SP-14-05

University of Nevada
Cooperative Extension

Fire Adapted Communities:

The Next Step in Wildfire Preparedness

LAKE TAHOE BASIN

Do You Know What It Takes To Survive Wildfire?

Fire Adapted Community:

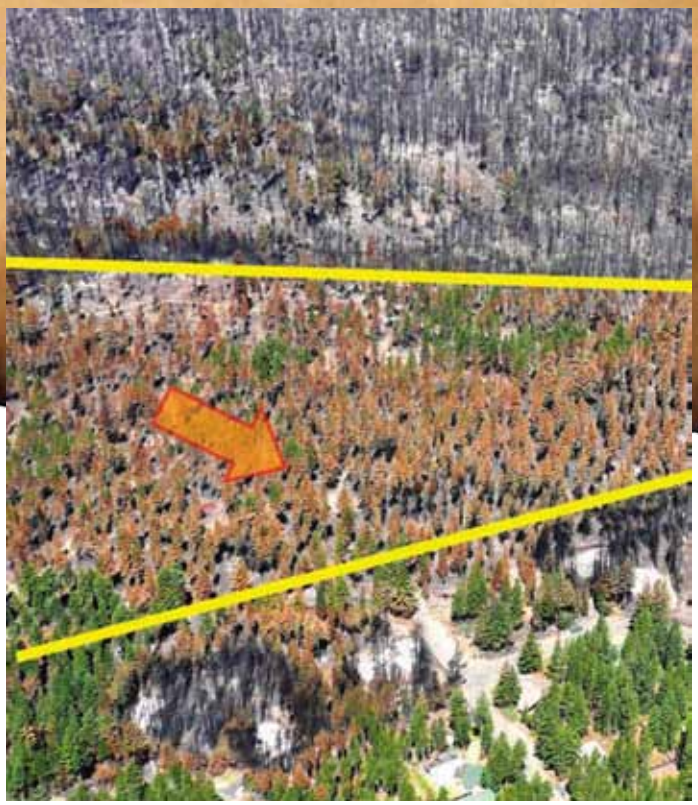
A community located in a fire-prone area that requires little assistance from firefighters during a wildfire. Residents of these communities accept responsibility for living in a high fire-hazard area. They possess the knowledge and skills to…

- Prepare their homes and property to survive wildfire.
- Evacuate early, safely and effectively.
- Survive, if trapped by wildfire.

Lake Tahoe Basin at Risk

There is more wildfire in our future and for many areas, it is not a matter of "if" wildfire is going to occur, but "when." Unfortunately, many residents in the Lake Tahoe Basin and their homes are not prepared to survive wildfire. Faced with the growing potential for loss of human life and property due to wildfire, the Lake Tahoe Basin's firefighting agencies and University of Nevada Cooperative Extension have come together to promote the Fire Adapted Community concept. They believe this is the best opportunity to decrease the wildfire threat.

There are proven steps that homeowners can take to improve personal safety and home survival during wildfire. The purpose of this publication is to promote and teach these steps. Once implemented at the neighborhood level, these recommendations will assist communities in becoming fire adapted.



Element of a Fire Adapted Community: *A high-intensity wildfire was burning through tree crowns (black area in the upper half of photograph) during the Lake Tahoe Basin's Angora Fire. The orange arrow shows the direction the fire was burning. When it reached a fuelbreak where the trees had been thinned, the fire changed from a crown fire to a lower-intensity surface fire (area of brown trees) that reduced the threat to nearby homes. Community fuelbreaks are often a key element of becoming a Fire Adapted Community. Photograph from "An Assessment of Fuel Treatment Effects on Fire Behavior, Suppression Effectiveness, and Structure Ignition on the Angora Fire," R5-TP-025, USDA Forest Service.*

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 the features of the house, the characteristics of the adjacent vegetation and other fuels, and routine maintenance that often determine which homes burn and which survive. These types of actions are called prefire activities. Prefire activities are actions completed before a wildfire occurs that improve the survivability of people and the home. The winners will be the people who implement prefire activities. When everyone in the neighborhood completes their prefire activities, they start becoming a Fire Adapted Community.

"The only viable, long-term response to wildfire threat in the Lake Tahoe Basin is a commitment to the Fire Adapted Community concept."

Mike Brown, Chief
North Lake Tahoe Fire Protection District

The Elements of a Fire Adapted Community

Community Protection

Well-designed fuelbreaks and safe areas protect the community.

Defensible Space

Proper management of vegetation surrounding the home reduces the wildfire threat.

Access

Good access helps emergency responders arrive in a timely manner.

Evacuation

Prepared communities can evacuate safely and effectively.

Built Environment

Appropriate home construction and maintenance resists ignition.

Fire is Natural to the Lake Tahoe Basin's Environment

Low-intensity Fire

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

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 have adaptations to survive and thrive 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 5) 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 consisted of a variety of age classes of trees, including large, mature trees with a sparse understory.

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

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 reported 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.

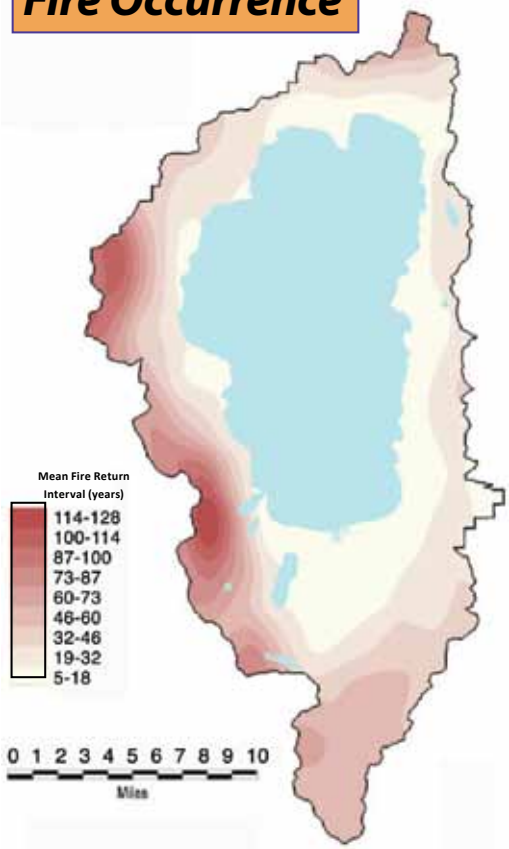
1870 **1900** **2000**

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 4 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 Lake Tahoe Basin. 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.

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

THE MARTIS FIRE | IN PERSPECTIVE

Tahoe threat looms

Hot, dry weather puts basin at risk for fire

Experts call this year's danger unprecedented

Fire danger around Lake Tahoe

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

Tahoe Today...

Today's Forest

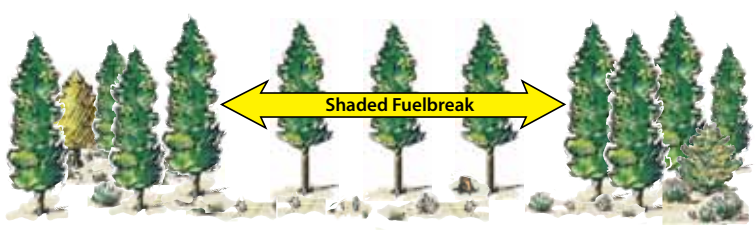
Tahoe's current forest is typically thick with trees, brush and dead vegetation. In many areas, fire has been absent for over a hundred years. As a result, there has been a great buildup of wildfire fuel. Homes have now been added to Tahoe's wildfire fuel mix.

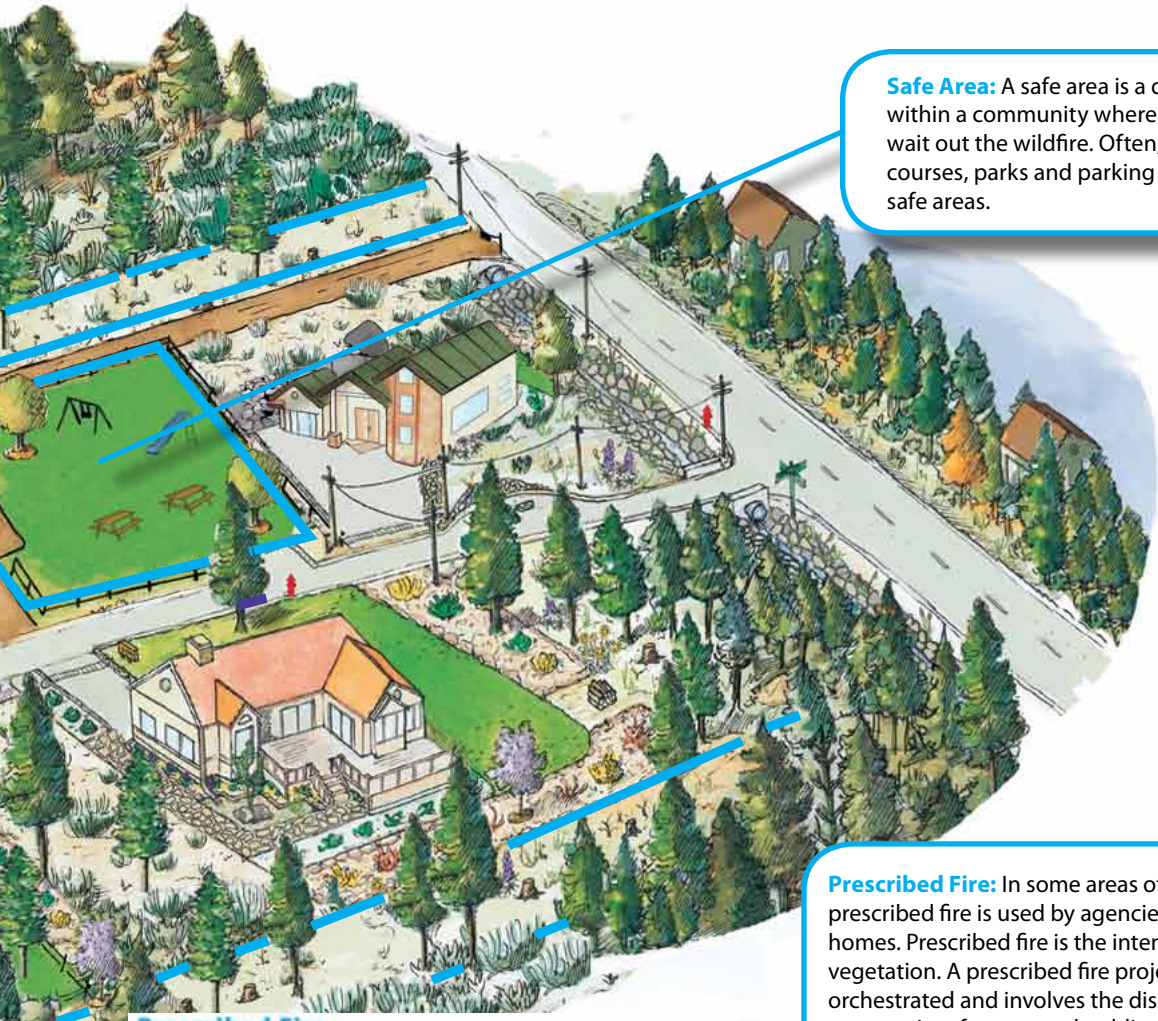
The likelihood for uncontrollable, high-intensity wildfire that impacts watersheds, destroys neighborhoods, and takes human life is high in many areas of the Lake Tahoe Basin.

Community Protection

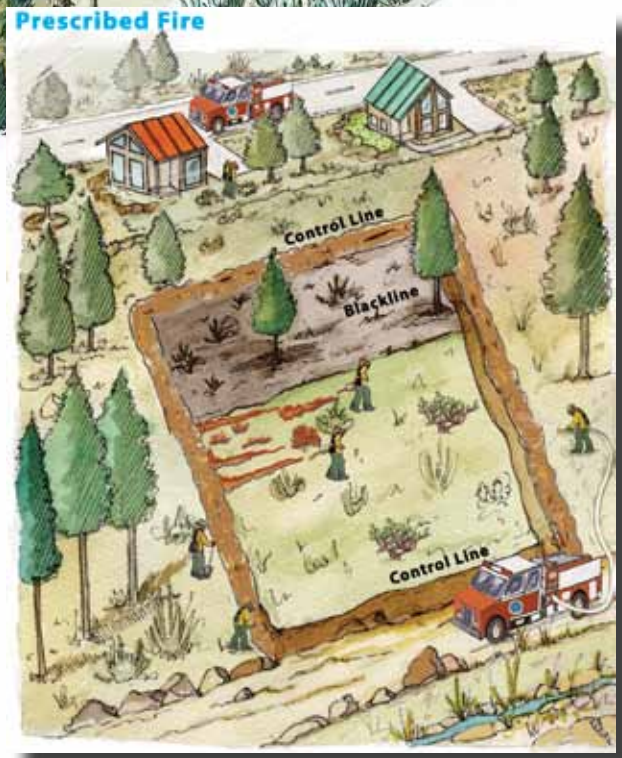
Fuelbreak: A fuelbreak is a strip of land where highly flammable vegetation is modified to reduce the wildfire threat. Fuelbreaks change fire behavior by slowing it down, reducing the length of flames and preventing the fire from reaching tree canopies. Fuelbreaks can improve the success of fire retardant dropped from the air, provide a safer area for firefighters to operate, and allow for easier creation of firelines (a strip of bare ground established during a wildfire). A **shaded fuelbreak** is created on forested lands when trees are thinned, tree canopies are raised by removing lower branches, and the understory vegetation is managed to reduce the fire threat. Community fuelbreaks are particularly effective when integrated with the defensible space of adjacent homes. They can be manmade or naturally occurring (rock outcrops, rivers and meadows).

Shaded Fuelbreak





Safe Area: A safe area is a designated location within a community where people can go to wait out the wildfire. Often, ballparks, golf courses, parks and parking lots can serve as safe areas.



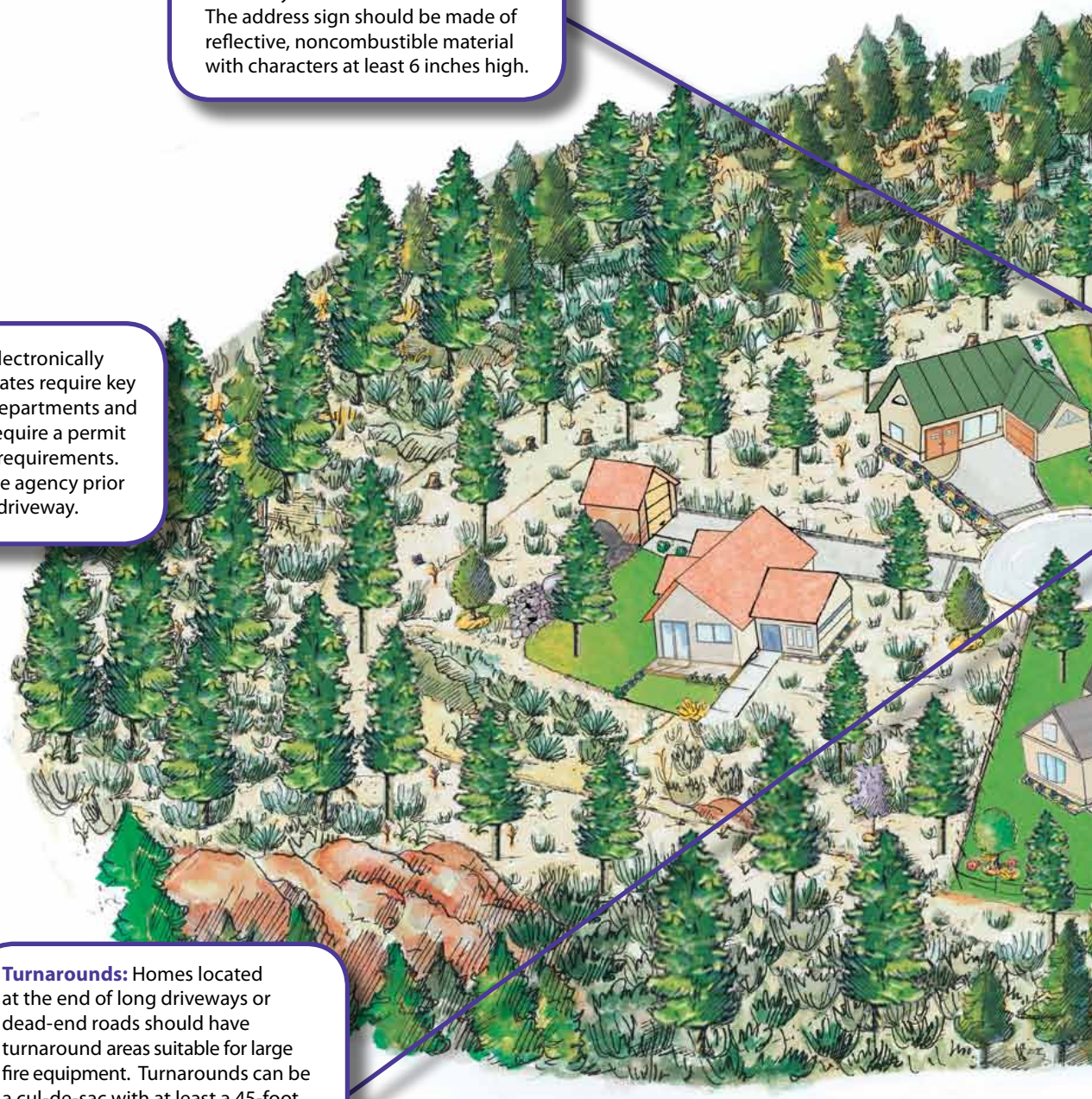
Prescribed Fire: In some areas of the Lake Tahoe Basin, prescribed fire is used by agencies to reduce wildfire fuels near homes. Prescribed fire is the intentional use of fire to manage vegetation. A prescribed fire project is well-planned, carefully orchestrated and involves the disciplines of fire ecology, fire suppression, forestry and public safety. The important parts of a prescribed fire project are:

- Training - Personnel have received extensive training and have been certified in prescribed fire.
- Preburn Activities - Each winter a multidisciplinary team develops the "Burn Plan" for the upcoming fall burn season. During the summer months work crews start preparing the burn sites by creating firebreaks, clearing around high value trees and thinning dense pockets of brush.
- Burn Day - The specific date of a proposed fire cannot be determined very far in advance. A "Go/No-go Checklist" is used to decide if a prescribed fire can be safely and effectively conducted. If the necessary conditions are not optimal, the fire will be postponed until conditions "come into prescription." The illustration presented at left portrays a typical prescribed fire.
- Tending the Burn - Prescribed fires are managed to minimize smoke production and maximize fuel consumption. Personnel closely monitor the site until the project is completed.

Access

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 6 inches high.

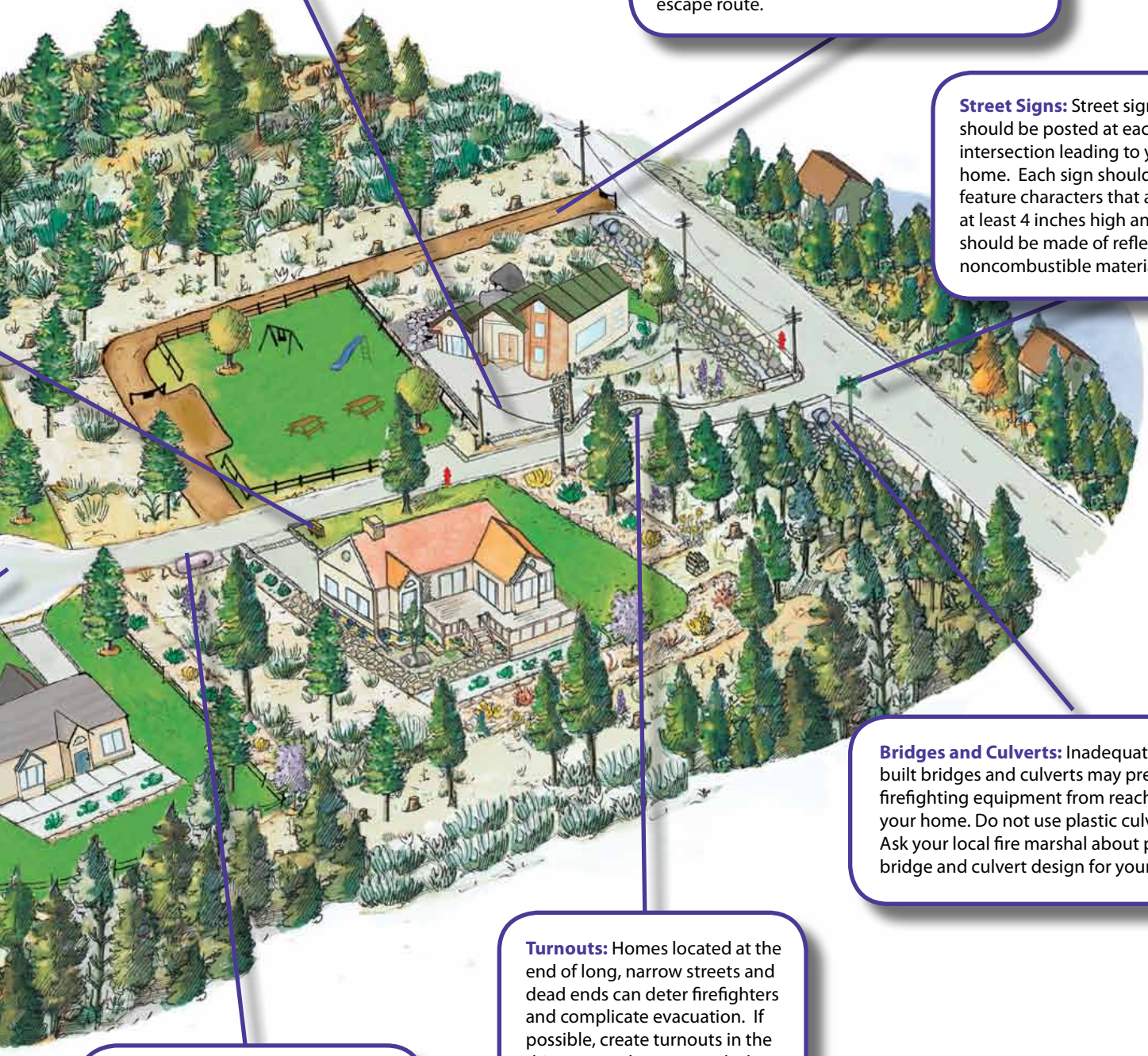
Gated Driveways: Electronically operated driveway gates require key access for local fire departments and districts. They may require a permit and have additional requirements. Contact your local fire agency prior to installing a gated driveway.



Turnarounds: Homes located at the end of long driveways 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 3-point turn. Contact your local fire agency for specific turnaround requirements.

Driveway Clearance: Remove flammable vegetation extending at least 10 feet from both sides of the driveway. Overhead obstructions (overhanging branches and power lines) should be removed or raised to provide at least a 13½-foot vertical clearance.

Secondary Road: When communities only have one way in and out, evacuation of residents while emergency responders are arriving can result in traffic congestion and potentially dangerous driving conditions. A second access road, even one only used for emergency purposes, can improve traffic flow during a wildfire and provide an alternate escape route.



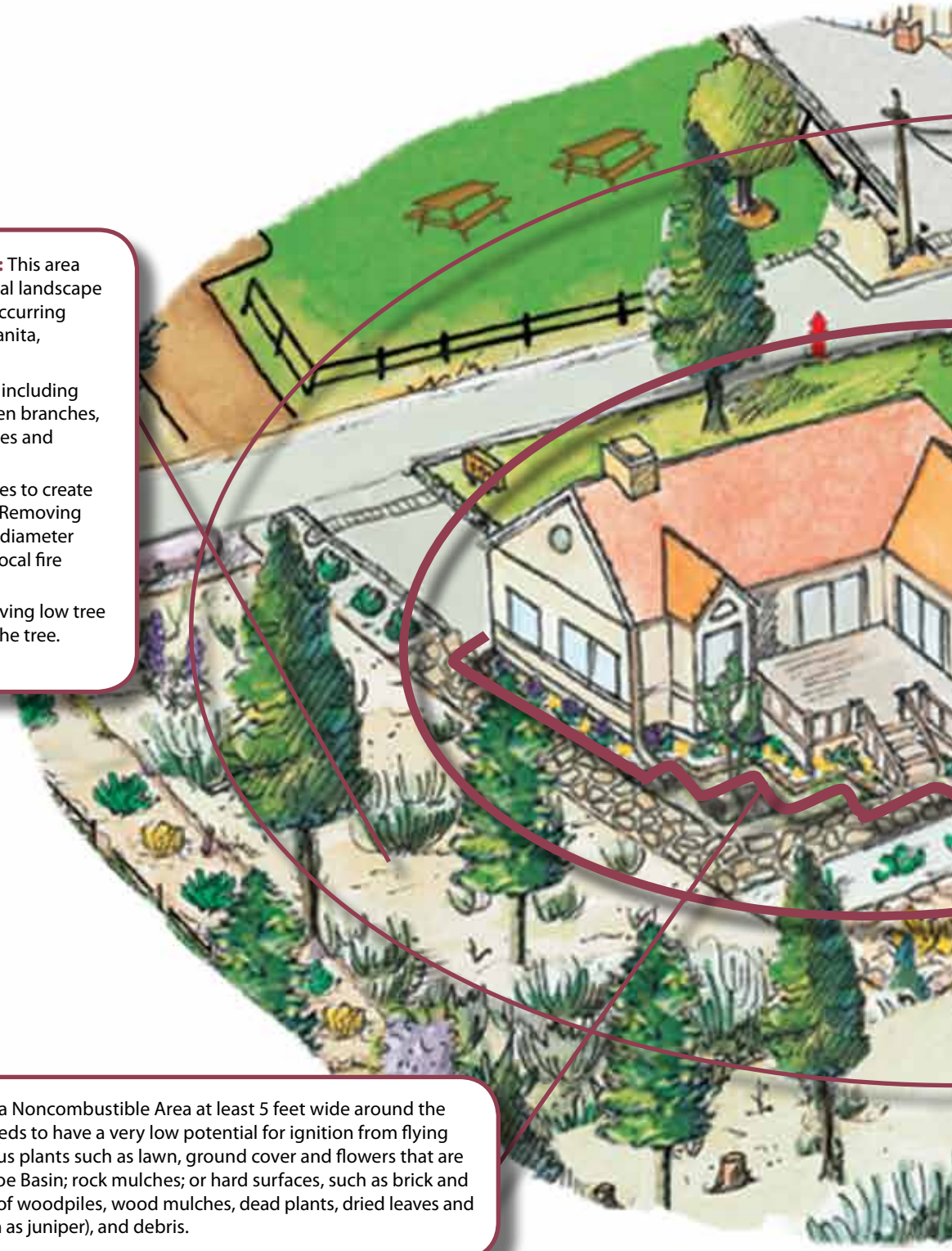
Street Signs: Street signs should be posted at each intersection leading to your home. Each sign should feature characters that are at least 4 inches high and should be made of reflective, noncombustible material.

Bridges and Culverts: Inadequately built bridges and culverts may prevent firefighting equipment from reaching your home. Do not use plastic culverts. Ask your local fire marshal about proper bridge and culvert design for your area.

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

Road Width and Grade: Roads should be at least 20 feet wide and long driveways should be at least 12 feet wide with a steepness grade of less than 12 percent.

Defensible Space

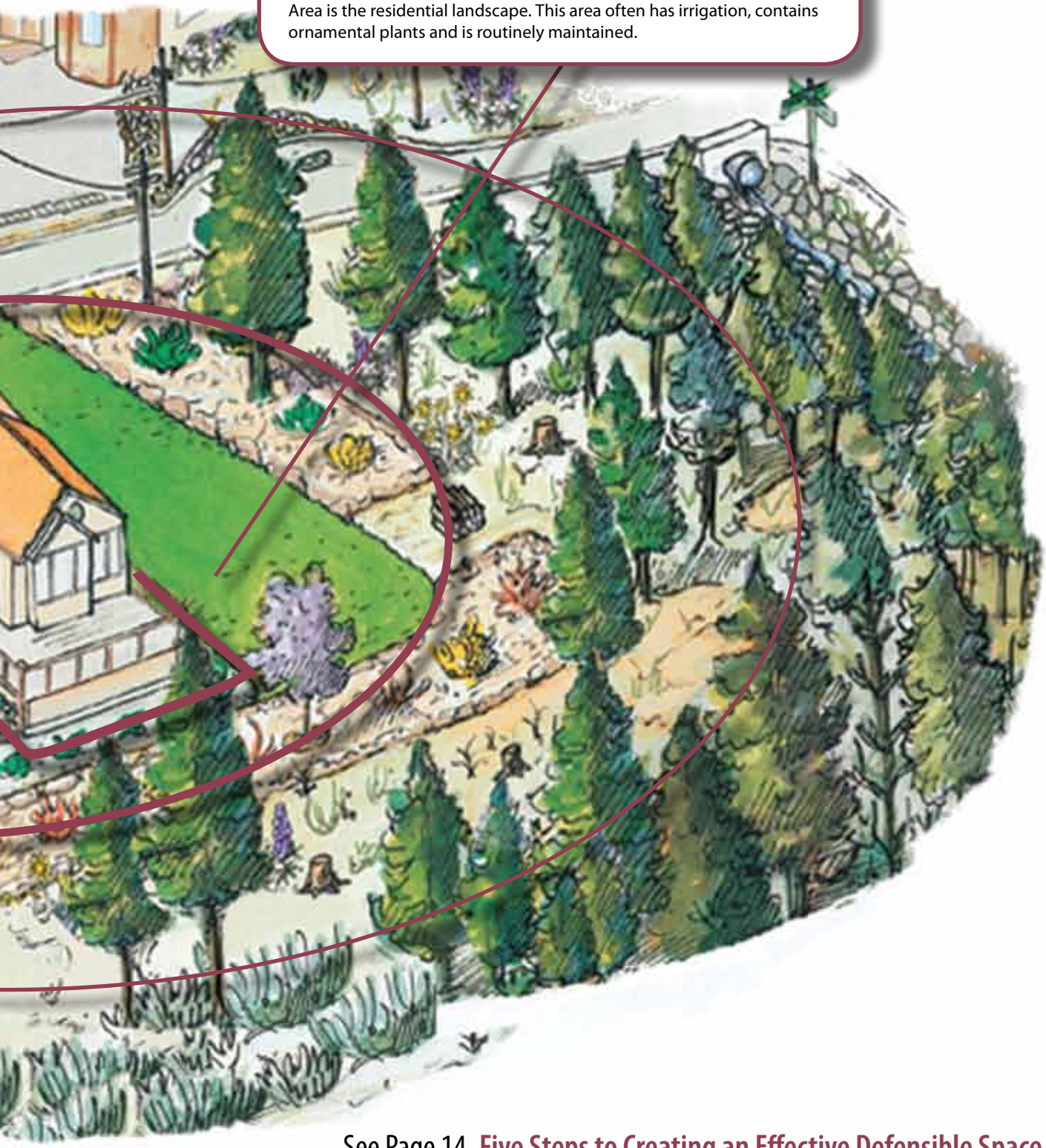


Wildland Fuel Reduction Area: This area usually lies beyond the residential landscape and often consists of naturally occurring plants, such as pine trees, manzanita, sagebrush, etc. Within this area:

- Remove all dead vegetation, including dead shrubs, dried grass, fallen branches, thick accumulations of needles and leaves, etc.
- Thin out thick shrubs and trees to create a separation between them. Removing trees more than 14 inches in diameter requires a permit from your local fire agency.
- Prevent ladder fuels by removing low tree branches and shrubs under the tree.

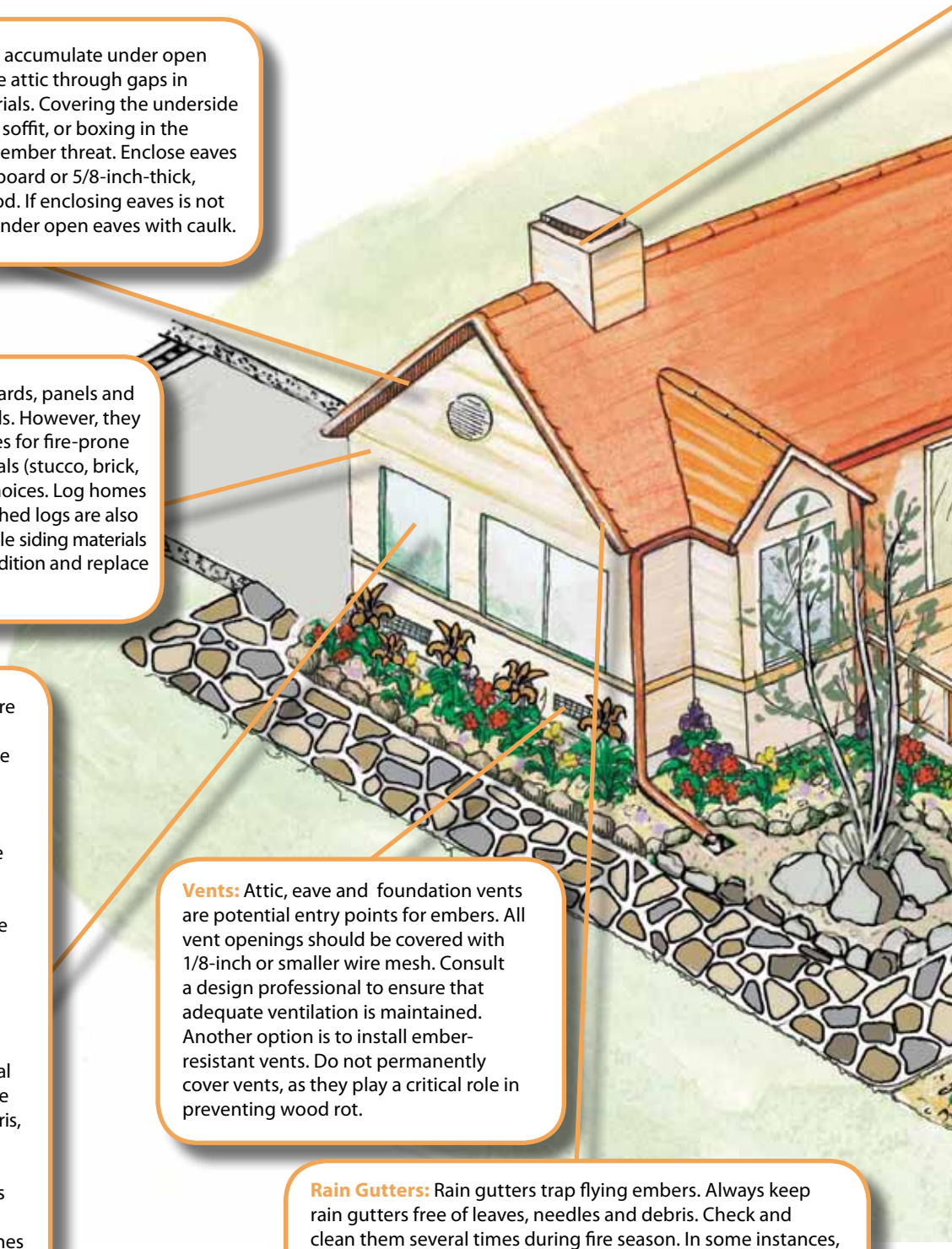
Noncombustible Area: Create a Noncombustible Area at least 5 feet wide around the base of your home. This area needs to have a very low potential for ignition from flying embers. Use irrigated herbaceous plants such as lawn, ground cover and flowers that are recommended for the Lake Tahoe Basin; rock 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.

Lean, Clean and Green Area: For a distance of at least 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 no accumulation of dead vegetation or flammable debris within the area. Green denotes 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.



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

Built Environment



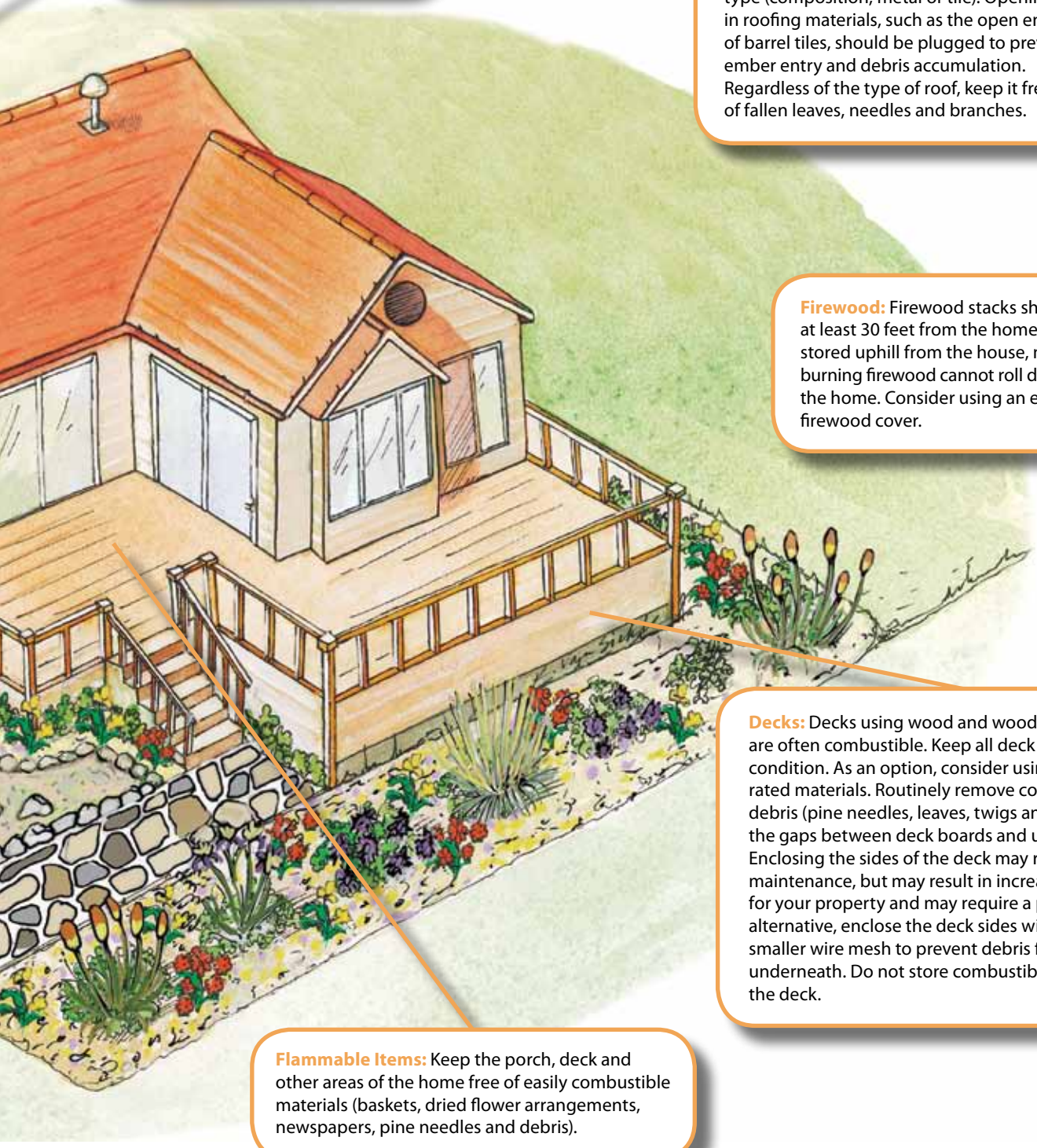
Eaves: Embers can accumulate under open eaves and enter the attic through gaps in construction materials. Covering the underside of the eaves with a soffit, or boxing in the eaves, reduces the ember threat. Enclose eaves with fiber cement board or 5/8-inch-thick, high-grade plywood. If enclosing eaves is not possible, fill gaps under open eaves with caulk.

Exterior Siding: Wood products (boards, panels and shingles) are common siding materials. However, they are combustible and not good choices for fire-prone areas. Noncombustible siding materials (stucco, brick, cement board and steel) are better choices. Log homes that utilize fire-rated chinking or notched logs are also good choices. If using noncombustible siding materials is not feasible, keep siding in good condition and replace materials in poor condition.

Windows and Skylights: 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-pane windows and large windows are particularly vulnerable. In high fire-hazard areas, install windows that are at least double-glazed and that utilize tempered glass for the exterior pane. The type of window frame (wood, aluminum or vinyl) is not as critical. However, vinyl frames should have metal reinforcements. Closable, solid exterior shutters can provide additional window protection. Keep skylights free of pine needles leaves and other debris, and remove overhanging branches. If skylights are to be placed on steep pitched roofs that face large amounts of nearby fuels (a mature pine tree or another house), consider using flat ones constructed of double-pane glass.

Vents: Attic, eave and foundation vents are potential entry points for embers. All vent openings should be covered with 1/8-inch or smaller wire mesh. Consult a design professional to ensure that adequate ventilation is maintained. Another option is to install ember-resistant vents. Do not permanently cover vents, as they play a critical role in preventing wood rot.

Rain Gutters: Rain gutters trap flying embers. Always keep rain gutters free of leaves, needles and debris. Check and clean them several times during fire season. 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, or without causing erosion. Gutter removal may also affect erosion control Best Management Practices (BMPs).



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

Roof: Homes with wood-shake or shingle roofs are much more likely to be destroyed during a wildfire than homes with fire-resistant roofs. Consider replacing wood-shake or shingle roofs with a Class-A fire-resistant type (composition, metal or tile). Openings in roofing 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, 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. Consider using an ember-resistant firewood cover.

Decks: Decks using wood and wood-plastic materials are often combustible. Keep all deck materials in good condition. As an option, consider using fire-resistant-rated materials. Routinely remove combustible debris (pine needles, leaves, twigs and weeds) from the gaps between deck boards and under the deck. Enclosing the sides of the deck may reduce this type of maintenance, but 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. Do not store combustible materials under the deck.

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

Property owners...**new construction must use approved, fire-resistant materials.**
For more information, contact your local fire agency.

Five Steps to Creating an Effective Defensible Space

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 home 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. 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 17 and 23 for contact information.

Photo courtesy of John Coburn

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

Step One

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 space 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.

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
Forest Trees Fir and pine. If there's a substantial shrub understory, use those values stated above.	100 feet	100 feet	200 feet

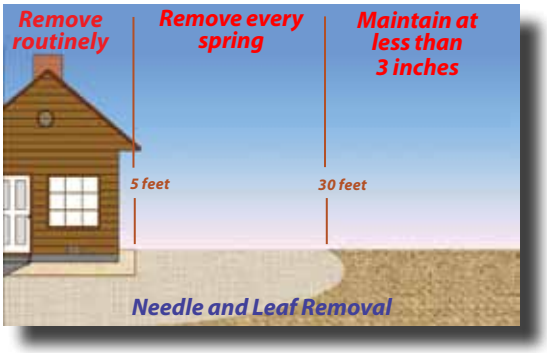
Step Two

Within the recommended Defensible Space Zone, remove:

- Dead and dying trees.
- Dead native and ornamental shrubs.
- Dead branches.
- Dried grass, weeds and flowers.
- Exposed branches from fallen trees that are embedded into the ground and located **more than 30 feet** from the house. The embedded tree can be left in place.

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

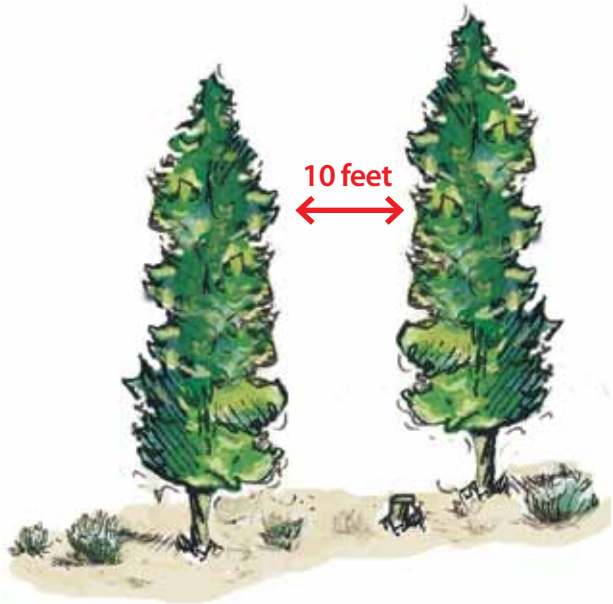
Within the Defensible Space Zone, native trees and shrubs, (Jeffrey pine, white fir and manzanita) should not occur in dense stands. Dense stands of trees and shrubs pose a significant wildfire threat. Thin dense tree and shrub stands to create more space between them.

Sagebrush, Manzanita, Huckleberry Oak and 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 homes located on steeper slopes, the separation distance should be greater. For example, if the typical shrub height is 2 feet, then 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 to reduce their height and/or diameter. See Step Five for shrub management recommendations **within 30 feet** of the house.

Forest Trees

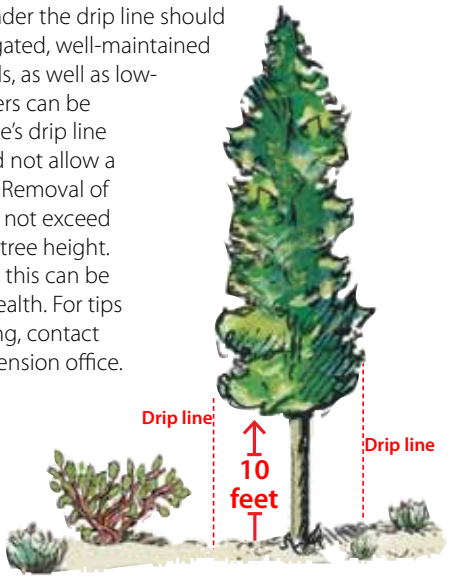
On flat to gently sloping terrain **more than 30 feet** from the house, individual trees or small groups of several trees should be thinned to provide an average separation between canopies of at least 10 feet. For homes located on steeper slopes, the separation distance should be greater.



Within 30 feet of the house, the canopies of individual or small groups of several trees should be separated by 10 feet to 30 feet. A continuous tree canopy maintained as previously described is also an option for this area. Contact your local fire professionals (see Page 23) or TRPA to have your trees evaluated and marked for removal.

Step Four

Vegetation that can carry a fire from low-growing plants to taller plants is called ladder fuel. In areas where trees have been thinned as per Step Three, 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 lawns and flower beds, as well as low-growing 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. Removing more than this can be detrimental to tree health. For tips on proper tree pruning, contact your Cooperative Extension office.



Lower tree branches should be removed to a height of at least 10 feet.

Step Five

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 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. The landscape should be arranged so that vegetation would not allow a fire to travel rapidly across the area.

Lean, Clean and Green Area Tips

Within the Lean, Clean and Green Area:

- Remove dead shrubs and trees; dried grass, flowers and weeds; dead branches; and firewood.
- Remove fallen needles and leaves every spring by May 1.
- Wood and bark mulches can be used, but not in a widespread manner. If used, these areas should be separated by ignition-resistant materials, such as irrigated lawn, clover and flowers or noncombustible materials such as gravel and rock.
- Native shrubs should be substantially reduced. Individual specimens or small groups can be retained as long as they are kept healthy and vigorous, and pruned to reduce height and amount. 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, actively growing herbaceous plants that are recommended for the Lake Tahoe Basin, such as lawn, clover, flowers, some ground covers and succulents. Plant materials that are cured out for the season should be removed.
- Ornamental, deciduous trees and shrubs can be used as specimens or in small groups. They should be irrigated, kept healthy and vigorous, and free of dead leaves and wood. 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 in 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 or roof. Remove limbs that are encroaching on power lines.
- Create a noncombustible area at least 5 feet wide around the perimeter of the house and any combustible attachments (decks). See Noncombustible Area Tips in the adjacent column.

Noncombustible Area Tips

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. Within this area:

- Remove dead shrubs and trees; dried grass, flowers and weeds; dead branches; and firewood.
- Remove fallen needles and leaves.
- Do not use wood and bark mulches.
- Do not use wood landscape timbers or boards.
- Remove flammable shrubs and trees. This includes native plants (big sagebrush, bitterbrush, greenleaf manzanita, snowbrush, rabbitbrush, huckleberry oak, pine and fir) and ornamental plants (juniper, mugo pine, arborvitae, 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 that are recommended for the Lake Tahoe Basin, such as lawn, clover, flowers, some ground covers and succulents.
- 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.
- Trellises used in this area should be made of noncombustible materials.

Maintenance

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, re-evaluate your property using the previous five steps and implement the necessary defensible space recommendations.

Photo courtesy of University of Nevada Cooperative Extension

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 the area. 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.

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.

Managing Trees	Cutting of live trees with trunks greater than 14 inches in diameter requires a permit from your local fire agency (no visit to TRPA required).
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, including lakeshores, a beach, stream environment zones, scenic resource areas and conservation/recreation areas, additional considerations may apply. Adequate defensible space can still be achieved with professional advice.

TAHOE REGIONAL PLANNING AGENCY

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

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. An important first step is to check with your local fire department or district for direction before proceeding. 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	530-542-5580
Nevada Division of State Lands	775-684-2720
Nevada Division of State Parks	775-684-2770
U.S. Forest Service	530-543-2600

If you are interested in getting other homeowners in your neighborhood organized to reduce wildfire hazards, contact your local fire district or department.

Photo from the NTCD Photo Archives

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.

"TRPA values our partnership with the Lake Tahoe Basin Fire Districts and our collective work to assure fire defensible space around people's homes and properties. Reducing the risk of a catastrophic wildfire in the Tahoe Basin is essential for the future of our communities and the Lake."

Joanne Marchetta, Executive Director
Tahoe Regional Planning Agency

Conservation Landscaping Concepts

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 775-784-4848 or the University of California Cooperative Extension, 530-542-2571.

Evacuation

Preparation

A key component of the Fire Adapted Communities concept is residents who know how to safely and effectively evacuate. Successful community evacuation requires preparation. The following checklists provide recommendations concerning proper evacuation preparation.

Elements of Family Emergency Planning and Preparation

- Meet with household members. Explain dangers to children and work as a team to prepare your family for emergencies.
- Discuss what to do about power outages and personal injuries.
- Post emergency phone numbers near phones.
- Learn how to turn off the water, gas (see inset) and electricity at your home.
- Select a safe meeting point. During an emergency, you may become separated from family members.
- Choose an out-of-town contact because it is often easier to make a long-distance phone call than a local call from a disaster area. Everyone must know the contact's phone number.
- Complete a family communications plan. Your plan should include contact information for family members, work and school.
- Teach children how to make long-distance phone calls.
- Complete an inventory of home contents and photograph/videotape the house and landscape. Place files in your to-go bag (see Page 16). A second copy of these files should be stored in a location away from your community.
- Identify escape routes and safe places. In a fire or other emergency, you may need to evacuate very quickly. Be sure everyone in your family knows the best escape routes out of your home and where safe places are in your home for each type of disaster. Draw an escape plan with your family highlighting two routes out of each room.
- Prepare *EVACUATED* sign and if you have an emergency water source (pool, pond or hot tub), a *WATER SOURCE HERE* sign. Select sites to post the signs where they will be clearly visible from the street.

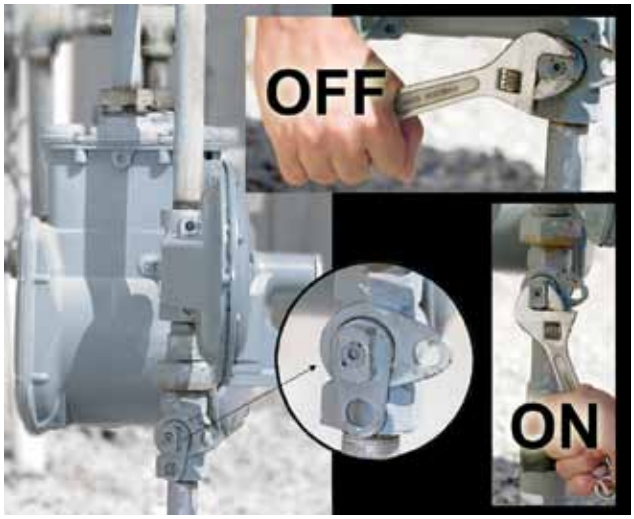


Photo Courtesy of Washoe County

How to Shut Off the Gas Supply
Attach a wrench to the gas meter with a wire so it is readily accessible in the event of an emergency. Use the wrench to turn the valve until it is perpendicular to the pipe. Be aware that once your gas is turned off, all your pilot lights will need to be relit when turning the gas back on. It is advisable to contact your gas provider at that time.

Contact Information for Your Local Utility Company:

Liberty Energy (CA)	**800-782-2506**
NV Energy (NV)	**775-834-4444**
Southwest Gas (CA, NV)	**800-772-4555**

Content for the Evacuation section adapted with permission from *Ready, Set, Go!,* International Association Of Fire Chiefs; *Incline Village/Crystal Bay Emergency Preparedness Guide,* North Lake Tahoe Fire Protection District; *Preparing Residents In Disaster Evacuations,* Sierra Fire Protection District; *Living With Fire,* University of Nevada Cooperative Extension; *Washoe County Emergency Preparedness Guide,* Washoe County Division Of Emergency Management & Homeland Security; and *They'll Be Counting On You*, Washoe County Regional Animal Services.

To-go Bag and Disaster Supplies Kit

Prepare for at least three days, but preferably seven days. The best time to assemble a to-go bag and disaster supplies kit is well before you need them. Most of these items are already in your home, and stocking up on emergency supplies now can add to your family's safety and comfort during and after a disaster.

Essentials for a Disaster Supplies Kit

If you anticipate an extended evacuation at an emergency shelter or your family is returning to a home without functioning electricity and water, these items will prove helpful:

- ☐ One gallon of water per person, per day, stored in unbreakable containers and labeled with the storage date. Replace every six months.
- ☐ Supply of nonperishable packaged or canned foods with a hand-operated can opener.
- ☐ Antibacterial hand wipes or gel.
- ☐ First-aid kit, including a first-aid book.
- ☐ At least one blanket or sleeping bag per person.
- ☐ ABC-type fire extinguisher.
- ☐ Special items for infants, elderly or disabled family members.
- ☐ Large plastic trash bags, tarps and rain ponchos.
- ☐ A large trash can.
- ☐ Bar soap, liquid detergent and household bleach.
- ☐ Rubber gloves and duct tape.

Photo courtesy of the Lake Tahoe Humane Society

Prepare a pet to-go bag and place pet carriers in an easily accessible location.

Preparing Pets and Livestock for Evacuation

Plan to take your animals with you and never turn them loose. Animals may not be allowed inside human emergency shelters. Contact your county's animal services department for advice on animal evacuation.

- ☐ Make sure dogs and cats wear properly fitted collars with identification, vaccination, microchip and license tags.
- ☐ Your pet evacuation plan should include routes, transportation needs and host sites. Share this plan with trusted neighbors in your absence.
- ☐ Exchange veterinary information with neighbors and file a permission slip with the veterinarian authorizing emergency care for your animals if you cannot be located.
- ☐ Make sure all vehicles, trailers and pet carriers needed for evacuation are serviced and ready to be used.
- ☐ Assemble a pet to-go bag with a supply of food, nonspill food and water bowls, cat litter and box, and a restraint (chain, leash or harness). Additional items to include are newspaper, paper towels, plastic bags, permanent marker, bleach/disinfectant solution and water buckets.

Essentials for a To-go Bag

The to-go bag should be easily accessible and filled with items needed to help you quickly and safely evacuate your home. When a wildfire is approaching, you may only have enough time to retrieve this bag. Be sure it contains:

- ☐ Clothing and personal toiletries.
- ☐ Inventory of home contents and photographs/videotape of the house and landscape. Contact your insurance agent for an inventory checklist.
- ☐ Flashlight, portable radio tuned to an emergency radio station and extra batteries. Change batteries annually.
- ☐ Extra set of car and house keys.
- ☐ Extra pair of eyeglasses.
- ☐ Contact information for family, friends and physicians.
- ☐ Copy of this publication.

How to Address the Special Needs of Vulnerable Populations During an Evacuation

During a disaster, it is essential that individuals with special needs, including the elderly, people with medical problems and people with certain disabilities, receive proper care.

- ☐ If the family member is dependent upon medications or equipment, or has special dietary needs, plan to bring those items with you. Documentation about insurance and medical conditions should also accompany the person.
- ☐ Transportation available to the general public during an emergency evacuation may not be suitable for family members with special needs. Plan ahead for their transportation.
- ☐ Many special-needs populations are easily upset and stressed by sudden and frightening changes. Your plans should ensure that a caregiver or trusted family member is able to stay with them at all times during an evacuation.

Photo courtesy of the Nevada Appeal

Plan ahead to provide suitable transportation for people with special needs.

Photo courtesy of John Pickett

Families should designate a safe meeting place and emergency contact person.

You Have Prepared Your Family for an Emergency Evacuation When You Have:

- ☐ Made a Family Emergency Plan.
- ☐ Registered with your local emergency notification system if this service is available in your area.
- ☐ Registered with your phone-tree captain, if a phone tree has been established in your community.
- ☐ Attended an evacuation drill and practiced two of the recommended evacuation routes out of the community.
- ☐ Arranged for transportation out of the affected area if you do not drive.
- ☐ Familiarized yourself and your family with the location of local evacuation centers.
- ☐ Designated a safe meeting place and contact person for you and your family members.
- ☐ Assembled a family to-go bag, a disaster supplies kit and a pet to-go bag.
- ☐ Inventoried home contents, videotaped/photographed property and placed photos and videos in the to-go bag.
- ☐ Reviewed the animal/livestock evacuation recommendations and assembled supplies needed for the animals care in a pet to-go bag.
- ☐ Reviewed the supplemental fire-preparedness information available at **www.livingwithfire.info/tahoe**.
- ☐ Prepared *EVACUATED* and *WATER SOURCE HERE* signage.

Notification

No single method of communication is fail-safe during an emergency, so regional public safety officials use a combination of five methods to keep the public informed during an emergency.

- ☐ Local government public information officers can prepare and distribute media releases for broadcast by local media outlets.
- ☐ Emergency managers can initiate the Emergency Alert System, which interrupts local radio and television broadcasts with important information.
- ☐ Public safety officials can directly broadcast messages over government cable channels.
- ☐ First responders and credentialed volunteers can go door-to-door to alert citizens.
- ☐ If applicable, the local emergency notification system can be used to automatically call affected residents.

There is no guarantee that every citizen will be contacted, but these five methods allow regional officials to quickly notify large sections of the local population. As another option, consider establishing an emergency phone tree in your neighborhood in conjunction with your local fire department/district.

In an Emergency, Tune to Your Local Radio Station for Updates.

Photo courtesy of John Pickett

Wildfires can start at any time during the day or night. Stay informed.

Emergency Notification System

Several counties employ emergency notification systems capable of calling telephones and sending emails and text messages to a particular area, providing a prepared message during an emergency. However, you may not receive the message if the electricity fails, if you are not at home when an emergency occurs, or if your contact information is not included in the notification system database.

These emergency communication systems may allow you to enter multiple forms of contact information (unlisted home number, cell phone, work phone and email address) into the database. Check with your county's emergency management department, local fire department/district or Sheriff's department to see if your county employs an emergency notification system and how you can register for alerts.

Time to Leave

During a wildfire, it will likely be dark, smoky, windy, dry and hot. There may be burning embers being blown about, no power, no phone service and poor water pressure. Remember, there is nothing you own worth your life! Please evacuate immediately when asked by fire or law enforcement officials. If you are concerned, don't wait to be asked to leave. Drive slowly, turn on your vehicle headlights and stay as far to the right side of the road as possible.

If You Have to Evacuate and There's Time

Wear and carry:

- ☐ Long pants, a long-sleeved shirt or jacket made of cotton or wool, a hat and boots.
- ☐ Gloves, a handkerchief and goggles to cover your face, and water to drink.
- ☐ Flashlight and portable radio from your to-go bag (see Page 16) tuned to a local radio station.

Family members should:

- ☐ Evacuate early, especially if not essential to preparing the house for wildfire.
- ☐ Follow practiced evacuation routes to the designated safe meeting place.
- ☐ Relay plans to the designated contact person.

For your animals:

- ☐ Evacuate them if possible.
- ☐ Contact your county's animal services department for assistance.
- ☐ Bring current pet photos (make sure distinguishing markings are visible), health records and paperwork (especially vaccination information) stored in waterproof bags, and medications and dosage instructions.
- ☐ Secure pets in their own carrier or cage.
- ☐ Place your pet to-go bag in the car (see Page 16).

For your vehicle:

- ☐ If you can lift your garage door manually, disconnect the electric garage door opener, and place the vehicle in the garage pointing out. Leave the garage door unlocked and closed. If you cannot lift your garage door manually, park the vehicle in the driveway facing out.
- ☐ Leave keys in the ignition.
- ☐ Roll up the windows.
- ☐ Keep the fuel tank full during fire season.

Place in your vehicle:

- ☐ To-go bag (see Page 16).
- ☐ Disaster supplies kit (see Page 16).
- ☐ Important documents (bank, IRS, trust, investment, insurance policies, birth certificates, marriage certificates, death certificates, medical and immunization records, wills, contracts, titles and deeds).
- ☐ Credit and ATM cards and extra cash.
- ☐ Medications.
- ☐ Driver's license, passport and Social Security cards.
- ☐ Laptop, charger and backup of desktop computer files.
- ☐ Address book.
- ☐ Cell phone and charger.
- ☐ Family photo albums and videos.
- ☐ Family heirlooms.
- ☐ Toys, books and games for entertainment.

Photo courtesy of Seth Meyer

During a wildfire, the dark and smoky conditions can make evacuation difficult. Be prepared!

Inside your home and out buildings:

- ☐ Close all interior doors.
- ☐ Leave a light on in each room.
- ☐ Remove combustible curtains and other materials from around windows.
- ☐ Close windows, skylights and exterior doors (house, garage, shop and barn).
- ☐ Close fire-resistant drapes, shutters and blinds.
- ☐ Turn off all pilot lights.
- ☐ Move overstuffed furniture (couches and easy chairs) to the center of the room.
- ☐ Close fireplace damper.
- ☐ Turn off air conditioning.
- ☐ Place an *EVACUATED* sign in the front window.

Outside your home and out buildings:

- ☐ Place combustible patio furniture and accessories inside or toss them away from the house.
- ☐ Remove barbecue propane tanks and place them away from the house where they can safely vent.
- ☐ Shut off propane at the tank or natural gas at the meter (see Page 15).
- ☐ Close or cover foundation, attic and eave vents with precut plywood covers or several layers of aluminum foil.
- ☐ Cover windows with plywood panels at least 1/2 inch thick.
- ☐ Prop a noncombustible ladder against the house.
- ☐ Connect garden hoses to faucets and attach nozzles set on spray.
- ☐ Remove excelsior pads from swamp coolers and toss them away from the house.
- ☐ Leave doors and gates unlocked.
- ☐ Turn on outside lights.
- ☐ Fill trash cans and buckets with water and place where firefighters can find them.
- ☐ If you have an emergency water source, post *WATER SOURCE HERE* sign in the predetermined spot clearly visible from the street.

Always Register With Official Personnel When You Arrive at a Shelter.

Photo courtesy of John Pickett

South Lake Tahoe's 2007 Angora Fire forced the evacuation of thousands of people.

If You Cannot Leave

- If you are unable to evacuate, stay in your home during the fire. It will be much hotter and more dangerous on the outside.
- Call 911 for assistance.
- Turn on all exterior lights.
- Stay away from windows and move to an interior room or hallway.
- Do not attempt to leave until after the fire has passed and you can safely leave.
- Check for small fires inside the house and extinguish them.
- Drink plenty of water.
- Make sure you can exit the house if it catches fire.
- Fill sinks and tubs with water.
- Place wet rags under doors and other openings to prevent entry of embers and smoke.
- Once the fire front has passed, check your flowerbeds, roof, rain gutters, attic and crawl space for fires or burning embers and extinguish them.

If You Cannot Evacuate Your Animals

- Bring small animals indoors. Do not leave pets tethered outdoors.
- Leave only dry food in nonspill containers. Do not leave treats or vitamins.
- Depending on your pet's needs, leave water in bathtubs, sinks or nonspill containers.
- Do not confine mixed species of pets, such as cats, dogs, hamsters and birds in the same room, even if they normally get along.
- Move livestock and horses to a safe area, such as a recently grazed or mown pasture, riding arena or irrigated pasture. Never release them onto streets and roads. Provide enough feed and water for at least 48 hours.
- Notify fire agency personnel of livestock on pasture or rangeland to coordinate evacuation.
- Notify your county's animal services department about animals you could not evacuate.

Evacuation Terms

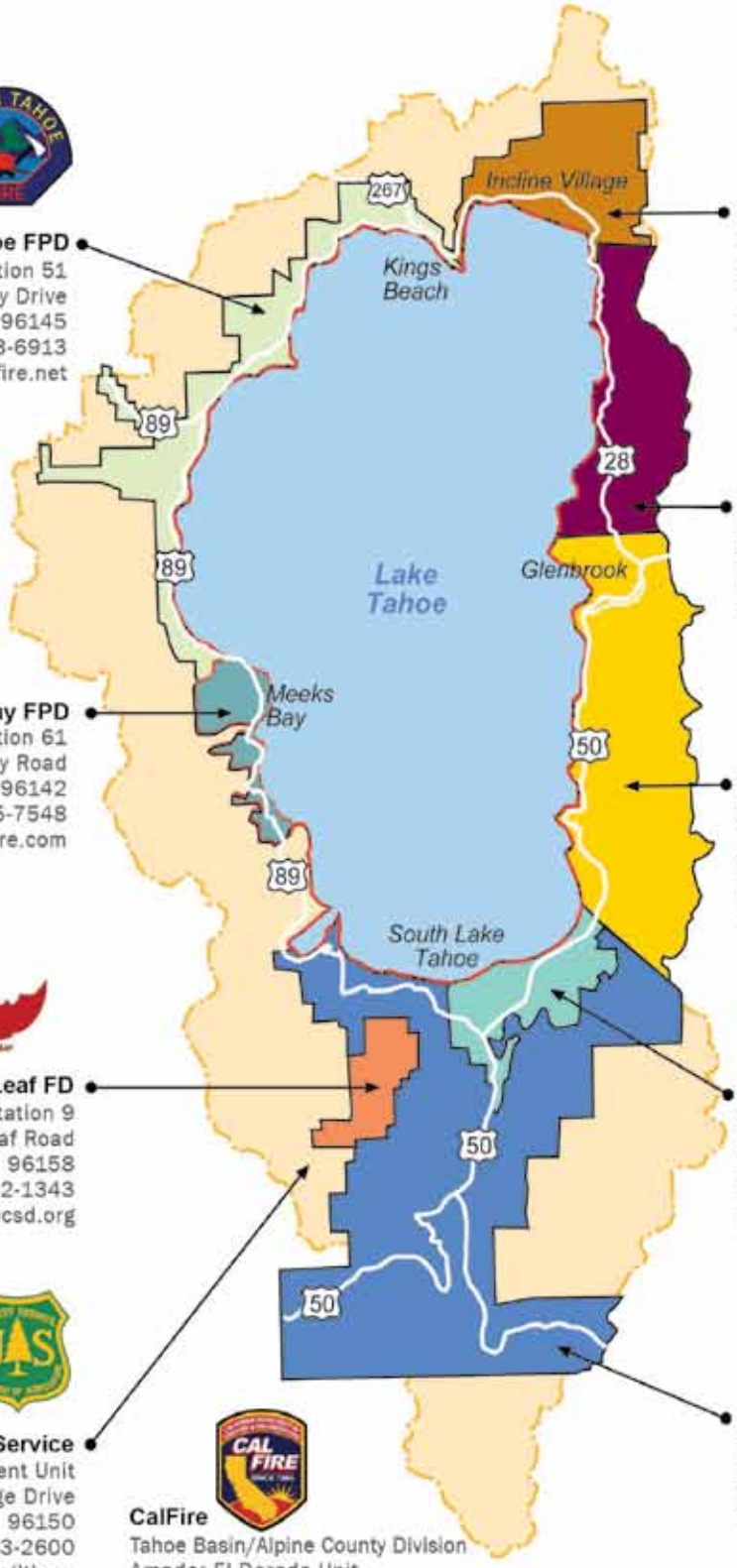
Exclusion Zone - An area established by the commander in charge of the disaster scene into which entry is temporarily forbidden due to extreme danger. Only official responder vehicles are allowed entry until the situation is deemed safe again.

Voluntary Evacuation - Voluntary evacuation is used when an area will most likely be impacted and residents are willing and able to leave before the situation worsens. This is helpful for residents with medical issues, pet owners and others who need more time to evacuate.

Evacuation Advisory - An advisory is issued when there is reason to believe the emergency will escalate and require mandatory evacuations. It provides residents time to prepare for evacuation.

Mandatory Evacuation - When the situation is severe and lives may be in danger, the governor has the authority to order mandatory evacuations. Should this occur, you must leave the area immediately. Follow any instructions you receive from law enforcement officers or fire officials.

Lake Tahoe Basin Fire Protection Agencies



North Tahoe FPD
Station 51
222 Fairway Drive
Tahoe City, CA 96145
530-583-6913
www.ntfire.net

North Lake Tahoe FPD
866 Oriole Way
Incline Village, NV 89451
775-831-0351
www.nltfpd.net

Nevada Division of Forestry
2478 Fairview Drive
Carson City, NV 89701
775-684-2500
www.forestry.nv.gov

Meeks Bay FPD
Station 61
8041 Emerald Bay Road
Tahoma, CA 96142
530-525-7548
www.meeksbayfire.com

Tahoe - Douglas FPD
Station 23
193 Elks Point Road
Zephyr Cove, NV 89448
775-588-3591
www.tahoefire.com

Fallen Leaf FD
Station 9
241 Fallen Leaf Road
South Lake Tahoe, CA 96158
530-542-1343
www.fallenleaflakecsd.org

South Lake Tahoe FD
Station 3
2101 Lake Tahoe Blvd.
South Lake Tahoe, CA 86150
530-542-6160
www.cityofslt.us

U.S. Forest Service
Lake Tahoe Basin Management Unit
35 College Drive
South Lake Tahoe, CA 96150
530-543-2600
www.fs.usda.gov/ltbmu

Lake Valley FPD
2211 Keetak St.
South Lake Tahoe, CA 96150
530-577-3737
www.lakevalleyfire.org

CalFire
Tahoe Basin/Alpine County Division
Amador-El Dorado Unit
3141 Highway 50, Suite B
South Lake Tahoe, CA 96150
530-573-2321
www.fire.ca.gov

In an Emergency Dial 9-1-1

Living With Fire in the Lake Tahoe Basin

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University of Nevada Cooperative Extension

For more information, visit

LivingWithFire.info/tahoe