The Wildland/Urban Interface

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

(Rev. 01/31/2006)

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

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

- 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*.

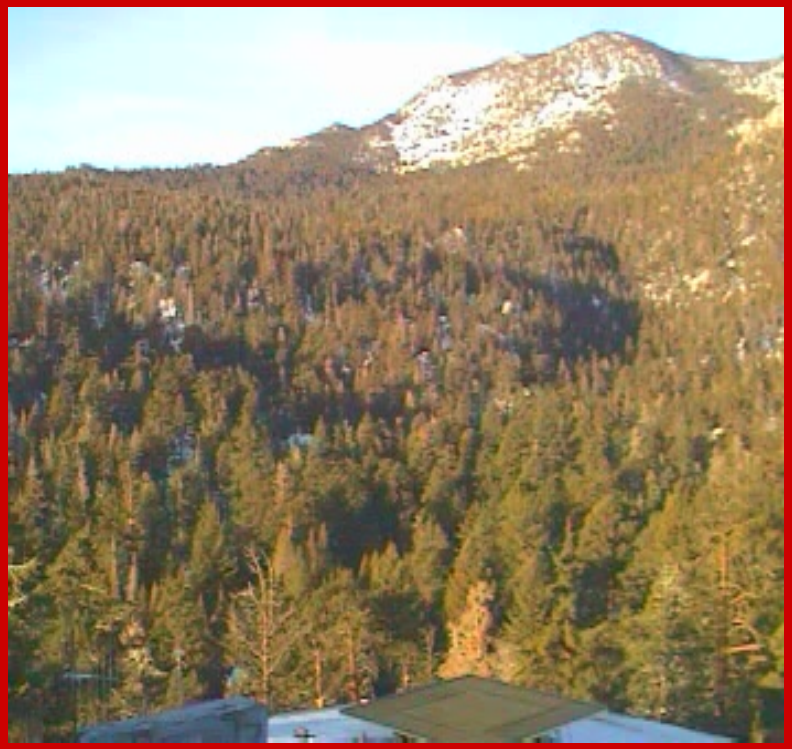
Local hillsides and canyons are covered with these flammable plant materials.

Local Conditions

VEGETATION = FUEL

In mountain areas, forests with large meadows are predominant.

Fire danger exists in this environment, as well.



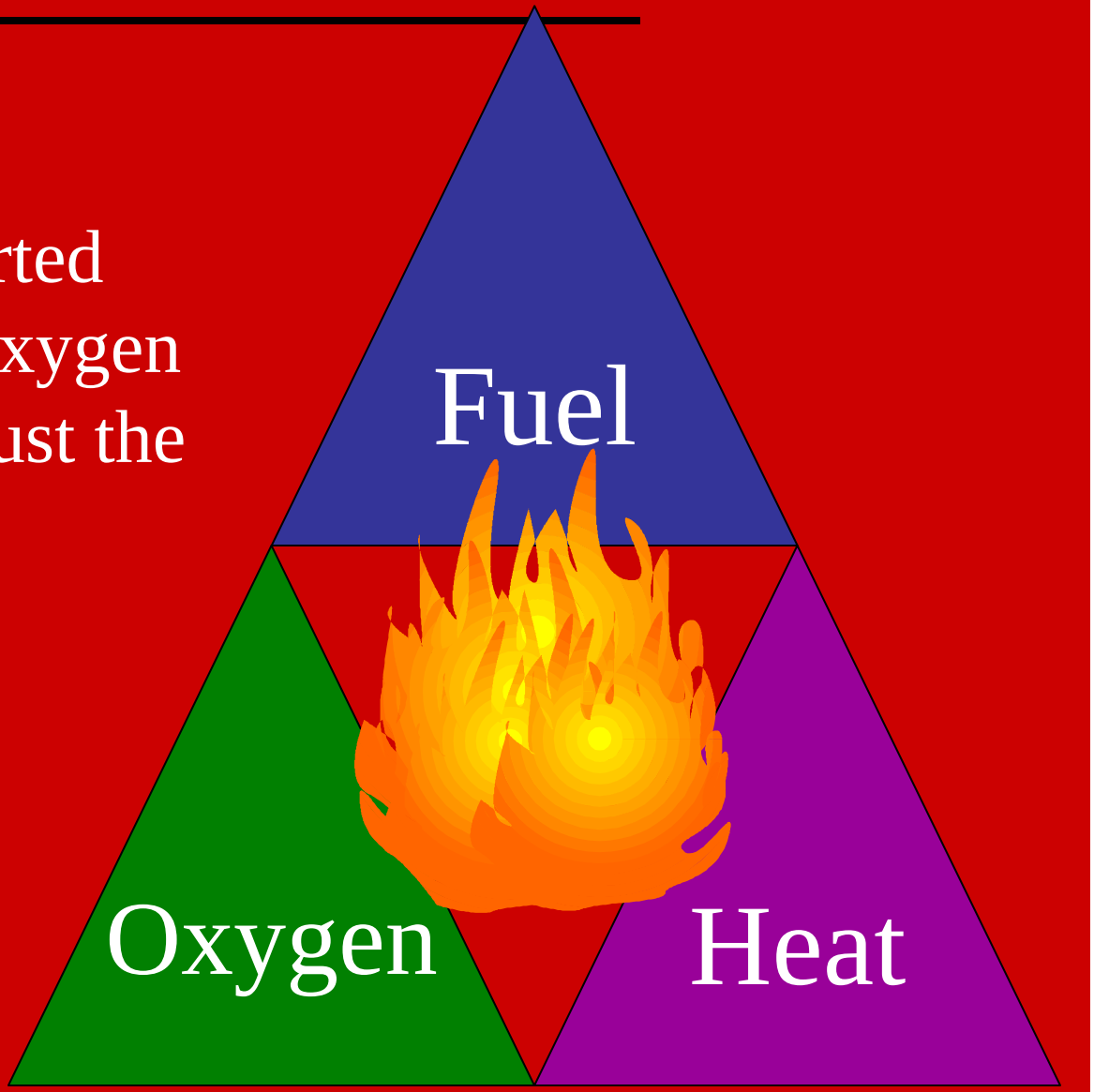
The Wildfire Environment

How a Fire Burns...

The act of burning is COMBUSTION

How a Fire Burns...

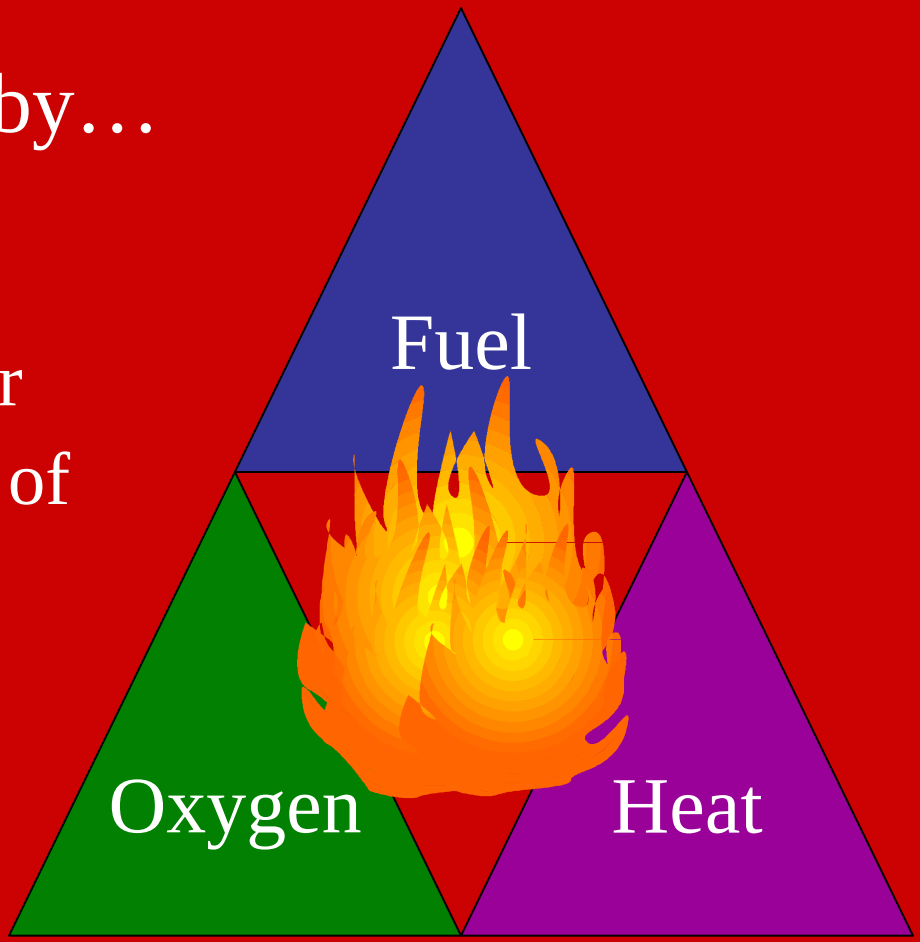
Combustion is supported when fuel, heat and oxygen (air) combine in the just the right amounts.



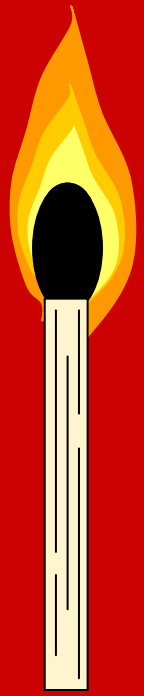
How a Fire Burns...

Combustion is interrupted by…

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



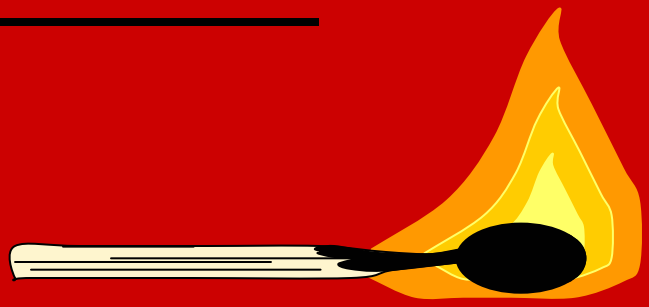
How a Fire Spreads...



Transfer of heat
by contact

Conduction

Slowest



Conduction and Radiation

Transfer of heat by
contact & through the air

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

**Conduction, Radiation,
and Convection**

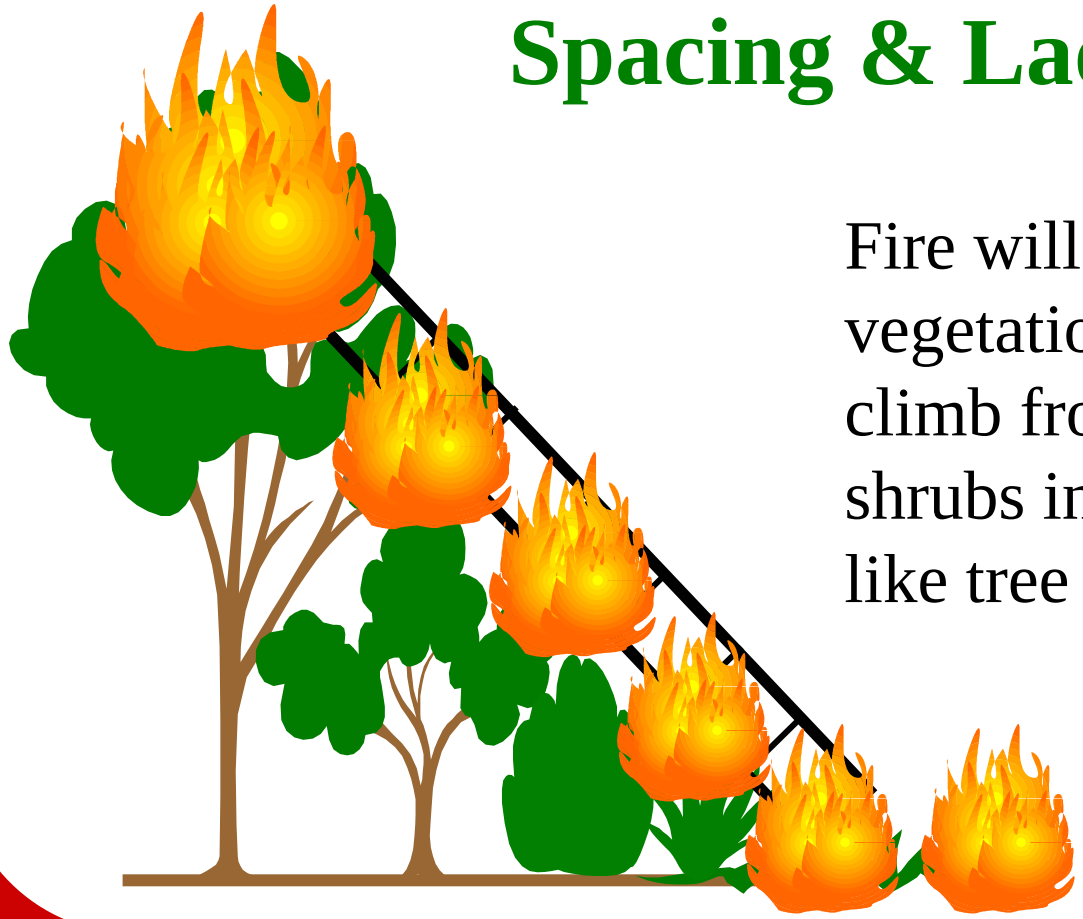
Fastest

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...



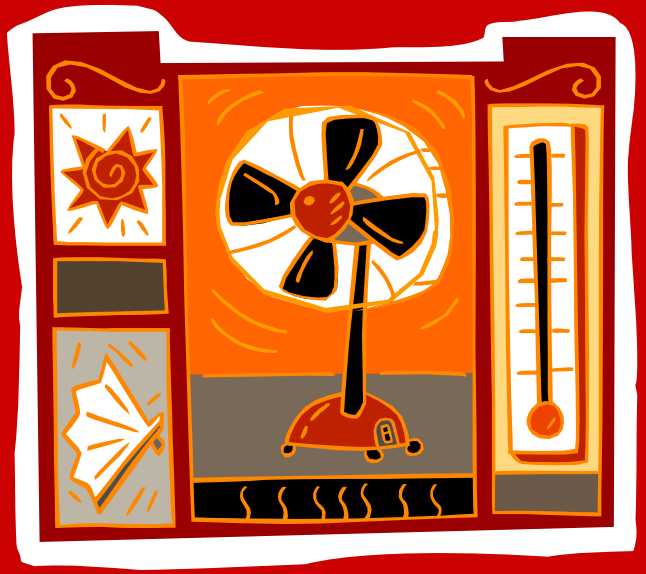
Spacing & Ladder Fuels

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

Weather & Wildfire...

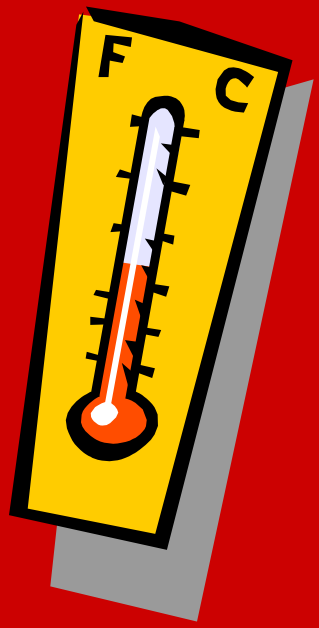
Three fundamental parts of weather have a significant impact on wildfire:

- 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

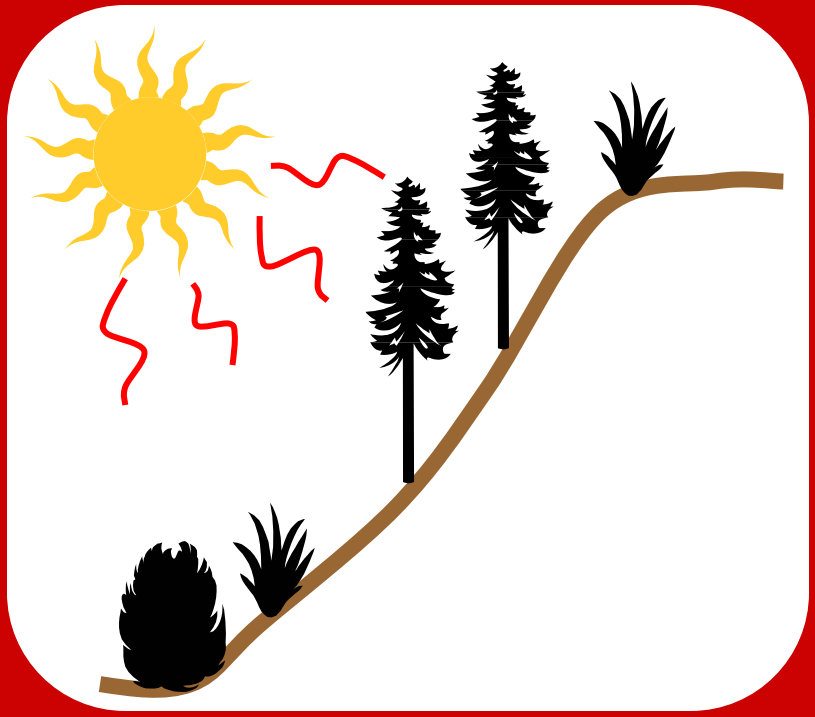
Topography...

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

Beware & Prepare

Defensible Space & Zones

The “Small Things”

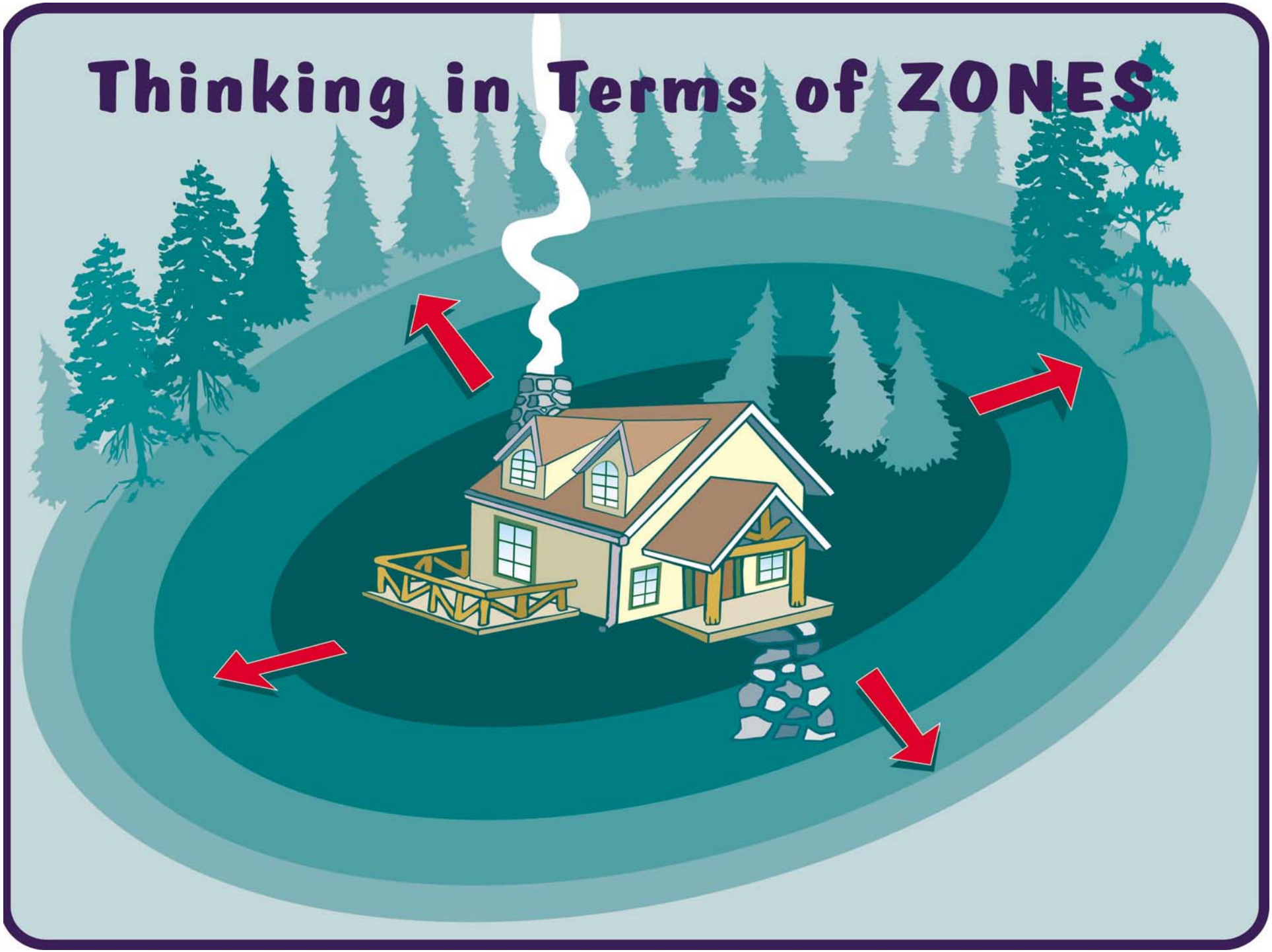
Access & Egress

Special Considerations

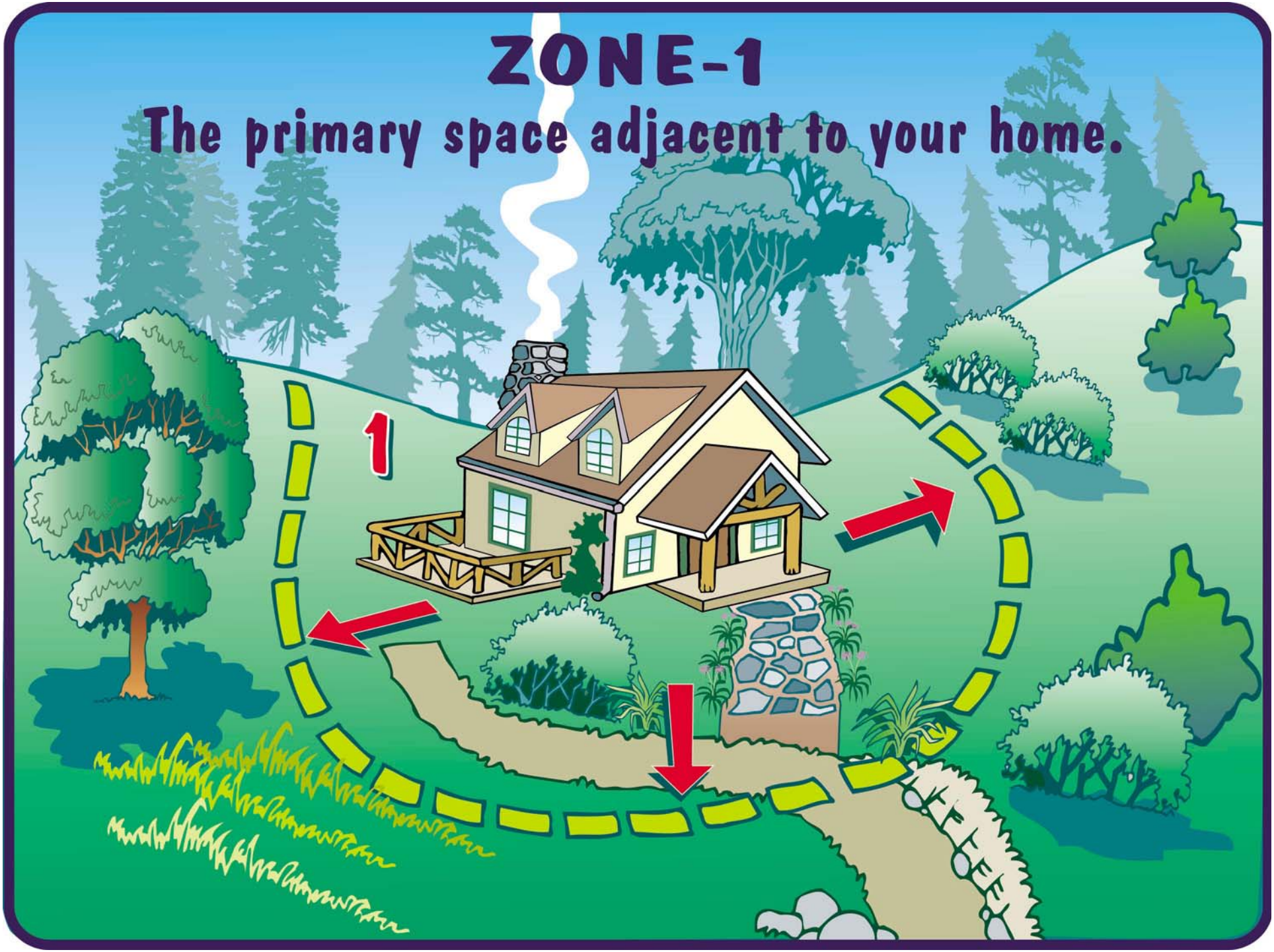
Defensible Space

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

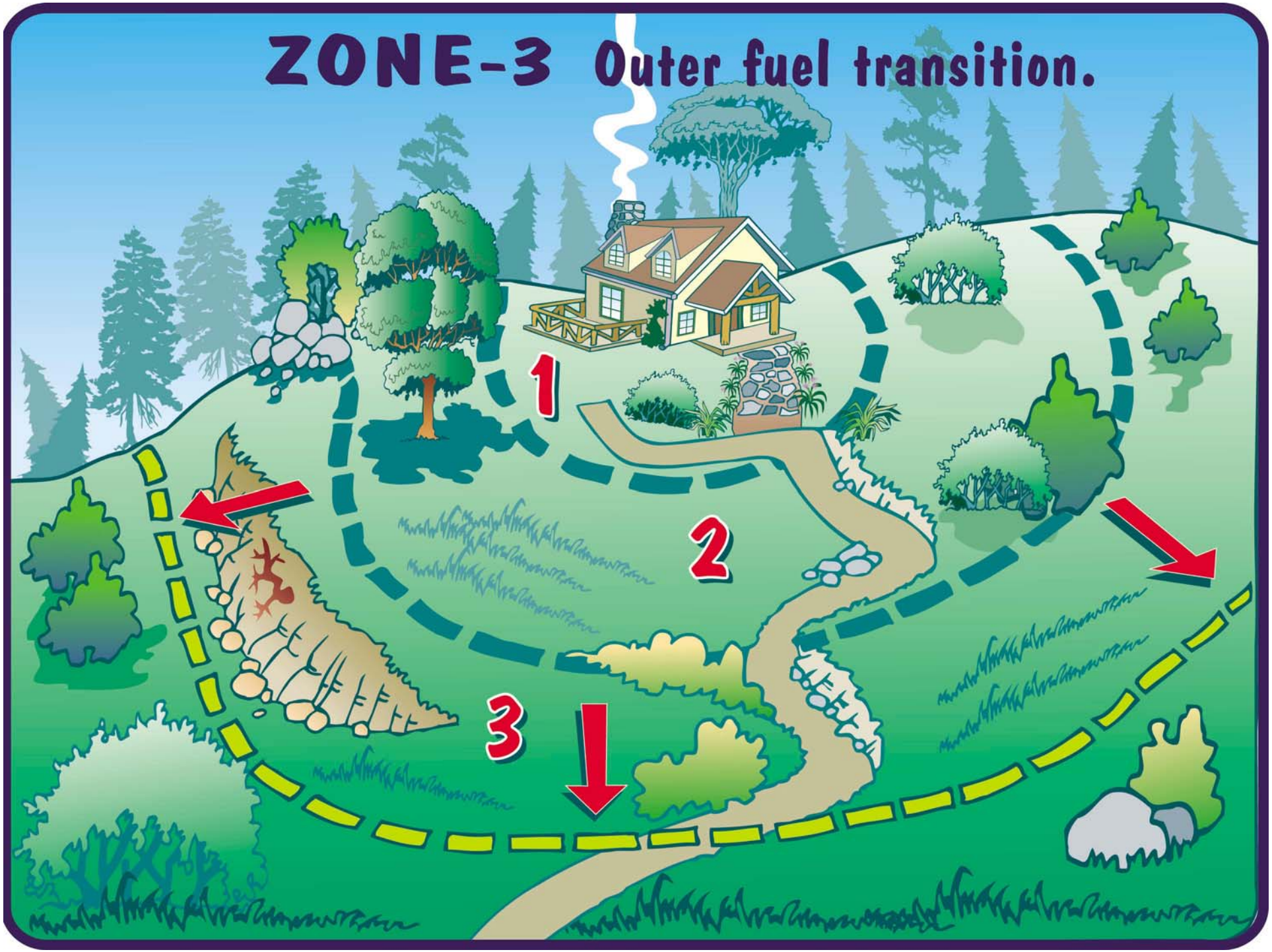
Thinking in Terms of ZONES




YOUR HOME
1
2
3
4


ZONE-1
The primary space adjacent to your home.
1
100 FEET


ZONE-2
Secondary buffer area.
1
2
100 FEET


ZONE-3 Outer fuel transition.
1
2
3

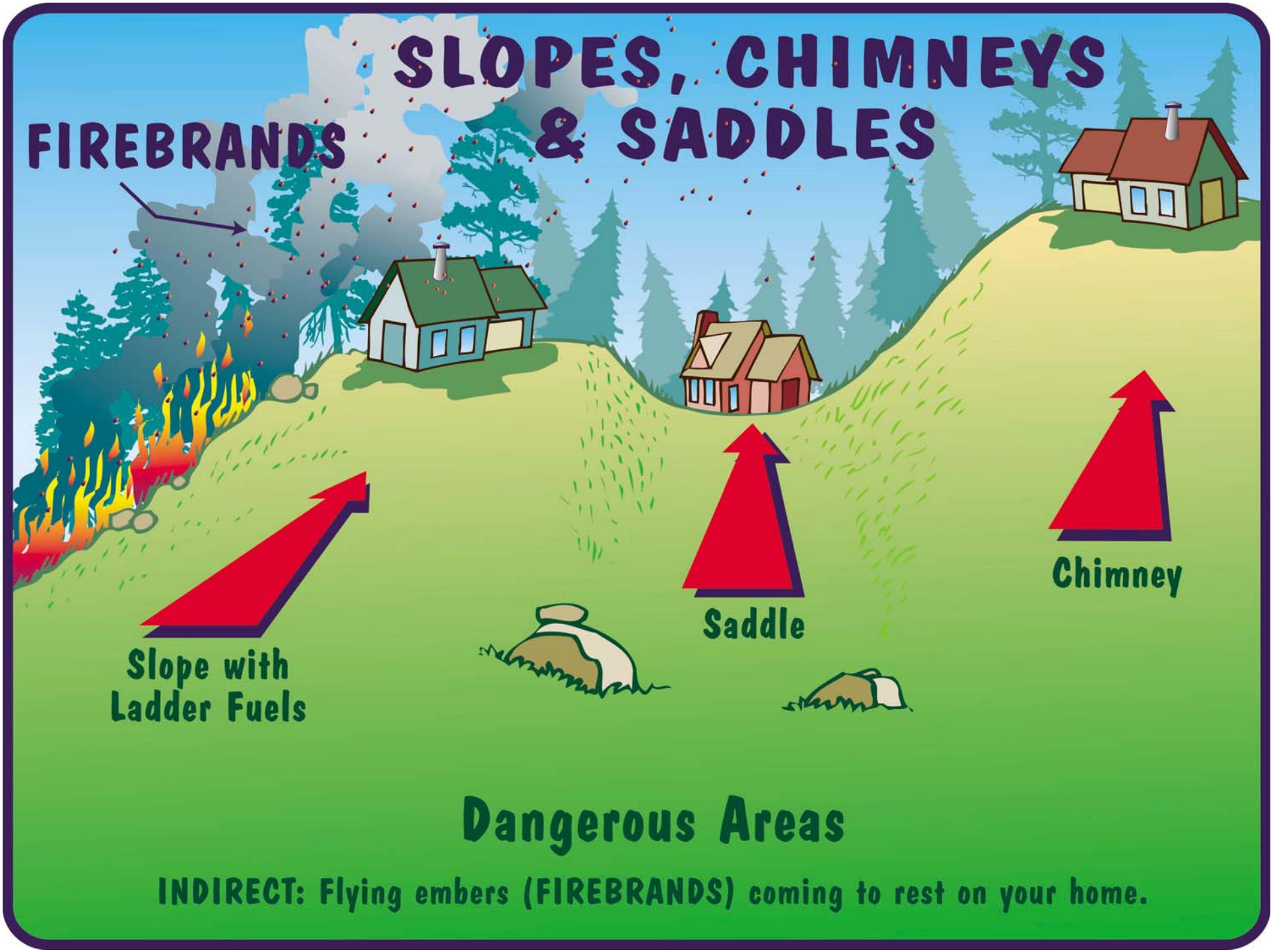

ZONE-4
Outer limits (on a slope)
1
2
3
4

The "Small Things"


YOUR HOME
CHIMNEY
GUTTERS
ROOF
DECK
WINDOW
SIDING


IT'S THE SMALL THINGS
CAULKING, WINDOWS & VENTS
DECORATIVE WOOD WORK
WIRE SCREENS
GUTTERS & DOWNSPOUTS

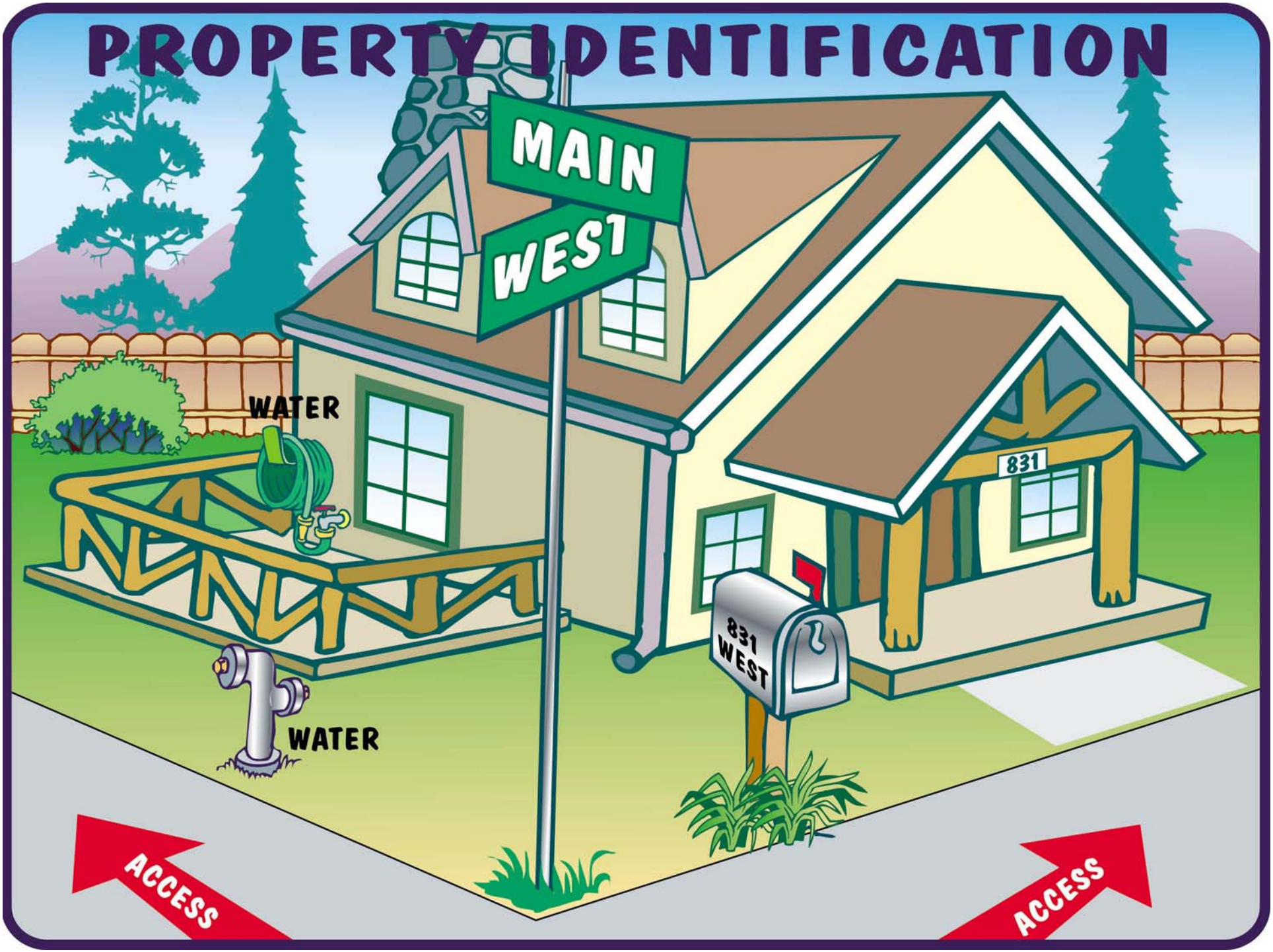

IT'S THE SMALL THINGS
SPACE BETWEEN SIDING & EAVES GABLES
VENTS & SCREENS
WINDOW BOXES
SPACKLE AROUND WINDOW
CELLAR WELLS & VENTS


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 (Min) on a contrasting background.


PROPERTY IDENTIFICATION
MAIN
WEST
WATER
WATER
831
831
WEST
ACCESS
ACCESS

Access…

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

Access…

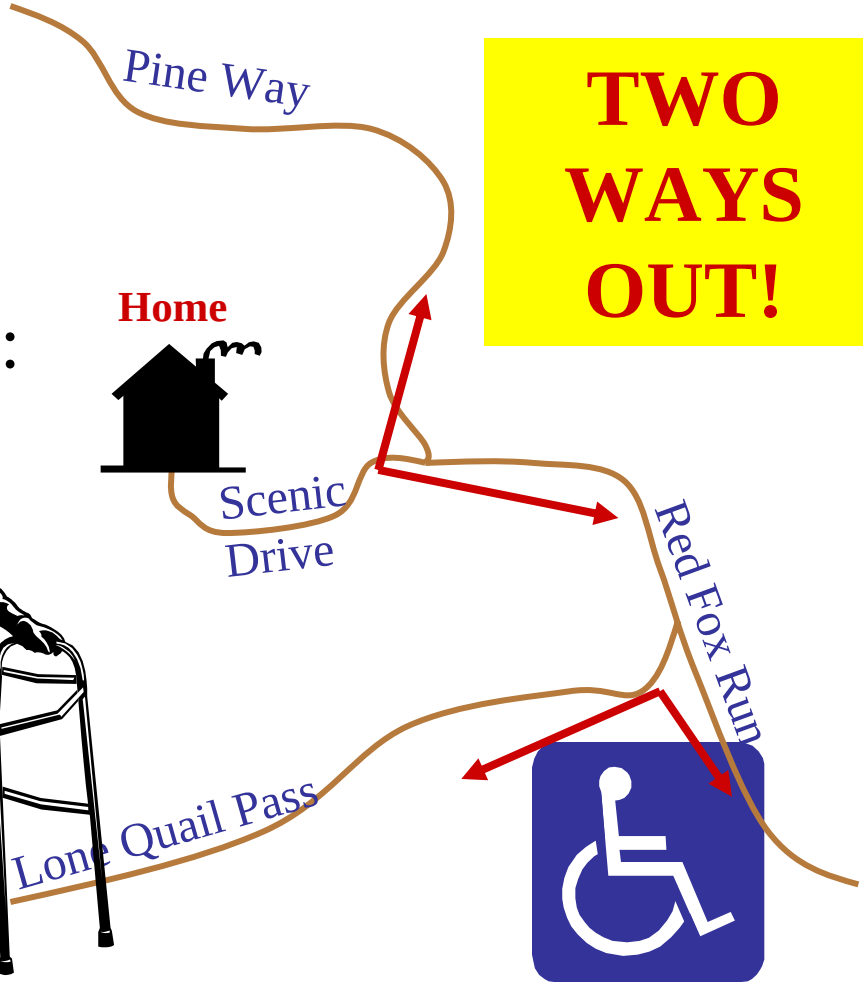
- *Minimum* 16-foot wide driveway/access road is needed.
- May need a wider road if a number of homes are served – allowing for two way traffic (access & egress).

Special Considerations

- Evacuation routes

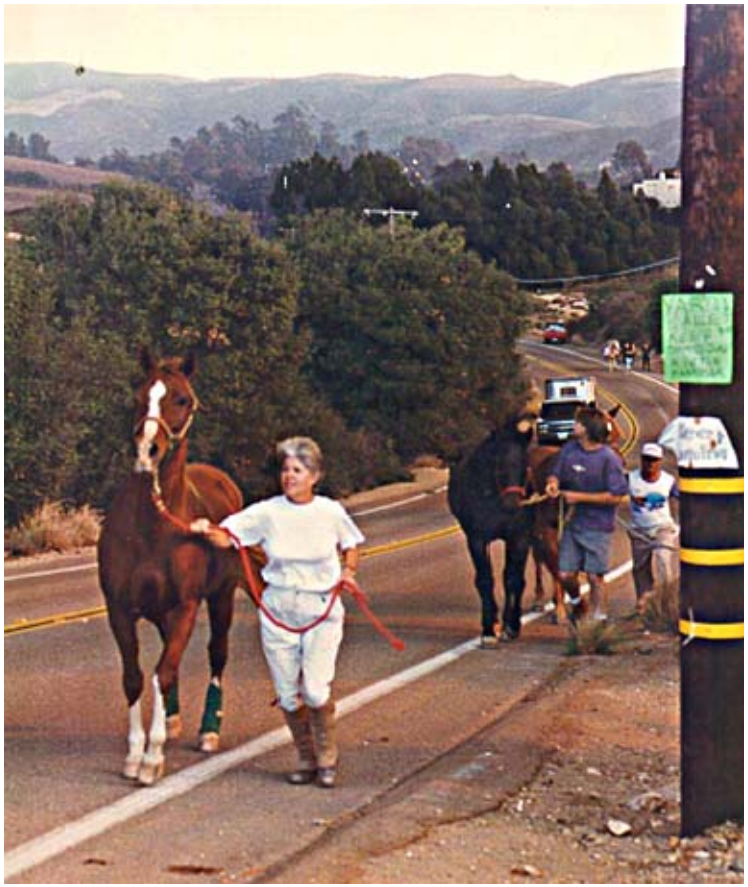
Special Considerations

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



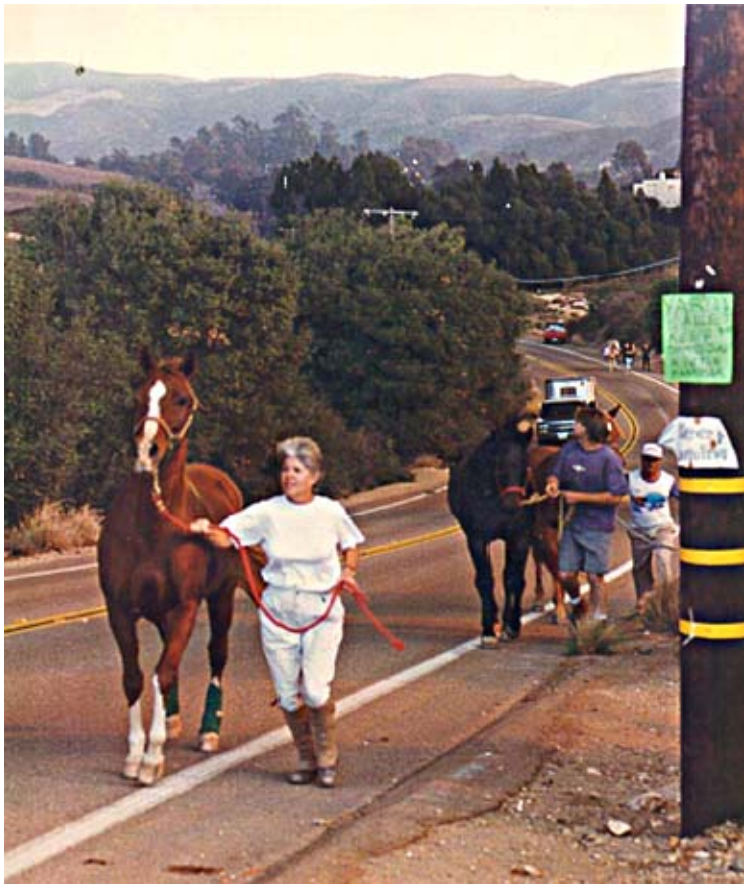
Special Considerations

- 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 defendable against wildfire, and
- Plan for any special considerations for evacuation in your neighborhood