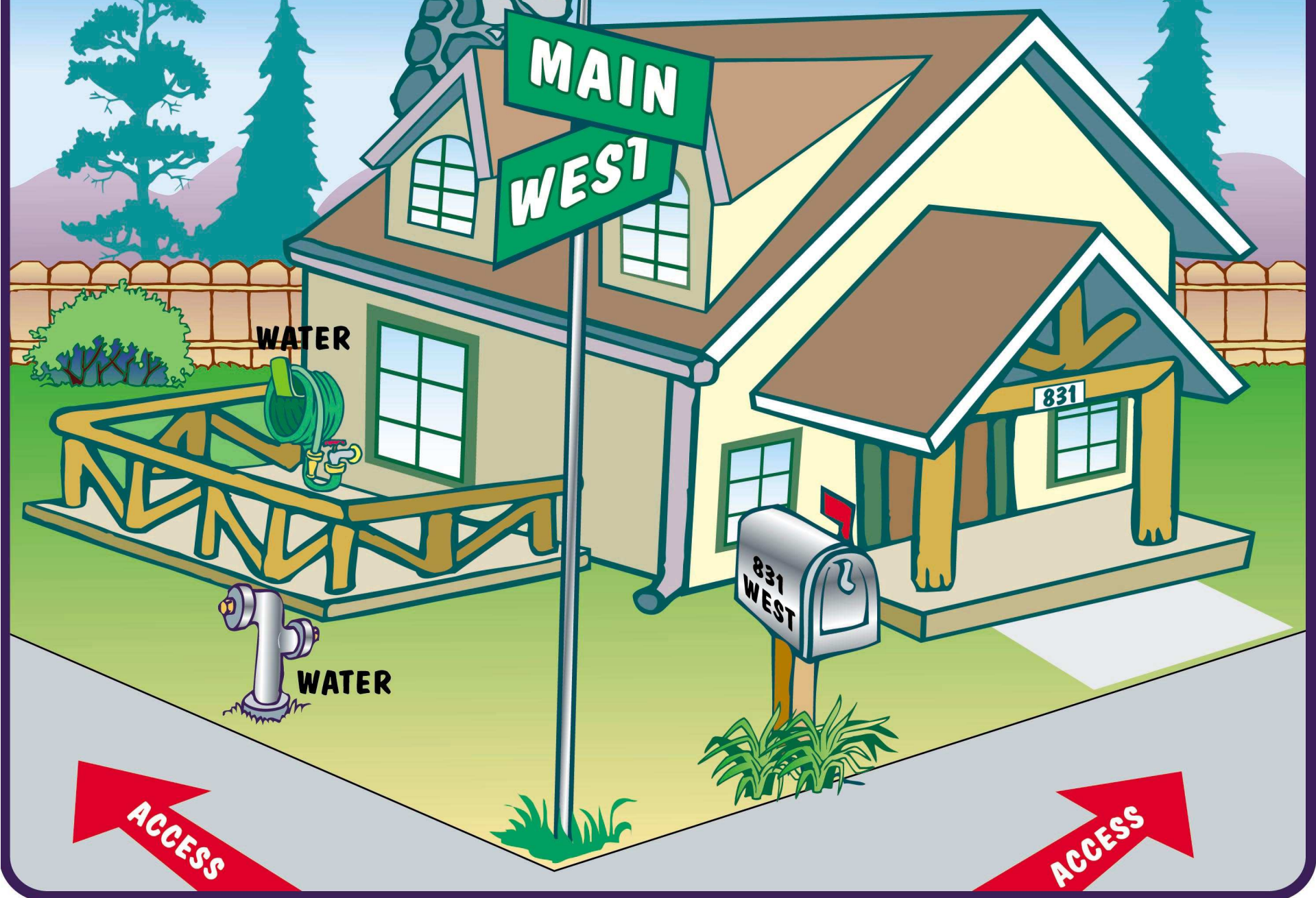
Access...

Fire department access is
extremely important & often overlooked



- Driveways and other access roads must meet or exceed your fire department's needs.
- Display address with 4" high numerals on a contrasting background.

PROPERTY IDENTIFICATION



Access...

- Keep roadways free from overhanging vegetation, fence posts or signage.
- “Vertical Clearance”
- Driveway/road surface and weight requirements.



Access...



- *Minimum* 16-foot wide driveway/access road is needed.
- May need a wider road if a number of homes are served – allowing for two way traffic (access & egress).

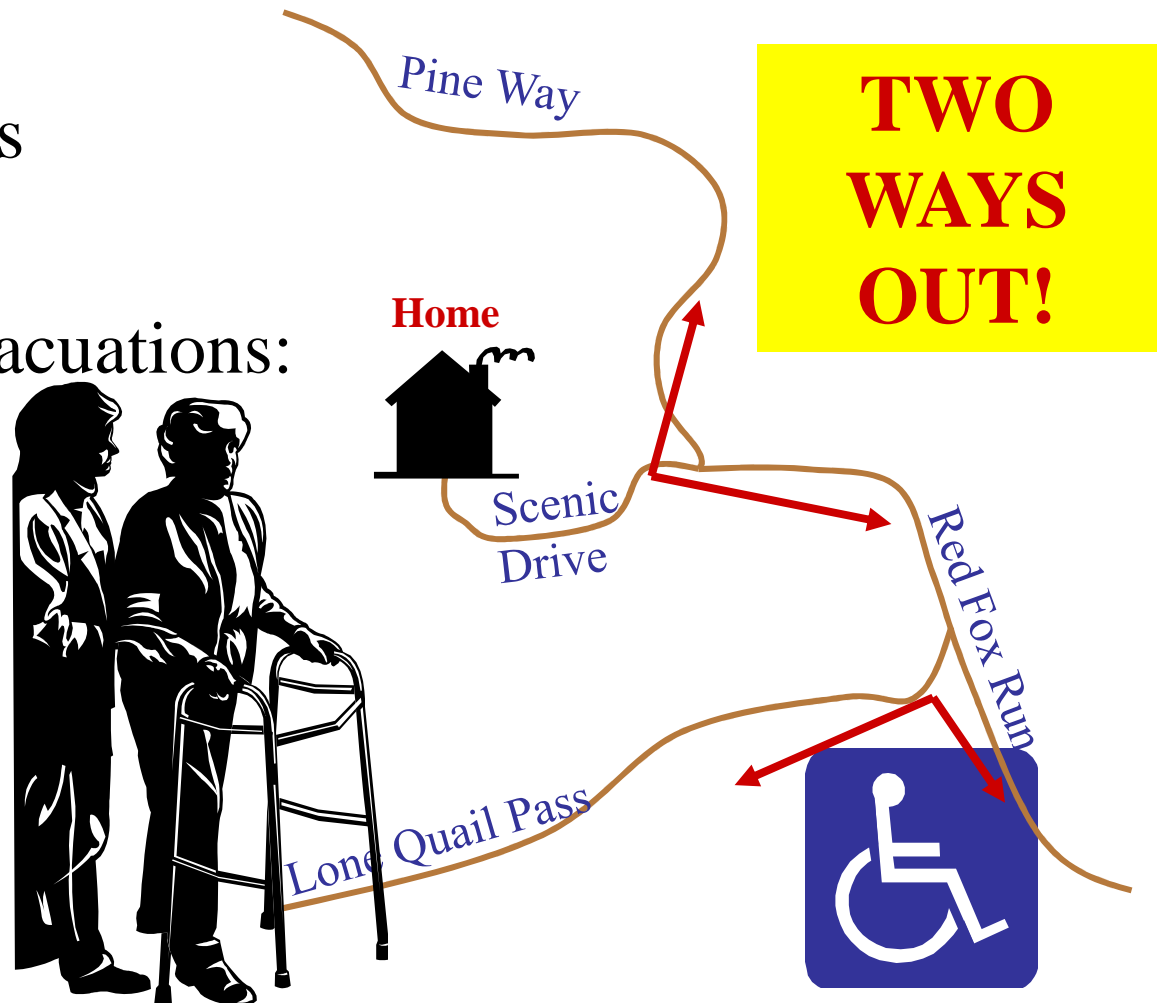
Special Considerations

- Evacuation routes



Special Considerations

- Evacuation routes
- Special-needs evacuations:
Plan ahead!



Special Considerations

- Evacuation routes
- Special-needs evacuations:
Plan Ahead!
- Livestock & pet evacuations



Special Considerations

- Evacuation routes
- Special-needs evacuations
Plan Ahead!
- Livestock & pet evacuations
- “Safe” areas



Summary

Wildfires are a year-round threat to communities throughout California

To prepare for the impacts of wildfires, continue to:

- Identify your local wildland fire problem,
- Monitor your local wildland environment,
- Make your home defensible against wildfire, and
- Plan for any special considerations for evacuation in your neighborhood



A Special Thanks

- This information has been developed in part through a generous grant provided by Fireman's Fund Insurance. We thank them for their investment in the safety of our communities.



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