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 eight (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 the influences the type and health of Tahoe's forests. During the 1870s to 1890s, 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 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.

Experts feel this is a good example of what Tahoe's original forest prior to European-American settlement looked like.

Fire is Natural to Tahoe's Environment

Fire has been natural to 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.

Living With Fire

Original Forest
Prior to 1870, infrequent 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 1857 nothing remained at Incline but stripped forest land."

Tahoe's Forest Timeline

Emerald Bay - 1890s
Emerald Bay - 1900
Emerald Bay - 2000

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. 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.

Prior to 1870, low-intensity fires burned routinely in the Tahoe Basin dominated by large trees. The fires created an open, park-like forest. The photo at the bottom left corner is of Emerald Bay, taken in the 1890s.

Emerald Bay - 1890s

Experts feel this is a good example of what Tahoe's original forest prior to European-American settlement looked like.

Under these unnatural conditions, uncontrolled, 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.

Fire Occurrence
Mean Fire Return Interval (years)

0 2 4 6 8 10

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 wildfires that impacts watersheds, destroys neighborhoods, and takes human life is high in many areas of the Lake Tahoe Basin.

Tahoe's historic fire occurrence. Map showing the frequency and intensity of fire in the Tahoe Basin. The map is divided into three categories: low-intensity fires, medium-intensity fires, and high-intensity fires. Each category is represented by a different color on the map. The map is overlaid on a satellite image of the Tahoe Basin, with key locations marked.

High-intensity Fire


Tahoe's Historic Fire Occurrence

Today's newspaper headlines were uncommon. Raging, high-intensity wildfires portrayed in patchy forest dominated by large trees. The fires created an open, park-like forest. These fires are a major cause of the increase in woody plants. 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.

Logging era. During the 1870s to 1890s, 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 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. 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, uncontrolled, 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.

Tahoe's Current Forest and Fire Threat...
BEFORE THE FIRE

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.

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.

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.

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.

Access Zone

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

Wildfire will threaten your house in three ways...

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.

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!

DURING THE FIRE

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.

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.

What can homeowners do to reduce the wildfire threat?

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

INTERIOR ZONE

This zone offers fire safety tips for inside the home.

Built Zone

This zone includes recommendations for home construction.

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.

Photo courtesy of Candice Towell and the RG-J

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.

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, 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.

Fact: 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.

Fact: 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.

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.

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

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

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

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

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

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.

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!

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.

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

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

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

FACT: The Lake Tahoe Basin’s forests have an unprecedented amount of fuel available for burning.
Access Zone

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

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.

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 dugged 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).

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.

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.

California property owners... new construction must use approved, fire-resistant materials. For more information, go to http://osfm.fire.ca.gov/sfmfirecagov.html.
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.
- Install according to the manufacturer’s directions. Regularly remove ash and place them in a metal container with a lid. Place the ash-filled container outdoors, away from any heat source. Contact the local fire department for specific disposal requirements in your area.
- 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.

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.

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.

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.

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.

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.

Portable Fire Extinguishers:

- 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.

碳一氧化碳检测器：一氧化碳（CO）检测器是唯一一种能够及时警报人们危险程度的检测器，即在悲剧发生前。一氧化碳是燃烧过程中产生的副产品，来自煤气炉等设备。只使用官方认证并有明显标记为美国标准- UL2034符号的检测器。

木炉和壁炉：让您的房屋安全地使用这些提示来关心木炉和壁炉。
- 根据制造商的指示安装。
- 从未使用易燃液体，如汽油，来点火。
- 仔细遵循使用合成原木的指示。
- 在烟囱和炉子开口前安装玻璃或金属屏幕，以防止火星或火花。
- 在至少3英尺处保持易燃材料。
- 切勿使用过量的纸张来启动您的火。
- 切勿燃烧有色纸张，它会加速焦油堆积并增加烟囱火灾的可能。
- 避免长时间以缓慢的速度燃烧原木，这会导致烟囱内固体的渗出。
- 使用干木头以提高燃烧效率。
- 定期从烟囱和烟斗开口移除并存放在金属容器里。
- 筛网烟囱和烟斗开口，使用认证的隔火网。
- 检查并清洗烟囱每年至少一次。

蜡烛安全：蜡烛是安全的产品，但若使用不当或置于不安全的环境中则可能成为危险。
- 总是将点燃的蜡烛置于视线范围内。
- 将蜡烛置于儿童和宠物够不到的地方。
- 在燃烧前将蜡烛芯剪短至1/4英寸。
- 总是使用热稳定，坚固，适合蜡烛的支架。
- 保持燃烧的蜡烛远离通风口，气流和可燃物。
- 始终将蜡烛放置在通风良好的房间。
- 熄灭火焰时保留2英寸的蜡，或当1/2英寸的蜡残留时。
- 使用蜡烛熄灭器。

自动喷水灭火系统：在室内安装自动喷水灭火系统可以在火灾发生时自动工作并扑灭火焰。确保您的家里的喷水灭火系统由有执照的施工人员安装。

便携式灭火器：便携式灭火器使您能够在火灾发生时快速响应。灭火器根据可灭火的火的类型进行评级：A - 木头或布料火，B - 液体火，C - 电气火，D - 金属火。
- 确保家里所有成员都熟知灭火器的位置和操作。
- 将灭火器每年至少服务一次，并在每次使用后重新灌装。
- 了解灭火器的类型以正确使用。

一氧化碳检测器：一氧化碳检测器是唯一的设备来警告人们危险程度，即在悲剧发生前。一氧化碳是燃烧过程中产生的副产品，来自煤气炉等设备。只使用官方认证并有明显标记为美国标准- UL2034符号的检测器。

其他加热系统：煤油和其他燃料加热器应安全使用。遵循制造商的指示使用这些设备。
- 确保它们经过独立检测实验室的批准。便携式加热器应转动关断。
- 仅使用制造商指定的燃料。
- 将燃料加满后离开。
- 保持儿童远离加热器。
- 从不燃烧木炭室内。
Seven Steps to Creating an Effective Defensible Space

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.

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 bushes, dry grass and weeds. 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.

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.

Recommended Defensible Space Distance

<table>
<thead>
<tr>
<th>Distance</th>
<th>Flat to Gently Sloping</th>
<th>Moderately Steep</th>
<th>Very Steep</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grass</td>
<td>100 feet</td>
<td>100 feet</td>
<td>100 feet</td>
</tr>
<tr>
<td>Shrub and Woodland</td>
<td>100 feet</td>
<td>200 feet</td>
<td>200 feet</td>
</tr>
<tr>
<td>Trees</td>
<td>100 feet</td>
<td>100 feet</td>
<td>200 feet</td>
</tr>
</tbody>
</table>

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.

Make your house safe for firefighters to defend.
Step Five
Create a Noncombustible Area at least 5 feet wide around the base of the home. This area immediately adjacent to the 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.
• Remove fallen leaves and leaves every spring by May. It is very difficult to clear dead leaves in the fall.
• 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 will not allow a fire to spread rapidly across the area.
• Native shrubs should be substantially reduced in this area. Individual species 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 spread rapidly across the area. When removing shrubs, leave the root systems in place.
• Use low-growing less than 18 inches tall), irrigated, deciduous shrubs recommended for the Lake Tahoe Basin as individual specimens or in small groups. Pumice these shrubs to remove branches in contact with the ground and sides of the house.
• Do not plant shrubs under first story windows, under eaves, or in corners.
• Use trellises made of noncombustible materials.

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

Lean, Clean and Green 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 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 reduced or not planted in this area include crape myrtle, madrone, maple, 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 shrubs less than 18 inches tall, such as pumice, golden and red currant, fuchsia, mahonia, Russian olive, black sage, flowering currant, and affordable ornamental honeysuckle could be used. A non-invasive hybrid honeysuckle, such as pumice, could be used.
• Use low-growing flowery grasses, such as pumice manzanita and Mahala mat, can be mulched.
• Use low-growing (less than 18 inches tall), irrigated, herbaceous plants, such as lawn, clover, erosion-control grasses, and flowers, ground covers and succulents, that are recommended for the Lake Tahoe Basin.
• Ornamental, deciduous shrubs and trees can be used as species or in small groups. They should be trimmed to keep height and vigorous, pruned to reduce height and amount, and would not allow a fire to spread rapidly 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 near the house.
• 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.

Erosion-control grasses and wildflowers are good choices for an attractive landscape and for providing a noncombustible area. Xeriscaping is recommended in those areas where the appearance of a yard is desired, but a high fuel load is not important.

Nonflammable plants, such as juniper, within 5 feet of the home. These can be used as ornamental evergreen shrubs, such as juniper, mugo pine, Austrian pine and others, should not be used near the house.

Little Green Gas Cans
• Gardeners also 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 fire fighters 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.

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 property maintained properly back of the house. "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; in fact, homeowners, not the firefighter, is responsible for these factors.

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, can contribute to the defensible space. 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 a home against an oncoming wildfire.

WHAT DOES DEFENSIBLE SPACE REQUIRE A LOT OF BARE GROUND IN MY LANDSCAPE?
No. Unfortunately, many people have this misconception. Bare ground is not the goal. Bare ground is not effective defensible space. Furthermore, excessive bare ground may increase the sod potential of your property. When properly implemented, defensible space practices should not contribute to Lake Tahoe’s water quality concerns.

WHAT DOES CREATING A DEFENSIBLE SPACE REQUIRE SPECIFIC SKILLS OR EQUIPMENT?
No. For the most part, creating a defensible space employs routine gardening and landscape maintenance practices, such as pruning, mowing, weed pulling, residue removal, appropriate plant selection and irrigation. Equipment needed includes common tools and, for areas which are not easily accessible by vehicle, a chainsaw, a pruning saw, pruner shears, loppers, a weed eater, a chipper, a shovel, and a spade. ALOG, compost bin or large round trash dumpster may be useful in disposing of unwanted plant materials.

WHAT’S YOUR EXCUSE?
“I don’t have time or money.” Try to keep in a high fire hazard area, creating defensible space needs to be a high priority or your safety. Many resources are varied. Presented below are responses to common excuses for not creating defensible space.

Nonflammable plants, such as juniper, mugo pine, Austrian pine and others, should not be used near the house. They are grown in both attractive landscapes and an effective defensible space.

THE FIRE DEPARTMENT IS SUPPOSED TO PROTECT MY HOUSE, SO WHY WORRY ABOUT DEFENSIBLE SPACE?
Some individuals incorrectly assume that a fire engine will be parked in their driveway and firefighters will actively defend their homes if a wildfire approaches. During a major wildfire, it’s unlikely that a large firefighting resource will be available to defend every home. In these circumstances, homeowners will likely have to take care of themselves; they must can safely and effectively protect. Even with adequate resources, some wildfires may be too large for firefighters to effectively defend certain homes. Perhaps, the most important person to protect your house is the homeowner, not a firefighter, but the property owner. And, it is the action taken by the homeowner to modify their property, such as proper landscapeing, that is most critical.

DEFEND YOUR HOME.
Defensible space size is not the same for every home, but the property owner. Not the firefighter, is responsible for ensuring that your home is protected. When properly implemented, defensible space practices should not contribute to Lake Tahoe’s water quality concerns.

DOES BUILDING A DEFENSIBLE SPACE MEAN MY HOUSE WILL SURVIVE A WILDFIRE?
No. Under extreme conditions, almost any house can burn. However, a defensible space will greatly improve your odds of your home surviving a wildfire.

DOES A DEFENSIBLE SPACE GUARANTEE MY HOUSE WILL SURVIVE A WILDFIRE?
No. In all cases, the creation of defensible space is compatible with TRPA ordinances. Several fire protection agencies have adopted firewise ordinances that limit nonflammable roof composition shingles, slate, metal, etc., are many times more likely to survive a wildfire. Defensible space also allows firefighters to effectively and safely defend your home.

HOW BIG IS AN EFFECTIVE DEFENSIBLE SPACE?
Defensible space size is not the same for every home, but the property owner. Not the firefighter, is responsible for ensuring that your home is protected.

HOW BIG IS AN EFFECTIVE DEFENSIBLE SPACE?
Defensible space size is not the same for every home, but the property owner. Not the firefighter, is responsible for ensuring that your home is protected.
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-cover 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.

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 justprint@taho.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-NVFSC, (530) 543-FIRE or info@nvfsc.org

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 at the University of California Cooperative Extension, (530) 543-2571.

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.

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 justprint@taho.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-NVFSC, (530) 543-FIRE or info@nvfsc.org

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 at the University of California Cooperative Extension, (530) 543-2571.

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.

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.
If Wildfire Approaches . . .

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

- 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

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.

For more information, visit our website
www.livingwithfire.info/tahoe