

LIVING WITH FIRE

A GUIDE FOR THE HOMEOWNER

**LAKE TAHOE BASIN
SECOND EDITION**

Lake Tahoe Basin's Angora Fire - 2007

*Published by University of Nevada
Cooperative Extension*

Living With Fire

. . . in the Lake Tahoe Basin

Fire is Natural to Tahoe's Environment

Fire has been a natural part of Tahoe's environment for thousands of years. These historic fires were frequent, of low intensity, and a major influence on the appearance of Tahoe's forests. Beginning in the 1870s, Tahoe's forests and the occurrence of fire started to change.

Much of the Lake Tahoe Basin is considered a "fire environment." It contains flammable vegetation and a climate to support fire. Fire is a natural process in the Lake Tahoe Basin, and many of the plants growing here evolved in the presence of frequent fires. In fact, it is unnatural for fire to be absent for very long in many areas of the Lake Tahoe Basin.

The map presented at right (Page 3) shows the occurrence of fire in the Tahoe Basin prior to European-American settlement. During this period, much of the Lake Tahoe Basin burned, on average, every five to 18 years. These areas are shown as pale yellow on the map. Because these areas burned so often, large amounts of wildfire fuels could not build up. Consequently, these fires were usually of low intensity.

The frequency and intensity of fire influences the type and health of Tahoe's forests. The frequent, low-intensity fires prior to European-American settlement created an open, park-like forest. The photo at the bottom left corner is of Emerald Bay, taken in the 1890s. Experts feel this is a good example of what Tahoe's original (prior to European-American settlement) forest looked like.

The low-intensity fires thinned out young trees and shrubs and also reduced the buildup of deep layers of pine needles, leaves, and twigs. The older, thick-barked trees survived this type of fire. As a result, the forest was dominated by patches of large, mature trees with a sparse understory.

This is no longer the case for Tahoe's forest.



Low-intensity Fire



Some Tahoe Basin plants, such as Jeffrey and ponderosa pine, require the conditions present after a fire to germinate and grow.



Original Forest

Prior to 1870, low-intensity fires burned routinely in the Tahoe Basin. These fires created an open, patchy forest dominated by large trees. The raging, high-intensity wildfires portrayed in today's newspaper headlines were uncommon.



Logging Era

During the 1870s to 1890s, much of the Tahoe Basin was logged. E.B. Scott in "The Saga of Lake Tahoe" states, "By the fall of 1897 nothing remained at Incline but stripped forest land."



The New Forest

A new forest establishes in the aftermath of the logging era. But now, fire has been effectively eliminated as a natural influence. Without frequent, low-intensity fires to thin dense stands of trees, the forest becomes overcrowded.

1870

1900

2000

Tahoe's Forest Timeline

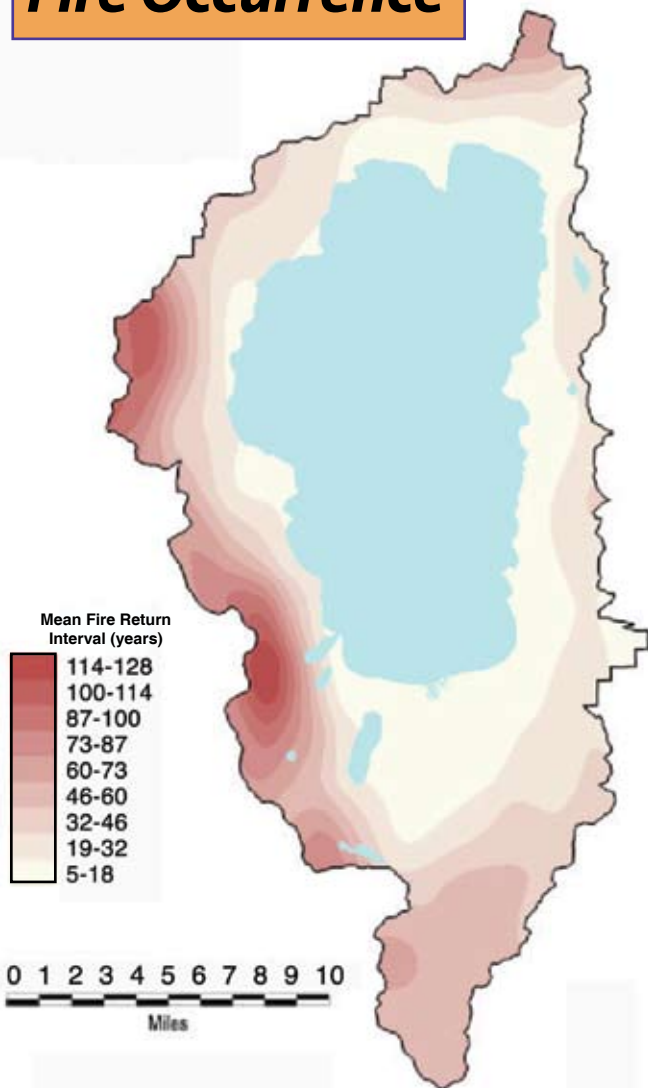


Emerald Bay - 1890s



Emerald Bay - 1990s

Tahoe's Historic Fire Occurrence



Source: Lake Tahoe Watershed Assessment: Volume I. General Technical Report PSW GTR-175. Pacific Southwest Research Station. Forest Service, USDA.

Tahoe's Current Forest and Fire Threat...

Today's forest is much different than the forest that existed prior to 1870. The low elevation mixed conifer forest of the Lake Tahoe Basin, where most homes are located, has four times more understory trees today than it did prior to 1870. In addition, there has been a substantial increase in the amount of shrubs present.

The photographs of Emerald Bay at the bottom of Page 2 are of the same location, but taken 100 years apart. Notice that large trees in the 1890s photograph are still present in the more recent photograph. However, there has been a considerable increase in the density of trees and shrubs in the understory. A major cause of the increase in woody plants has been the lack of frequent, low-intensity fires. With European-American settlement, these fires were effectively suppressed.

Under these unnatural conditions, uncontrollable, high-intensity fires are much more likely. The Angora and Gondola Fires are recent examples of these types of fires in the Tahoe area. Furthermore, the forest is less healthy and more susceptible to disease and insects, particularly during drought.

Unfortunately, given Tahoe's current conditions, homes and lives are at risk.



High-intensity Fire



Dense stands of trees are more likely to be stressed during drought and are often more vulnerable to disease and insects.

Tahoe Today...

Today's Forest

Tahoe's current forest is typically thick with trees, brush and dead vegetation. In many areas, fire has been absent for over a hundred years. As a result, there has been a great buildup of wildfire fuel. Homes have now been added to Tahoe's wildfire fuel mix. The likelihood for uncontrollable, high-intensity wildfire that impacts watersheds, destroys neighborhoods, and takes human life is high in many areas of the Lake Tahoe Basin.



Newspaper stories, such as this Reno Gazette-Journal article, warn of the potential for a catastrophic wildfire in the Lake Tahoe Basin.

Tahoe homeowners need to prepare for wildfire...

Fact: Despite our best prevention efforts, the Lake Tahoe Basin has one of the highest wildfire ignition rates in the Sierra Nevada.

Fact: The Lake Tahoe Basin's forests have an unprecedented amount of fuel available for burning.

Fact: Many Lake Tahoe Basin homes, neighborhoods and communities are not prepared to survive a wildfire.



The 2007 Angora Fire destroyed 242 homes and damaged 35 others. The presence of unburned vegetation surrounding this house suggests a burning ember landed on something easily ignitable on or immediately adjacent to the home.

Living in a High Wildfire Hazard Area

The potential for loss of human life and property due to wildfire in the Lake Tahoe Basin is growing. In response, local, state, federal, private and nonprofit organizations have banded together to create *Living With Fire*, a wildfire threat reduction program for homeowners.

The *Living With Fire* program is not about fire prevention. Its purpose is to teach people how to live more safely with the threat of wildfire. For the Lake Tahoe Basin, it is not a question of "if" wildfire will occur, but "when" it will occur.

Who Wins, Who Loses...

Why do some houses survive a wildfire, while others are destroyed? Research findings prove that house survival during wildfire is not random, miraculous or "dumb luck." Rather, it is how the house is built, the characteristics of the adjacent vegetation and other fuels, and routine maintenance that often determine which ones burn and which survive. These types of actions are called "pre-fire" activities. Pre-fire activities are actions completed before a wildfire occurs that improve the survivability of people and the house. The "winners" will be the people who implement pre-fire activities.

The homeowner is the most important person in preventing a house from being destroyed by wildfire. It is the actions that a homeowner takes before a wildfire occurs that are critical.



HUMAN BEHAVIOR IS JUST AS IMPORTANT AS FIRE BEHAVIOR IN SAVING YOUR HOME!

BEFORE THE FIRE



DURING THE FIRE



AFTER THE FIRE



Prior to the fire, this homeowner changed the roof material from wood shakes to fire-resistant tiles and reduced the amount of flammable vegetation surrounding the home. These pre-fire activities helped this house survive the fire.

Wildfire will threaten your house in three ways...



CONTACT BY FLAMES

This type of threat occurs when vegetation and other fuels burning near the house produce flames that come in contact with the home and ignite it. Often, it happens when fire burns through a uniform layer of vegetation right up to the house. Direct contact by flames is probably what most homeowners visualize when they think of a house burning during wildfire.



RADIATED HEAT

Radiated heat melted the vinyl siding on this house. Flames never came in contact with it. Radiated heat is produced by invisible electromagnetic waves that travel out in all directions from a flame. When a house receives enough radiated heat for a sufficient amount of time, it will ignite. Sometimes radiated heat can burst windows and allow burning embers to enter the house.



FLYING EMBERS

More houses burn due to flying embers than any other reason. If fire conditions are right, embers can be lofted high into the air and transported more than a mile. Burning embers can also be carried by wind and fire whirls. If these burning embers land in easily ignitable materials, a new fire can start.

What can homeowners do to reduce the wildfire threat?

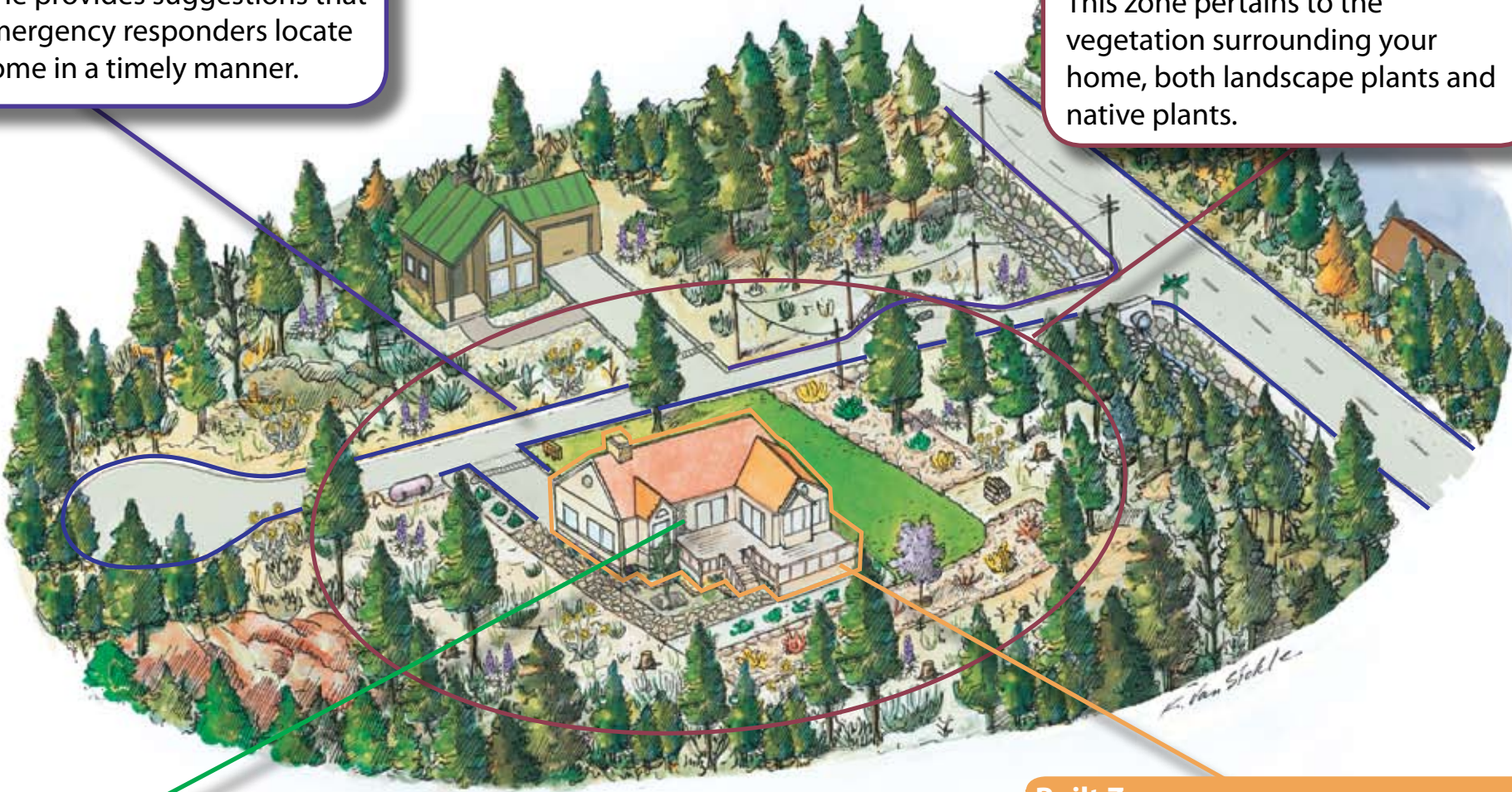
The Living With Fire wildfire threat reduction recommendations are presented according to four zones...

Access Zone

This zone provides suggestions that help emergency responders locate your home in a timely manner.

Defensible Space Zone

This zone pertains to the vegetation surrounding your home, both landscape plants and native plants.



Interior Zone

This zone offers fire safety tips for inside the home.

Built Zone

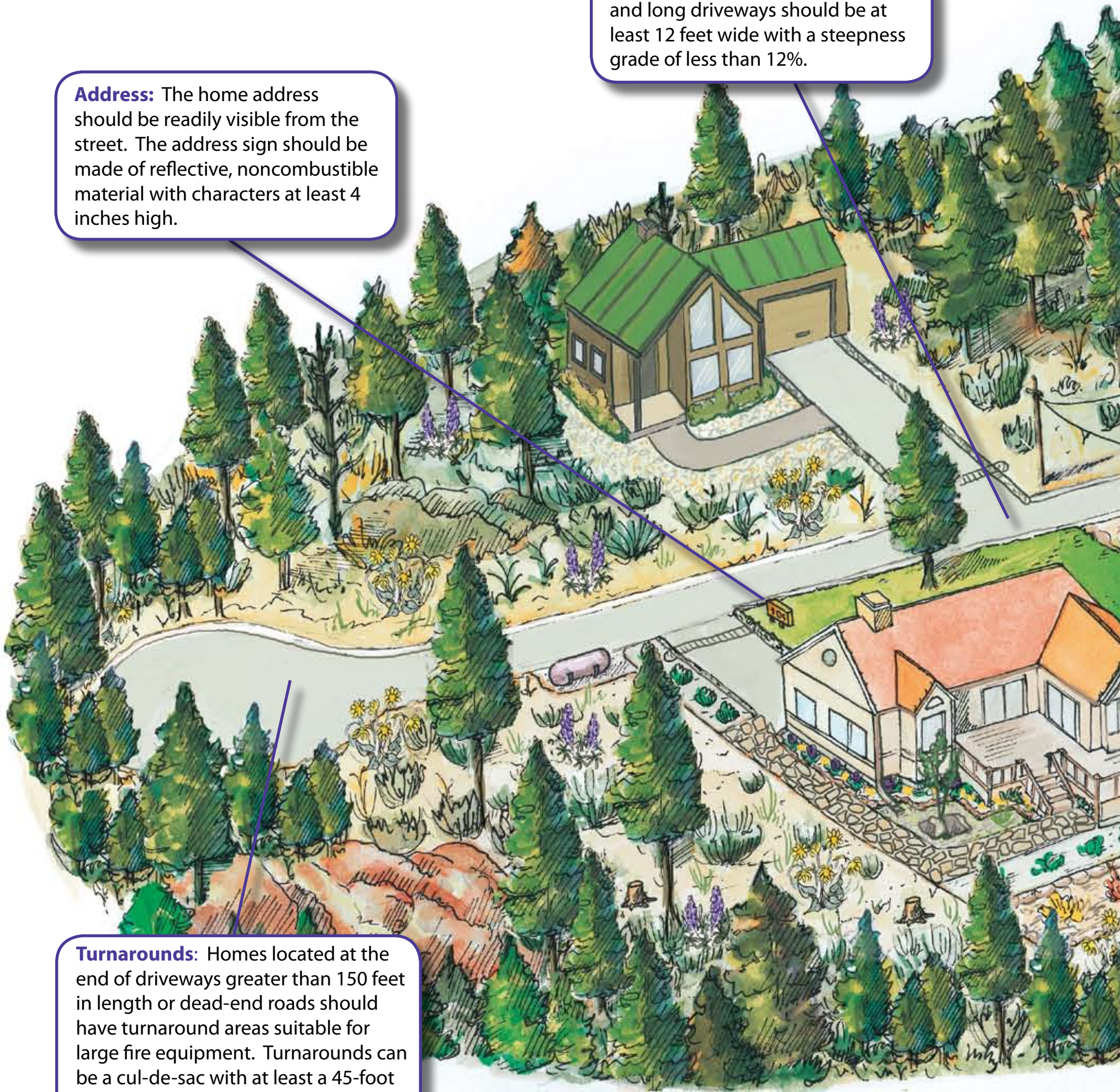
This zone includes recommendations for home construction.

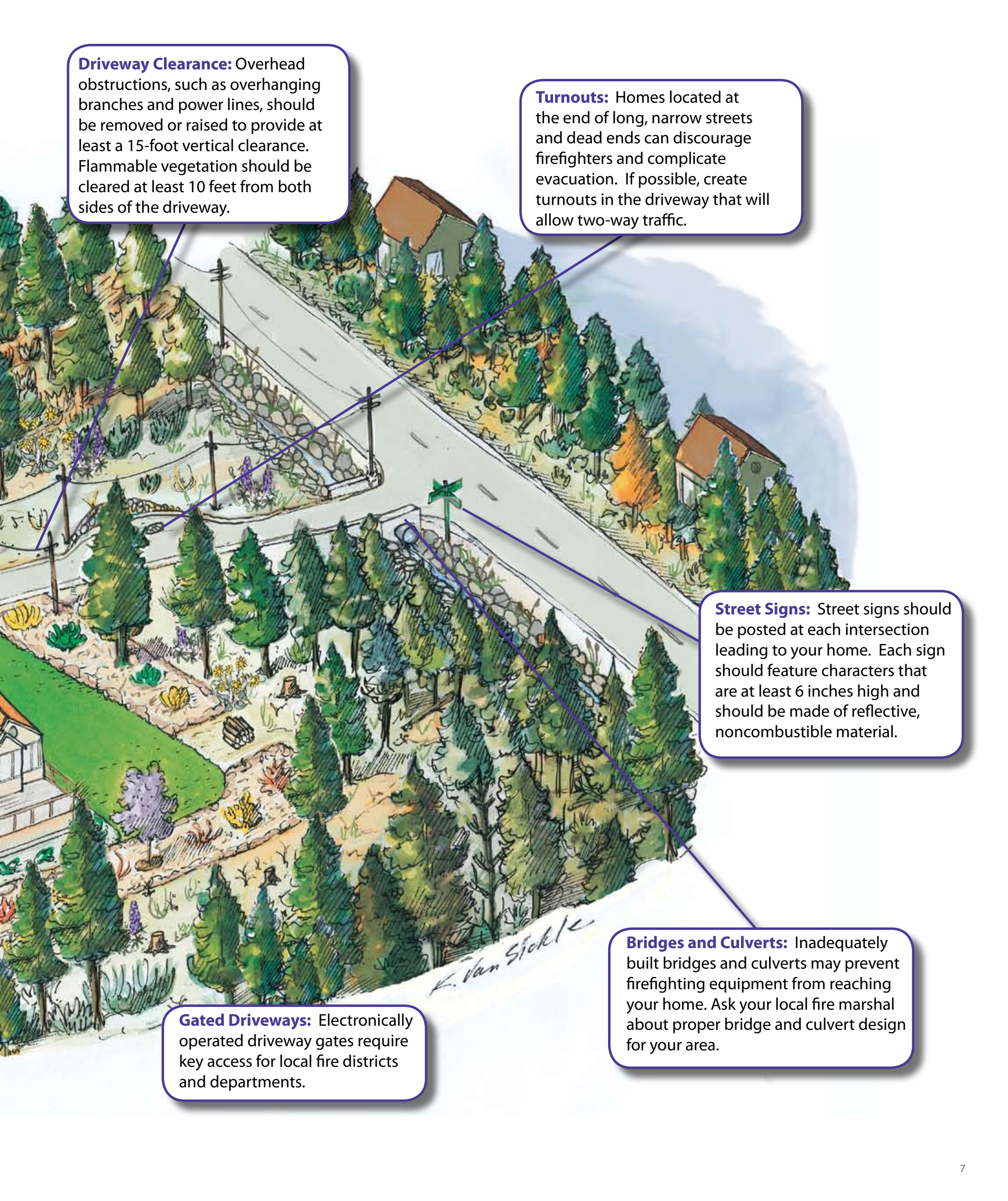
Access Zone

Address: The home address should be readily visible from the street. The address sign should be made of reflective, noncombustible material with characters at least 4 inches high.

Road Width and Grade: Roads and long driveways should be at least 12 feet wide with a steepness grade of less than 12%.

Turnarounds: Homes located at the end of driveways greater than 150 feet in length or dead-end roads should have turnaround areas suitable for large fire equipment. Turnarounds can be a cul-de-sac with at least a 45-foot radius or a location suitable for a three-point turn.





Driveway Clearance: Overhead obstructions, such as overhanging branches and power lines, should be removed or raised to provide at least a 15-foot vertical clearance. Flammable vegetation should be cleared at least 10 feet from both sides of the driveway.

Turnouts: Homes located at the end of long, narrow streets and dead ends can discourage firefighters and complicate evacuation. If possible, create turnouts in the driveway that will allow two-way traffic.

Street Signs: Street signs should be posted at each intersection leading to your home. Each sign should feature characters that are at least 6 inches high and should be made of reflective, noncombustible material.

Gated Driveways: Electronically operated driveway gates require key access for local fire districts and departments.

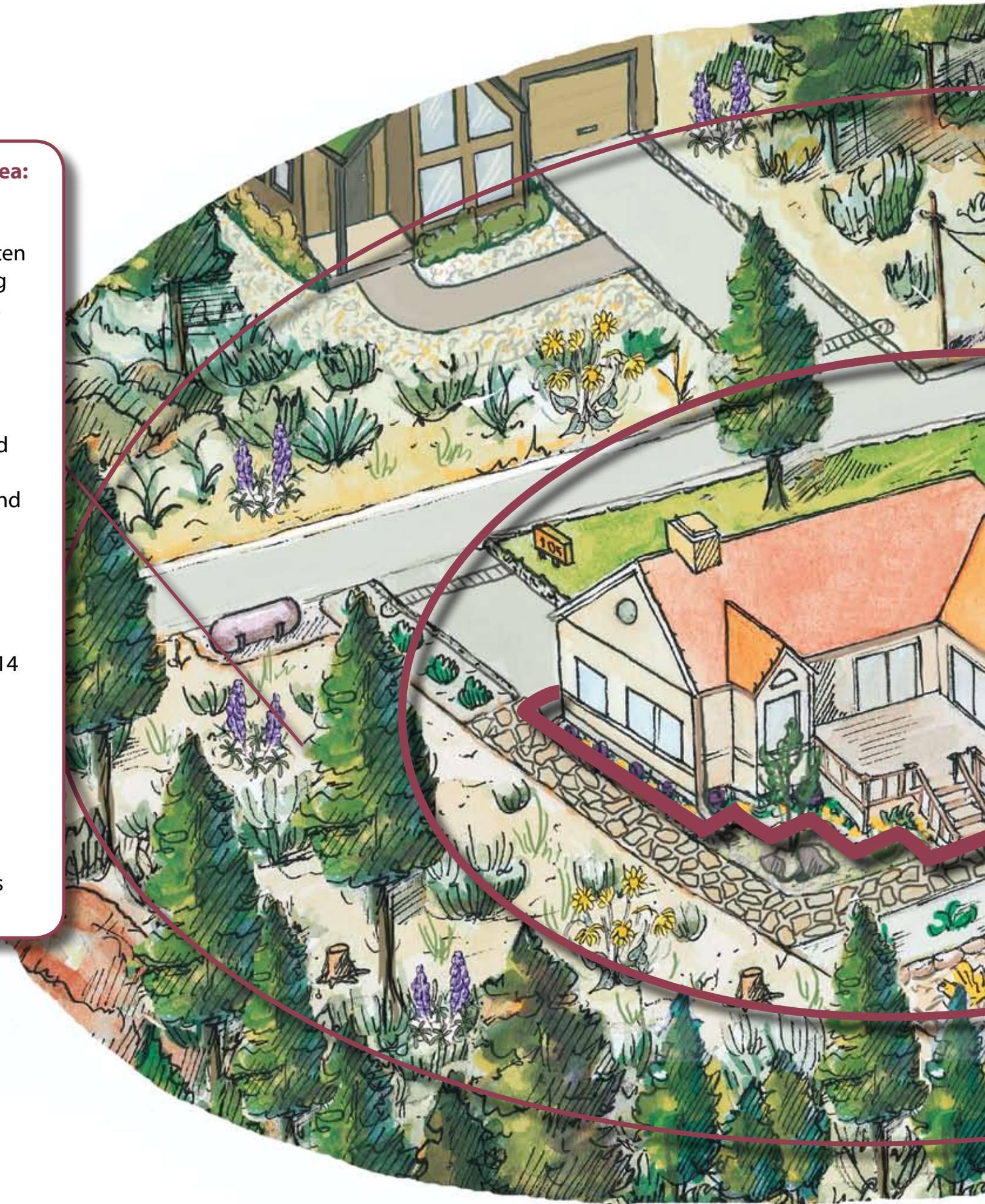
Bridges and Culverts: Inadequately built bridges and culverts may prevent firefighting equipment from reaching your home. Ask your local fire marshal about proper bridge and culvert design for your area.

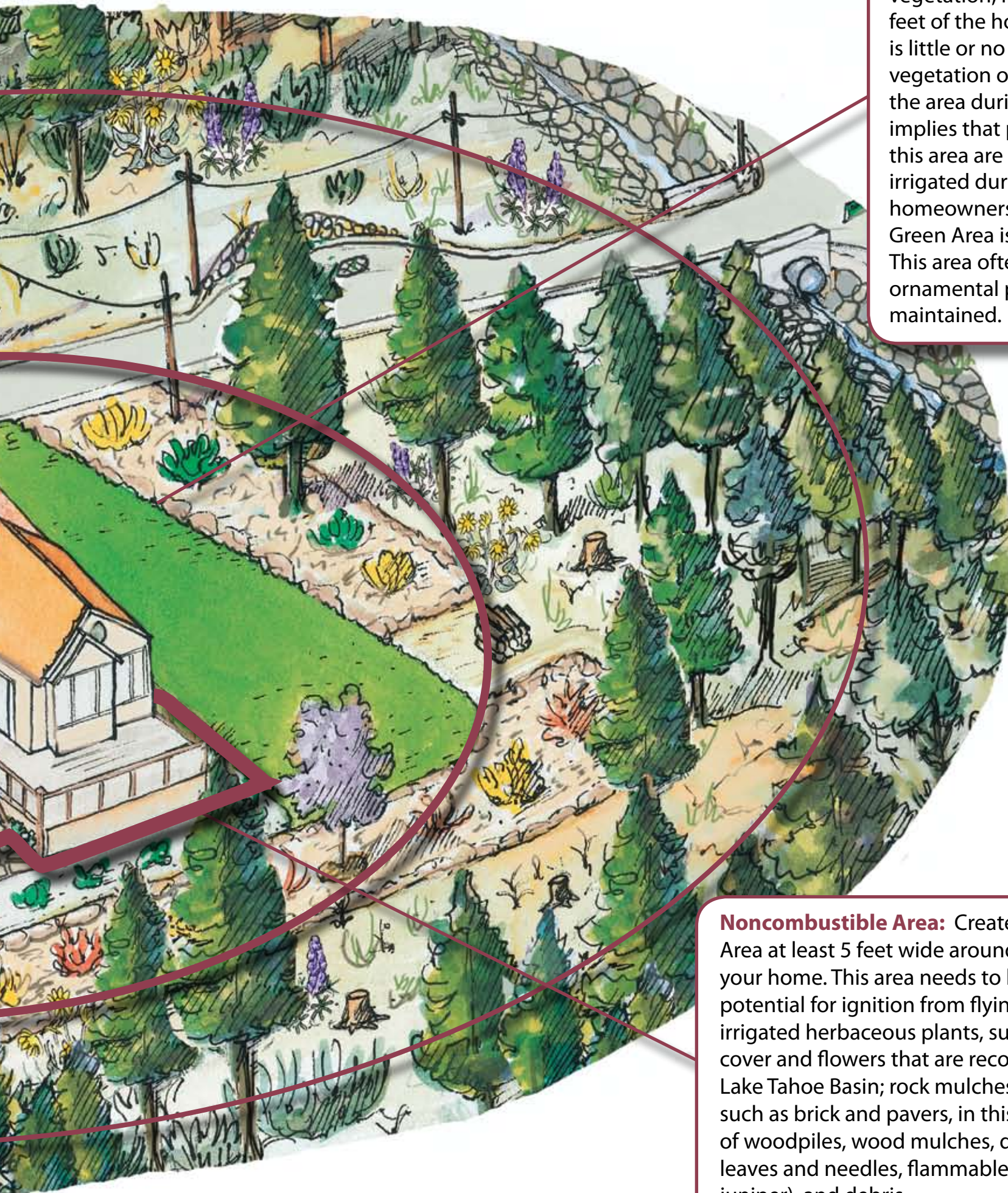
Defensible Space Zone

Wildland Fuel Reduction Area:

The Wildland Fuel Reduction Area lies beyond the Lean, Clean and Green Area and often consists of naturally occurring plants (pine trees, manzanita, sagebrush, etc.). Within this area:

- Remove dead vegetation, including dead shrubs, dried grass, fallen branches, thick accumulations of needles and leaves, etc.
- Thin dense stands of shrubs and trees to create a separation between them. Removing trees more than 14 inches in diameter requires a permit from the Tahoe Regional Planning Agency (TRPA) or your local fire professional.
- Remove “ladder fuels” by removing low tree branches and shrubs under the trees.





Lean, Clean and Green Area: For a distance of 5 feet to 30 feet from the home, there should be a Lean, Clean and Green Area. "Lean" indicates that only a small amount of flammable vegetation, if any, is present within 30 feet of the house. "Clean" means there is little or no accumulation of dead vegetation or flammable debris within the area during fire season. "Green" implies that plants located within this area are kept healthy, green and irrigated during fire season. For most homeowners, the Lean, Clean and Green Area is the residential landscape. This area often has irrigation, contains ornamental plants, and is routinely maintained.

Noncombustible Area: Create a Noncombustible Area at least 5 feet wide around the base of your home. This area needs to have a very low potential for ignition from flying embers. Use irrigated herbaceous plants, such as lawn, ground cover and flowers that are recommended for the Lake Tahoe Basin; rock mulches; or hard surfaces, such as brick and pavers, in this area. Keep it free of woodpiles, wood mulches, dead plants, dried leaves and needles, flammable shrubs (such as juniper), and debris.

See Page 14, **Seven Steps to Creating an Effective Defensible Space**

Built Zone

Eaves: The eaves of a home act as a heat trap for hot air and gases, greatly increasing the chance of ignition. Covering the underside of the eave with a soffit, or “boxing in” the eave, allows the heat to escape. Enclose eaves with fiber cement board or 5/8-inch-thick, high-grade plywood.

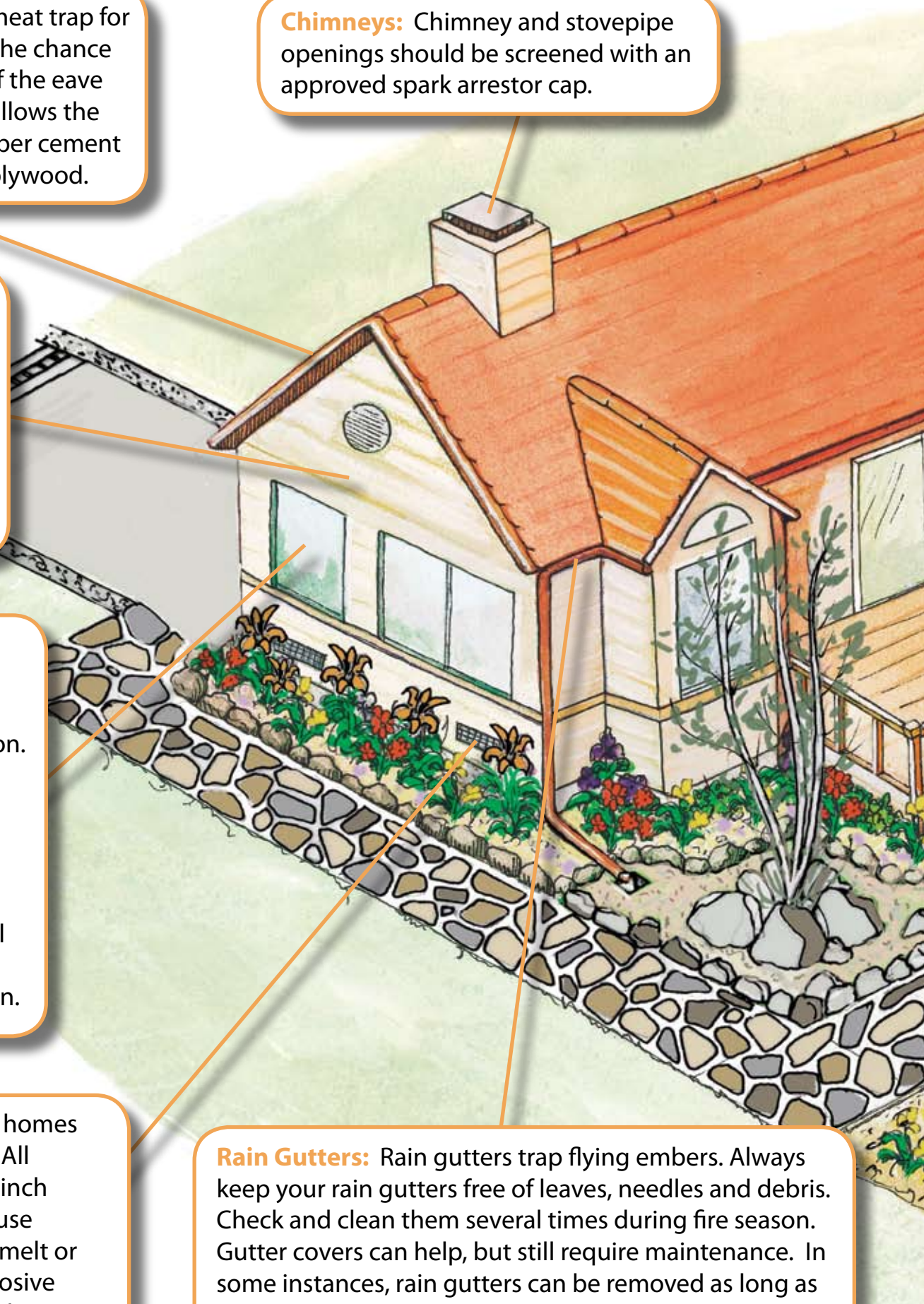
Chimneys: Chimney and stovepipe openings should be screened with an approved spark arrestor cap.

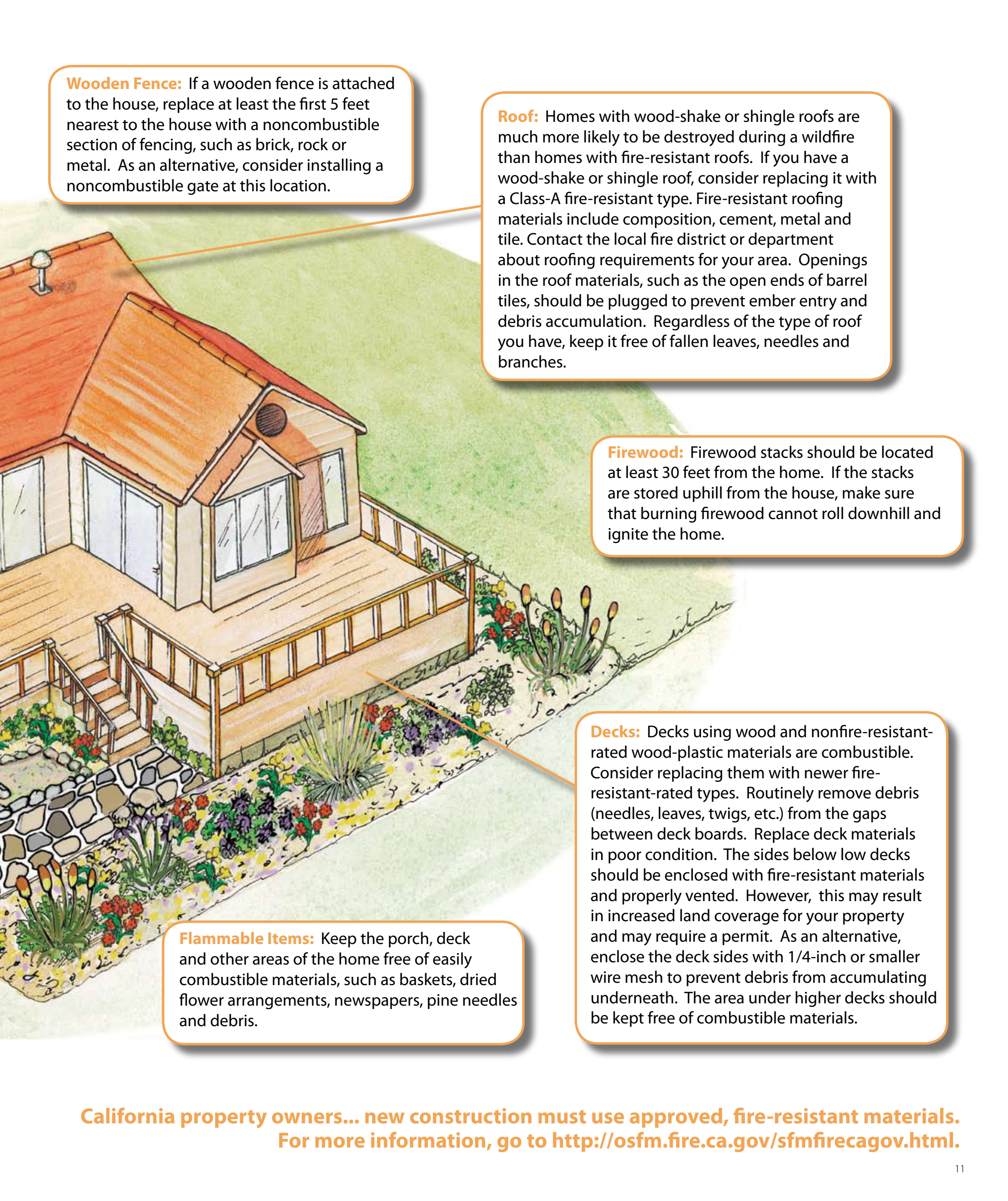
Exterior Siding: Wood products, such as boards, panels and shingles, are common siding materials. However, they are combustible and not good choices for fire-prone areas. Noncombustible siding materials, such as stucco, brick, stone and cement board, are better choices. Log homes that utilize fire-rated chinking or notched logs are also good choices.

Windows: Windows are one of the weakest parts of a home and usually break before the structure ignites. This allows burning embers and heat to enter the home, which may lead to internal ignition. Single-paned and large windows are particularly vulnerable. In high fire hazard areas, install windows that are at least double-paned and that utilize tempered glass for the exterior pane. The type of window frame (wood, aluminum or vinyl) is not critical. If using vinyl, make sure it has metal reinforcement members. Closable, solid exterior shutters can provide additional window protection.

Vents: Attic, soffit and foundation vents on homes are potential entry points for flying embers. All vent openings need to be covered with 1/4-inch or smaller noncorrosive wire mesh. Do not use fiberglass or plastic mesh because they can melt or burn. Covering vents with 1/8-inch noncorrosive metal mesh is preferred, but the mesh is easily clogged and requires more maintenance. Do not permanently cover vents, as they play a critical role in preventing wood rot in the house.

Rain Gutters: Rain gutters trap flying embers. Always keep your rain gutters free of leaves, needles and debris. Check and clean them several times during fire season. Gutter covers can help, but still require maintenance. In some instances, rain gutters can be removed as long as roof runoff water can be carried away without damaging the house exterior or foundation, and without causing erosion. Gutter removal may also affect erosion control Best Management Practices (BMPs).





Wooden Fence: If a wooden fence is attached to the house, replace at least the first 5 feet nearest to the house with a noncombustible section of fencing, such as brick, rock or metal. As an alternative, consider installing a noncombustible gate at this location.

Roof: Homes with wood-shake or shingle roofs are much more likely to be destroyed during a wildfire than homes with fire-resistant roofs. If you have a wood-shake or shingle roof, consider replacing it with a Class-A fire-resistant type. Fire-resistant roofing materials include composition, cement, metal and tile. Contact the local fire district or department about roofing requirements for your area. Openings in the roof materials, such as the open ends of barrel tiles, should be plugged to prevent ember entry and debris accumulation. Regardless of the type of roof you have, keep it free of fallen leaves, needles and branches.

Firewood: Firewood stacks should be located at least 30 feet from the home. If the stacks are stored uphill from the house, make sure that burning firewood cannot roll downhill and ignite the home.

Decks: Decks using wood and nonfire-resistant-rated wood-plastic materials are combustible. Consider replacing them with newer fire-resistant-rated types. Routinely remove debris (needles, leaves, twigs, etc.) from the gaps between deck boards. Replace deck materials in poor condition. The sides below low decks should be enclosed with fire-resistant materials and properly vented. However, this may result in increased land coverage for your property and may require a permit. As an alternative, enclose the deck sides with 1/4-inch or smaller wire mesh to prevent debris from accumulating underneath. The area under higher decks should be kept free of combustible materials.

Flammable Items: Keep the porch, deck and other areas of the home free of easily combustible materials, such as baskets, dried flower arrangements, newspapers, pine needles and debris.

California property owners... new construction must use approved, fire-resistant materials.
For more information, go to <http://osfm.fire.ca.gov/sfmfirecagov.html>.

Interior Zone

Carbon Monoxide Detectors: Carbon monoxide (CO) detectors are the only way to alert people to dangerous levels of carbon monoxide before tragedy strikes. Carbon monoxide is a byproduct of combustion from gas appliances or automobiles. Only use detectors that are officially approved and are clearly marked with the American Standard – UL2034 symbol.

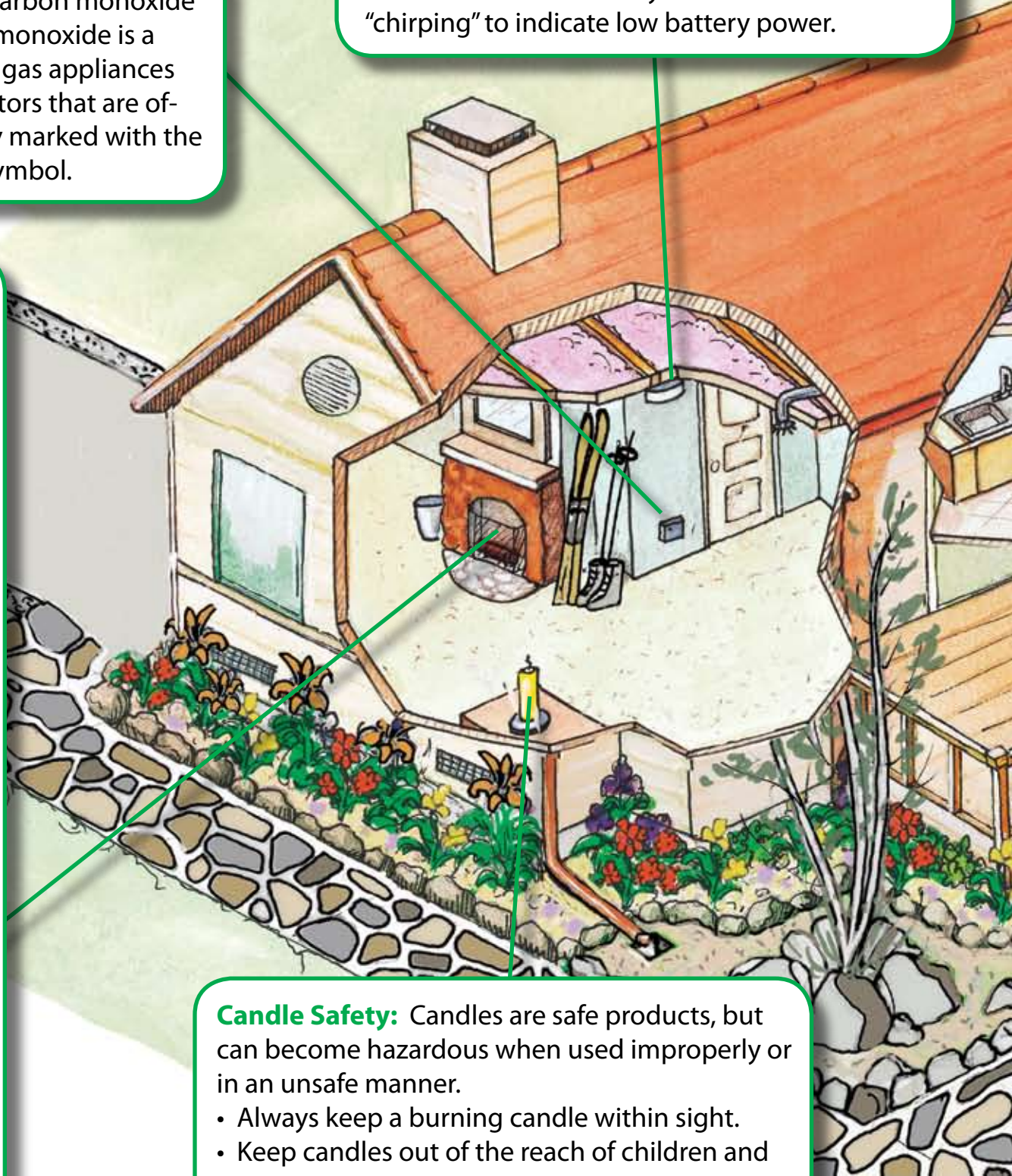
Smoke Detectors: Smoke detectors are inexpensive devices that save many lives. Current fire codes require a smoke detector in every bedroom and in common areas. Many older or retrofitted smoke detectors are not wired to the home's electrical circuits and operate by self-contained batteries. Replace the batteries at least once a year or when the unit is "chirping" to indicate low battery power.

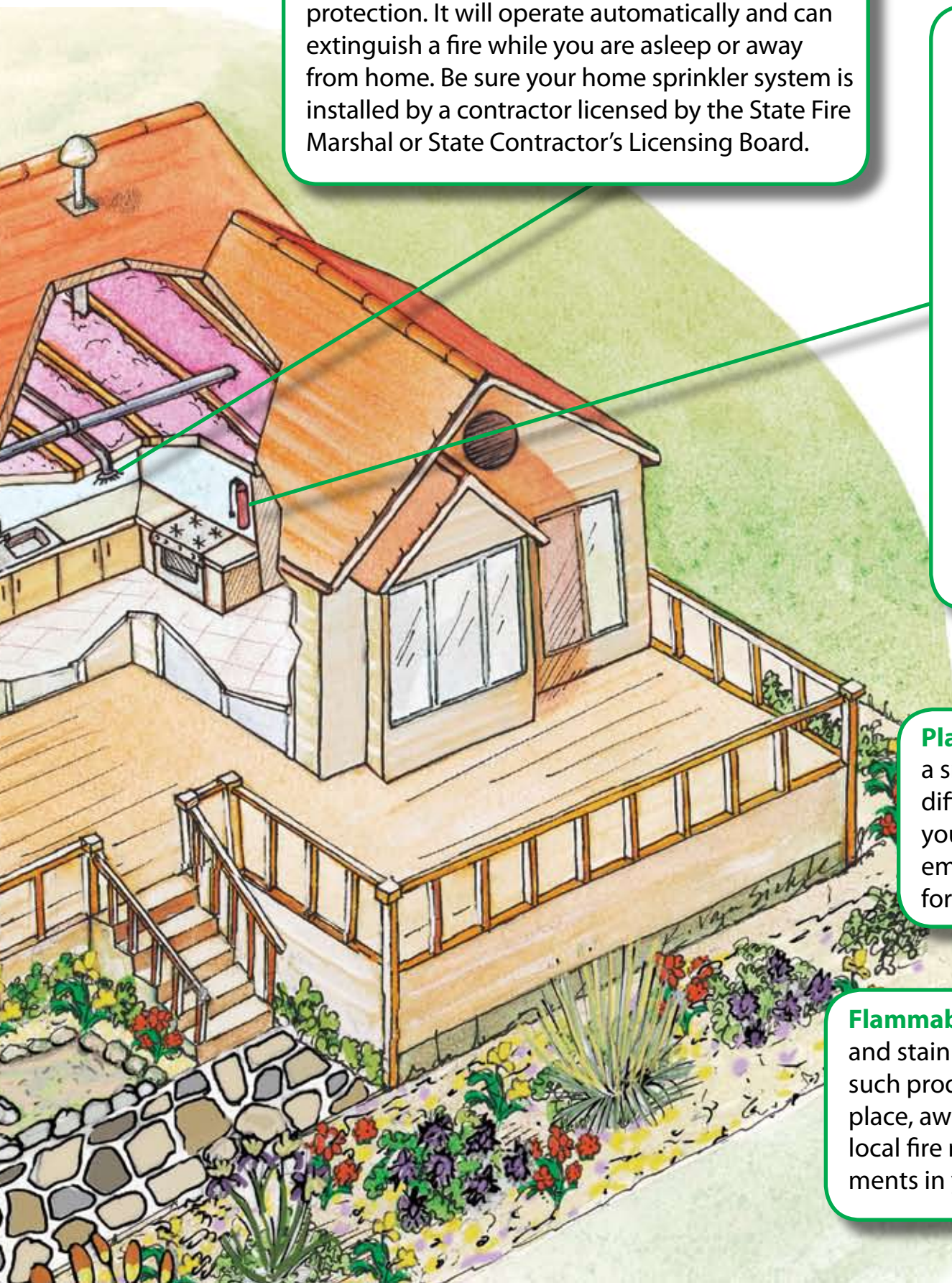
Wood Stoves and Fireplaces: Heat your home safely by following these tips concerning wood stoves and fireplaces.

- Install according to the manufacturer's directions.
- Never use a flammable liquid, such as gasoline, to start a fire.
- Carefully follow directions when using synthetic logs.
- Keep a glass or metal screen in front of the fireplace opening to prevent embers or sparks from escaping.
- Keep flammable materials off the mantle and at least 3 feet away.
- Do not use excessive amounts of paper to start your fire.
- Do not burn colored paper, which can accelerate creosote buildup and increase the likelihood of a chimney fire.
- Avoid burning wood slowly for long periods of time, which contributes to soot and creosote buildup. Instead, allow the wood to burn rapidly for 10 to 15 minutes several times a week to help reduce creosote buildup. Use dry wood for more efficient burning.
- Dispose of ash properly. Regularly remove ashes and place them in a metal container with a lid. Place the ash-filled container outdoors, away from combustible materials. Do not set the ash container on a wood surface, such as a deck, or on other combustible materials. Once ashes are cool, they can be spread into flower beds, gardens or compost piles.
- Screen chimney and stovepipe openings with an approved spark arrestor cap.
- Inspect and clean chimneys at least once a year.

Candle Safety: Candles are safe products, but can become hazardous when used improperly or in an unsafe manner.

- Always keep a burning candle within sight.
- Keep candles out of the reach of children and pets.
- Before burning, trim wicks to 1/4-inch.
- Always use a heat-resistant, sturdy candleholder that is large enough to contain any melted wax.
- Keep burning candles away from drafts, vents, air currents and easily combustible materials.
- Always burn candles in a well-ventilated room.
- Extinguish the flame when 2 inches of wax remains, or when 1/2-inch remains if in a container.
- Use a candle snuffer to extinguish candles.





Sprinkler Systems: A sprinkler system installed inside the home can provide effective fire protection. It will operate automatically and can extinguish a fire while you are asleep or away from home. Be sure your home sprinkler system is installed by a contractor licensed by the State Fire Marshal or State Contractor's Licensing Board.

Portable Fire Extinguishers: Portable fire extinguishers enable you to quickly respond to a fire. Extinguishers are rated by the type of fire they can effectively extinguish: "A" – wood or cloth fires, "B" – liquid fires, "C" – electrical fires, and "D" – metal fires.

- Be sure all family members know the extinguisher's location and its operation.
- Get the extinguisher serviced annually and recharged after each use.
- The term P-A-S-S will help you remember the right way to use the extinguisher:

Pull the safety pin.

Aim the extinguisher.

Squeeze the trigger.

Sweep the extinguisher at the base of the fire.

Plan Your Escape: Even with early warning from a smoke detector, escaping a house fire can be difficult. By planning and practicing exit drills, you can better prepare your family for a fire emergency. Contact your local fire department for advice.

Flammable Paint and Stain Products: Paint and stain products are hazardous materials. All such products should be stored in a cool, dry place, away from any heat source. Contact the local fire marshal for specific disposal requirements in your area.

Other Heating Systems: Kerosene and other fuel-fired heaters should be used properly. Follow manufacturers' instructions when using these devices.

- Be sure they are approved by an independent testing laboratory. Heaters should turn off if accidentally tipped over.
- Use only the fuels specified by the manufacturer for each particular heating appliance.
- Refuel heaters outdoors.
- Keep children away from heaters.
- Never burn charcoal indoors.

Seven Steps to Creating an Effective Defensible Space



Photo courtesy of John Cobourn

Through proper planning, an effective defensible space can be attractive and control soil erosion.

The term “defensible space” refers to the area between a house and an oncoming wildfire where the vegetation has been managed to reduce the wildfire threat and allow firefighters to safely defend the house. In the event that firefighters are not available, defensible space also improves the likelihood of a house surviving without assistance.

Fortunately for Lake Tahoe Basin homeowners, there are a variety of resources available to assist them in creating defensible space. Local fire districts and departments will conduct free defensible space inspections. The Tahoe Basin Region of the Nevada Fire Safe Council can help organize your neighborhood to take action in reducing the wildfire threat and possibly fund defensible space projects. Advice on integrating defensible space practices with Best Management Practices (BMPs) and other landscape management topics can be provided by the Conservation Districts and Cooperative Extension in conjunction with the Tahoe Regional Planning Agency (TRPA) and fire professionals. See Pages 18 and 19 for contact information.



Photo courtesy of Mike Dannenberg

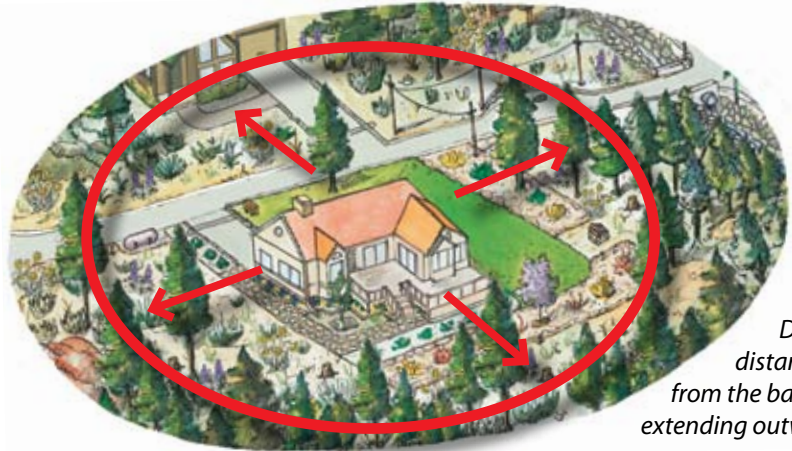
Make your house safe for firefighters to defend.

Step One

Determine the size of an effective defensible space: The size of the defensible space is usually expressed as a distance extending outward from the house in all directions. The recommended distance is not the same for every home. It varies depending on the dominant vegetation surrounding the home and steepness of slope. Use the Recommended Defensible Space Distance table to determine the right size for your home.

Once the recommended distance for defensible space is known, mark it by tying strips of cloth or flagging to shrubs. This becomes the “Defensible Space Zone.”

If the Defensible Space Zone exceeds your property boundaries, seek permission from adjacent landowners before doing work on their property. It is important to note that the effectiveness of the Defensible Space Zone improves when entire neighborhoods implement defensible space practices.



Defensible space distance is measured from the base of the house, extending outward.

Recommended Defensible Space Distance

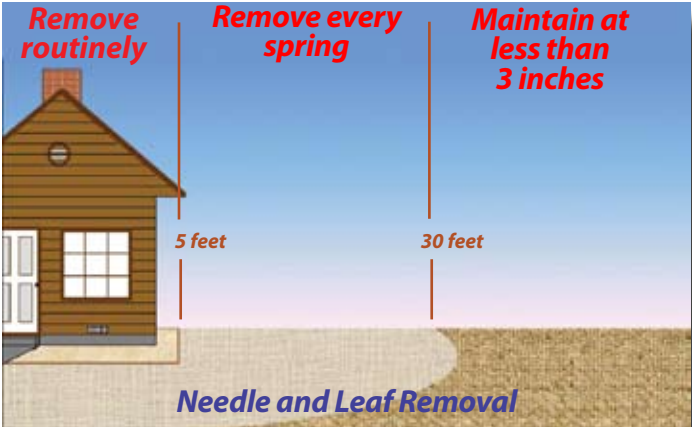
	Flat to Gently Sloping 0-20%	Moderately Steep 21-40%	Very Steep +40%
Grass Dry grass and weeds	100 feet	100 feet	100 feet
Shrubs and Woodland Sagebrush, manzanita and mountain mahogany	100 feet	200 feet	200 feet
Trees Forest trees, such as fir and pine. If there's a substantial shrub understory, use those values stated above.	100 feet	100 feet	200 feet

Step Two

Remove dead vegetation: For the most part, dead vegetation should be removed from the Defensible Space Zone. Dead vegetation includes dead and dying standing trees or recently fallen trees; dead native and ornamental shrubs; dead branches; dried grass, weeds and flowers. Fallen trees embedded into the ground and located **more than 30 feet** from the house can be left in place, with exposed branches removed.

Regarding fallen needles and leaves:

- **Within 5 feet** of the house, remove routinely throughout fire season.
- From **5 feet to 30 feet** of the house, remove every spring by May 1. Needles and leaves that fall after the spring removal period can accumulate on the ground as long as they do not create a fire hazard.
- **More than 30 feet** from the house, do not allow fallen needles and leaves to exceed a depth of 3 inches.

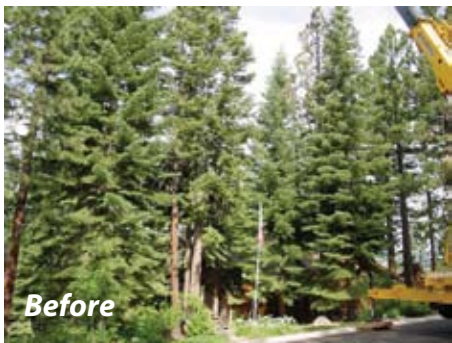


Step Three

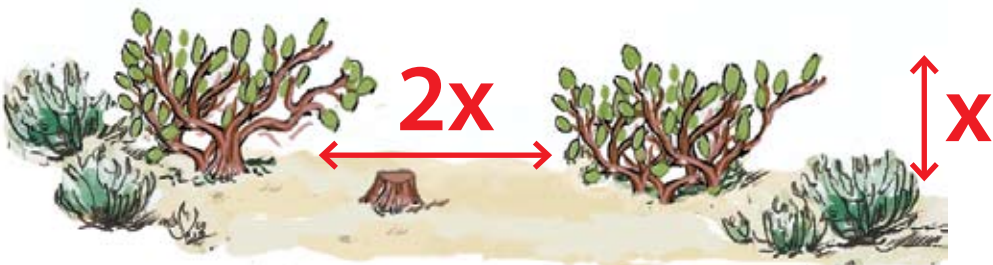
Create a separation between trees and shrubs: Within the Defensible Space Zone, native trees and shrubs, such as Jeffrey pine, white fir, and manzanita, should not occur in a dense stand. Dense stands of trees and shrubs pose a significant wildfire threat. Thin dense tree and shrub stands to create more space between them.



Dense shrub fields pose a significant fire threat.



Photos courtesy of Jennifer Arrowsmith



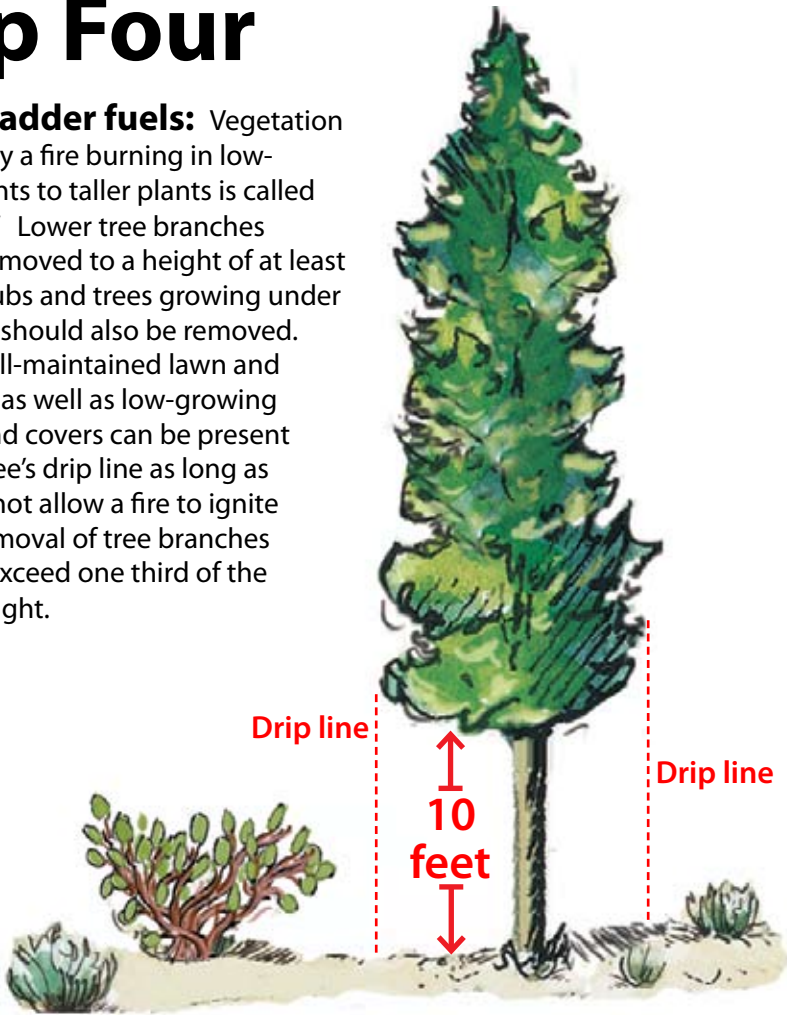
Sagebrush, Manzanita, Huckleberry Oak, Other Shrubs: On flat to gently sloping terrain **more than 30 feet** from the house, individual shrubs or small clumps of shrubs within the Defensible Space Zone should be separated from one another by at least twice the height of the average shrub. For example, if the typical shrub height is 2 feet, there should be a separation between shrub branches of at least 4 feet. For homes located on steeper slopes, the separation distance should be greater. Remove shrubs or prune them to reduce their height and/or diameter. See Step 5 for shrub management recommendations **within 30 feet** of the house.



Forest Trees: On flat to gently sloping terrain **more than 30 feet** from the house, trees should be thinned to provide an average separation between the canopies of at least 10 feet. For homes located on steeper slopes, the separation distance should be greater. **Within 30 feet** of the house, tree canopies should be separated by 10 feet to 30 feet. Contact your local fire professionals (see Page 19) or TRPA to have your trees evaluated and marked for removal.

Step Four

Remove ladder fuels: Vegetation that can carry a fire burning in low-growing plants to taller plants is called "ladder fuel." Lower tree branches should be removed to a height of at least 10 feet. Shrubs and trees growing under the drip line should also be removed. Irrigated, well-maintained lawn and flower beds, as well as low-growing native ground covers can be present under the tree's drip line as long as they would not allow a fire to ignite the tree. Removal of tree branches should not exceed one third of the total tree height.



Remove ladder fuels to a height of 10 feet.



Step Five

Create a Lean, Clean and Green Area extending 5 feet to 30 feet from the house:

There are two goals for the Lean, Clean and Green Area. The first goal is to eliminate easily ignitable fuels, or “kindling,” near the house. This will help prevent embers from starting a fire in your yard. The second goal is to keep fire intensity low if it does ignite near the house. By proper management of the vegetation and other fuels near the house, a fire would not be able to generate enough heat to ignite the home.

For most homeowners, the Lean, Clean and Green Area is also the residential landscape. This area often has irrigation, is planted with ornamental vegetation, and is regularly maintained.

Lean, Clean and Green Area Tips

- Remove dead shrubs and trees; dried grass, flowers and weeds; dead branches; and firewood from this area.
- Remove fallen needles and leaves every spring by May 1.
- Wood and bark mulches can be used in this area, but not in a widespread manner. Areas of wood and bark mulches should be separated by noncombustible materials, such as irrigated lawn, clover, erosion-control grasses and flowers, gravel, and rock, and arranged so that they would not allow a fire to travel rapidly across the area.
- Native shrubs should be substantially reduced in this area. Individual specimens or small groups can be retained as long as they are kept healthy and vigorous, pruned to reduce height and amount, and would not allow a fire to travel rapidly across the area. When removing shrubs, leave the root systems in place. Low-growing native shrubs, such as pinemat manzanita and Mahala mat, can be retained.
- Use low-growing (less than 18 inches tall), irrigated, herbaceous plants, such as lawn, clover, erosion-control grasses, flowers, some ground covers and succulents, that are recommended for the Lake Tahoe Basin.
- Ornamental, deciduous trees and shrubs can be used as specimens or in small groups. They should be irrigated, kept healthy and vigorous, free of dead leaves and wood, and arranged so that they could not rapidly transmit fire across the area. Deciduous trees should be placed so that their mature canopy can be easily maintained at a distance of at least 10 feet from other trees and the house. Shorter deciduous shrubs are preferred.
- Ornamental evergreen shrubs and trees, such as juniper, mugo pine, Austrian pine and others, should not be used within this area.
- Clear all flammable vegetation from within 10 feet of the propane tank.
- Remove tree limbs that are within 10 feet of the chimney, house, deck and roof. Remove limbs that are encroaching on power lines.

Step Six

Create a Noncombustible Area at least 5 feet wide around the base of the house: The area immediately adjacent to a house is of critical importance to house survival during a wildfire. It should consist of noncombustible landscape materials and ignition-resistant, low-volume plants.

Noncombustible Area Tips

- Remove dead shrubs and trees; dried grass, flowers and weeds; dead branches; and firewood from this area.
- Routinely remove fallen needles and leaves.
- Do not use bark and wood mulches.
- Do not use wood landscape timbers or boards.
- Remove flammable shrubs and trees. This includes native plants, such as big sagebrush, bitterbrush, greenleaf manzanita, snowbrush, rabbitbrush, huckleberry oak, pine and fir. Ornamental plants that should be removed or not planted in this area include evergreens (juniper, mugo pine, arborvitae, etc.), Scotch broom and large exotic grasses. When removing plants, leave their root systems in place.
- Noncombustible landscape materials, such as gravel, rock and brick, are acceptable.
- Use low-growing (less than 18 inches tall), irrigated, herbaceous plants, such as lawn, clover, erosion-control grasses, flowers, some ground covers and succulents, that are recommended for the Lake Tahoe Basin.
- Use low-growing (less than 18 inches tall), irrigated, deciduous shrubs recommended for the Lake Tahoe Basin as individual specimens or in small groups. Prune these shrubs to remove branches in contact with the ground and sides of the house.
- Do not plant shrubs under first-story windows, under soffit vents, in front of foundation vents, or in corners.
- Use trellises made of noncombustible materials.



Erosion-control grasses and wildflowers are good choices for the Lean, Clean and Green Area. When dry, they should be mowed.



Photo courtesy of Mike Darnenberg

During a wildfire, airborne embers may land and accumulate in the area next to the house. Avoid using combustible materials, such as wood mulch, and flammable plants, such as juniper, within 5 feet of the home.

Step Seven

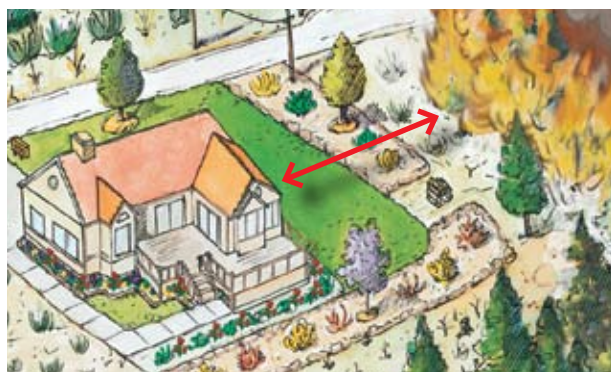
Maintain the Defensible Space Zone: Maintaining a defensible space is an ongoing activity. Plants grow back, and flammable vegetation needs to be routinely removed and disposed of properly. Before each fire season, reevaluate your property using the previous six steps and implement the necessary defensible space recommendations.



Little Green Gas Cans

Firefighters often refer to ornamental junipers as “little green gas cans.” During a wildfire involving homes, embers can smolder undetected under ornamental junipers. The junipers can then ignite and burn intensely after firefighters have left your property. Planting ornamental junipers next to your house is never a good idea. Keep these “little green gas cans” at least 30 feet from the house or replace them with low-growing deciduous shrubs, herbaceous flowers, rock mulches and hard surfaces.

FREQUENTLY ASKED QUESTIONS ABOUT DEFENSIBLE SPACE



WHAT IS DEFENSIBLE SPACE?

Defensible space is the area between a house and an oncoming wildfire where the vegetation has been modified to reduce the wildfire threat and to provide an opportunity for firefighters to effectively defend the house. Sometimes, a defensible space is simply a homeowner's properly maintained backyard.

WHAT IS THE RELATIONSHIP BETWEEN VEGETATION AND WILDFIRE THREAT?

Many people do not view the plants growing on their property as a threat. But in terms of wildfire, the vegetation adjacent to their homes can have considerable influence upon the survivability of their houses. All vegetation, including plants native to the area and ornamental plants, is potential wildfire fuel. If vegetation is properly modified and maintained, a wildfire can be slowed, the length of flames shortened, and the amount of heat reduced, all of which assist firefighters in defending the home against an oncoming wildfire.



Photo courtesy of Mike Dannenberg

THE FIRE DEPARTMENT IS SUPPOSED TO PROTECT MY HOUSE, SO WHY BOTHER WITH DEFENSIBLE SPACE?

Some individuals incorrectly assume that a fire engine will be parked in their driveway and firefighters will be actively defending their homes if a wildfire approaches. During a major wildfire, it is unlikely there will be enough firefighting resources available to defend every home. In these instances, firefighters will likely select homes they can most safely and effectively protect. Even with adequate resources, some wildfires may be so intense that there may be little that firefighters can do to prevent a house from burning. The key is to reduce fire intensity as wildfire nears the house. This can be accomplished by reducing the amount of flammable vegetation surrounding a home. Consequently, ***the most important person in protecting a house from wildfire is not a firefighter, but the property owner.*** And, it is the action taken by the owner ***before*** the wildfire occurs, such as proper landscaping, that is most critical.

DOES DEFENSIBLE SPACE REQUIRE A LOT OF BARE GROUND IN MY LANDSCAPE?

No. Unfortunately, many people have this misconception. While bare ground is certainly effective in reducing the wildfire threat, it is not required or desired. Many homes have attractive, well-vegetated landscapes that also serve as effective defensible space. Furthermore, excessive bare ground may increase the soil erosion potential of your property. When properly implemented, defensible space practices should not contribute to Lake Tahoe's water quality concerns.

DOES CREATING A DEFENSIBLE SPACE REQUIRE ANY SPECIAL SKILLS OR EQUIPMENT?

No. For the most part, creating a defensible space employs routine gardening and landscape maintenance practices, such as pruning, mowing, weeding, plant removal, appropriate plant selection and irrigation. Equipment needed includes common tools, such as a chain saw, a pruning saw, pruning shears, loppers, a weed-eater, a shovel and a rake. A chipper, compost bin or large rented trash dumpster may be useful in disposing of unwanted plant material.



HOW BIG IS AN EFFECTIVE DEFENSIBLE SPACE?

Defensible space size is not the same for every home, but varies depending on the slope and type of wildland vegetation growing near the house. See "Step One" on Page 14.

DOES DEFENSIBLE SPACE MAKE A DIFFERENCE?

Yes. Investigations of homes threatened by wildfire indicate that those with an effective defensible space are much more likely to survive a wildfire. Furthermore, homes with both an effective defensible space and a nonflammable roof (composition shingles, tile, metal, etc.) are many times more likely to survive a wildfire. Defensible space also allows firefighters to effectively and safely defend your home.

DOES HAVING A DEFENSIBLE SPACE GUARANTEE MY HOUSE WILL SURVIVE A WILDFIRE?

No. Under extreme conditions, almost any house can burn. However, having a defensible space will significantly improve the odds of your home surviving a wildfire.

WHY DOESN'T EVERYONE LIVING IN A HIGH FIRE HAZARD AREA CREATE A DEFENSIBLE SPACE?

The specific reasons for not creating a defensible space are varied. Presented below are responses to common excuses for not creating defensible space.

What's your excuse?

"I don't have the time or money.": If you live in a high fire hazard area, creating defensible space needs to be a high-priority use of your spare time. Many defensible space activities require little or no money to implement. For bigger, more expensive tasks, consider forming a Nevada Fire Safe Council chapter for assistance in acquiring grant funds.

"It's wrong to cut trees.": In many areas of the Lake Tahoe Basin, forest trees occur in unnaturally dense stands. Thinning of these thick stands of trees not only reduces the fire threat, but often promotes forest health.

"It won't look good.": There is a misconception that defensible space has to be ugly and barren to be effective. Through proper planning, a homeowner can have both an attractive landscape and an effective defensible space.

"It's not my responsibility.": The manner in which a house is built, characteristics of the adjacent vegetation, and their maintenance often determine house survivability during wildfire. The homeowner, not the firefighter, is responsible for these factors.

"I don't have an easy way to dispose of the unwanted vegetation.": Check to see if there is a free community cleanup day in your area. Ask your fire marshal if there is a fuels-reduction chipping program, or join several other neighbors and rent a chipper and trailer for a weekend.

"It's not going to happen to me.": The Lake Tahoe Basin has all the ingredients necessary for wildfire. All that is lacking is an ignition on a hot, dry, windy day.

"TRPA won't allow it.": In all cases, the creation of defensible space is compatible with TRPA ordinances. See "TRPA PROMOTES DEFENSIBLE SPACE" on Page 18 for details.

"I've got insurance.": While insurance can rebuild a house, it cannot recreate a home. Photo albums, heirlooms and other memorabilia are often irreplaceable.

"I don't know what to do.": For more information about creating defensible space, go to www.livingwithfire.info/tahoe, or contact your local fire professional.

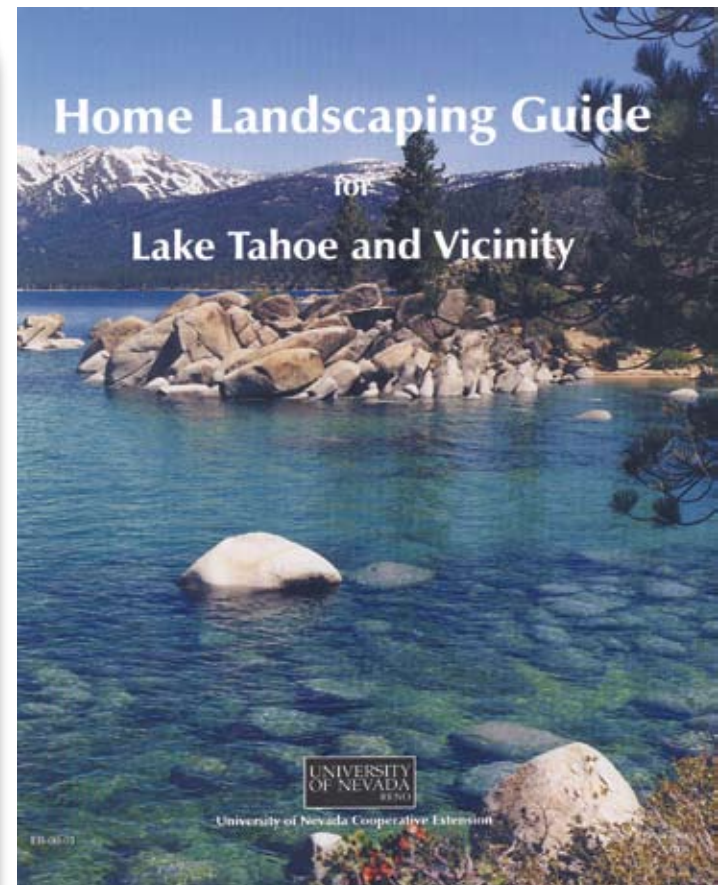


TRPA PROMOTES DEFENSIBLE SPACE

There are some popular myths about TRPA and wildfire safety. Defensible space is actually supported by TRPA's environmental goals and its ordinances. A healthy forest means a healthy lake. A few defensible space recommendations may call for consultation or a permit from TRPA to reduce other potential impacts to the ecosystem. Trained staff are available by phone and at the north and south shore offices.

Managing Trees	Cutting of live trees with trunks greater than 14 inches in diameter requires a permit from local fire professionals or the TRPA.
Plant Selection	Plants being used in areas other than borders, entryways, flower beds and similar locations need to be selected from the TRPA Recommended Plant List, which includes information on the fire resistance of different plants. This plant list, as well as a list of accent plants suitable for Lake Tahoe Basin conditions, can be found in the "Home Landscaping Guide for Lake Tahoe and Vicinity."
Noncombustible Area	In the 5-foot Noncombustible Area around structures, using gravel, rock, pervious concrete, pervious pavers or appropriate vegetation will avoid the need for a permit from TRPA. Land-coverage standards may apply when increasing the amount of hard or impervious surfaces around a property.
Enclosing Decks	Enclosing the underside of a deck may increase the amount of land coverage on a property and may require a permit.
Sensitive Areas	If the Defensible Space Zone includes sensitive areas, such as a beach or stream zone, additional considerations may apply. Adequate defensible space can still be achieved with professional advice. Sensitive areas include stream environment zones, lakeshores, scenic resource areas and conservation/recreation areas.

For more information, contact TRPA, (775) 588-4547, or visit www.trpa.org.



The "Home Landscaping Guide for Lake Tahoe and Vicinity" provides information about erosion control, defensible space and general landscape management. Contact University of Nevada Cooperative Extension, (775) 832-4150, to request a copy.

Working With Your Neighbors

When the area needed to create an effective defensible space exceeds your property boundaries, you'll need to contact the adjacent property owner to discuss opportunities to work cooperatively. In the Lake Tahoe Basin, your neighbor could be a government agency. Contact information for some of the common government landowners in Lake Tahoe Basin neighborhoods is presented below.

California State Parks	(530) 583-2240
California Tahoe Conservancy	(530) 543-6047 or jurizar@tahoe.ca.gov
Nevada Division of State Lands	(775) 684-2720 or nvlands@lands.nv.gov
Nevada Division of State Parks	(775) 831-0494 or tahoe@parks.nv.gov
U. S. Forest Service	(530) 543-2600

If you are interested in getting other homeowners in your neighborhood organized to reduce wildfire hazards, contact the Tahoe Basin Region of the Nevada Fire Safe Council. Becoming a chapter of the Nevada Fire Safe Council is one way your community could become eligible for grant funds, educational programs and other activities to reduce the wildfire hazard.

Tahoe Basin Region - Nevada Fire Safe Council (877) LT-NVFC, (530) 543-FIRE or info@nvfsc.org



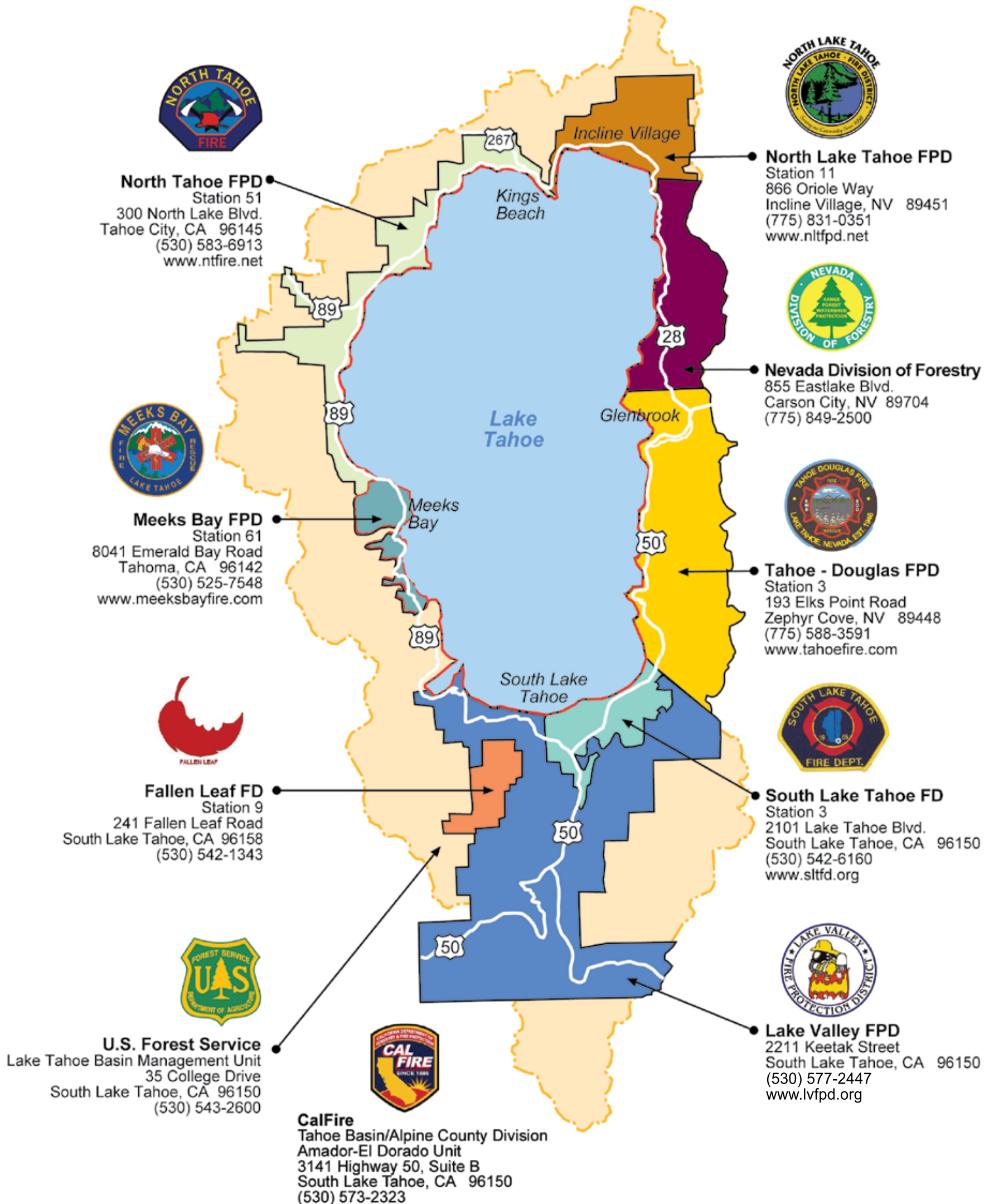
The area within 5 feet of your house is important to both water quality and defensible space concerns. When constructing erosion-control BMPs in this area, such as the installation of an infiltration trench shown at left, contact your local fire professional and Conservation District for advice on defensible space and BMPs.

Conservation Landscaping

When creating defensible space, be aware of Lake Tahoe water quality concerns. If misapplied, defensible space practices could encourage accelerated erosion, a major contributor to the lake's declining clarity. Consider using the following conservation landscaping concepts when creating defensible space:

- Do not remove all vegetation from the Defensible Space Zone.
- Low-fire-hazard vegetation is the preferred alternative to incorporate the objectives of both Best Management Practices (BMPs) and defensible space.
- Do not dig out plant roots. Leave them in place.
- When breaking up dense brush fields on steep slopes, leave islands of lean and green shrubs staggered horizontally across the slope.
- Implement BMPs on your property. BMPs are measures that help slow water runoff and control soil erosion. For a free BMP inspection of your property, contact the Conservation District in California, (530) 543-1501, ext. 113, or in Nevada, (775) 586-1610, ext. 28.
- For educational materials and programs about defensible space, erosion control and general landscape management, call University of Nevada Cooperative Extension at (775) 832-4150 or the University of California Cooperative Extension, (530) 542-2571.

Lake Tahoe Basin Fire Protection Agencies



In an Emergency Dial 9-1-1

If Wildfire Approaches . . .



Photo courtesy of Nevada Appeal

What should I wear and have with me?

- ☐ Wear only cotton or wool clothes
- ☐ Proper attire includes long pants, long-sleeved shirt or jacket, and boots
- ☐ Carry gloves, a handkerchief to cover your face, water to drink, and goggles
- ☐ Keep a flashlight and portable radio with you at all times
- ☐ Tune in to a local radio station and listen for instructions

What about family members and pets?

- ☐ If possible, evacuate all family members not essential to preparing the house for wildfire
- ☐ Make sure to designate a safe meeting place and contact person
- ☐ Relay your plans to the contact person
- ☐ Evacuate pets
- ☐ Contact the local Humane Society for pet assistance if needed

How should I prepare my car?

- ☐ Place vehicles in the garage, pointing out with keys in the ignition
- ☐ Roll up the windows
- ☐ Close the garage door, but leave it unlocked
- ☐ If applicable, disconnect the electric garage door opener so that the door can be opened manually

What should I take?

- ☐ Important documents (bank, IRS, trust, investment, insurance policy, birth certificates, medical records)
- ☐ Credit and ATM cards
- ☐ Medications
- ☐ Prescription glasses
- ☐ Driver's license
- ☐ Passport
- ☐ Computer backup files
- ☐ Inventory of home contents (consider videotaping)
- ☐ Photographs of the exterior of the house and landscape
- ☐ Address book
- ☐ Cell phone and charger
- ☐ Personal toiletries
- ☐ Change of clothing
- ☐ Family photo albums and videos
- ☐ Family heirlooms
- ☐ Place essential items in the car

How should I leave my home?

- ☐ Close all interior doors
- ☐ Leave a light on in each room



Photo courtesy of Seth Meyer

Be prepared! It will likely be dark, smoky, windy and hot. There may be airborne embers, no power, no telephone service, and poor water pressure.

- ☐ Remove lightweight, nonfire-resistant curtains and other combustible materials from around windows
- ☐ Close fire-resistant drapes, shutters and Venetian blinds
- ☐ Turn off all pilot lights
- ☐ Move overstuffed furniture, such as couches and easy chairs, to the center of the room

What about the outside of my home?

- ☐ Place combustible patio furniture in the house or garage
- ☐ Shut off propane at the tank or natural gas at the meter
- ☐ Close all exterior vents if possible
- ☐ Prop a ladder against the house to provide firefighters with access to the roof
- ☐ Make sure that all garden hoses are connected to faucets and attach nozzles set on "spray"
- ☐ Close all exterior doors and windows
- ☐ Leave exterior doors unlocked
- ☐ Turn on outside lights
- ☐ If available and if there's time, cover windows, attic openings and vents with plywood that is at least one-half inch thick
- ☐ Wet down wood-shake or shingle roofs before leaving
- ☐ Fill trash cans and buckets with water and place them where firefighters can find them
- ☐ If you have an emergency water source (pool, pond, etc.) and/or portable pump, clearly mark its availability so it can be seen from the street

Living With Fire: A Guide for the Homeowner – Lake Tahoe was made possible through support from the following organizations:



Bureau of Land Management is a federal land management agency and is Nevada's largest wildland firefighting organization. Visit www.nv.blm.gov.



Nevada Division of Forestry is a state agency that provides crucial firefighting resources throughout Nevada and is an important manager of Nevada's natural resources located on private and state lands. Visit www.forestry.nv.gov.



Sierra Front Wildfire Cooperators is a collaborative effort of western Nevada's and eastern California's local, state and federal firefighting agencies. Contact Ronna Hubbard, (775) 885-6137.



U. S. Forest Service provides numerous wildland firefighting resources across the state on National Forest lands. Visit www.fs.fed.us.



University of Nevada Cooperative Extension is a federal, state and county partnership that develops educational programs in response to Nevada's important issues. They are responsible for managing the *Living With Fire* program. For information about other Cooperative Extension programs, visit www.unce.unr.edu.

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For more information about *Living With Fire*, contact Ed Smith, (775)782-9960 or smithe@unce.unr.edu; or Sonya Sistare, (775)784-4848 or sistares@unce.unr.edu.

A master CD is available to agencies who wish to create a customized version of this publication by registering at www.livingwithfire.info/tahoe.

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