



### Visit These Websites

for more information on how to enhance the protection of your community from wildfires:

[www.azsf.gov](http://www.azsf.gov)  
[www.Firewise.org](http://www.Firewise.org)



# LIVING WITH WILDFIRE



## HOMEOWNERS' FIREWISE GUIDE FOR ARIZONA



# LIVING WITH WILDFIRE

## NOTES

Much of the Southwest is considered a high-hazard fire environment. Based on recent history and experience, these areas possess all of the ingredients necessary to support large, intense, and uncontrollable wildfires.

Within this hazardous environment are individual houses, subdivisions, and entire communities. Many homeowners, however, are ill-prepared to survive an intense wildfire. It is not a question of "if" a wildfire will occur, but when. As such, the odds of losing human life and property are growing.

Our ability to live safely in this fire environment depends on pre-fire activities. These are actions taken before a wildfire occurs that improve the survivability of people and homes. The National Firewise® Communities/USA program, administered by the State Forester, helps communities to pursue a comprehensive approach to having a Firewise® community.

The look of our Southwestern forests has changed dramatically during the Twentieth Century. In many instances, trees are smaller but are far more numerous. This situation has led to destructive fires in recent years. The build-up of fuel, coupled with recent insect and disease outbreaks, has greatly increased potential for severe wildfires. Climatic factors such as drought and warmer temperatures also play an important role.

This guide provides the homeowner with an effective approach to prevent home ignition in the event of wildfire, built on the Survivable Space concept (see Frequently Asked Questions on pg. 20-21). It features a series of management zones with prescribed treatments, graphic summaries for protecting a home from wildfire, and a checklist of pre-fire activities. The reader will also find the wildfire emergency guidelines useful.



*The pre-fire activities implemented by this homeowner include a maintained landscape, use of Firewise® plant materials, reduced vegetation around the perimeter of the property and fire-resistant roofing material.*

## WILDFIRE CRISIS TRIANGLE



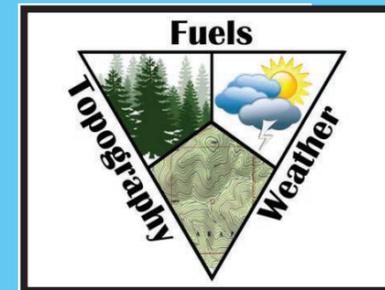
In May 1998, the University of Nevada (Cooperative Extension and Agricultural Experiment Station) and the Sierra Front Wildfire Cooperators initiated a program entitled "Living with Fire." One program product was a publication for homeowners. The Arizona Interagency Coordinating Group (AICG) reviewed and modified, with permission, this publication for use in Arizona. The publication was revised again in 2016, with the addition of the Ready!Set!Go! and Fire Adapted Communities programs.

# Fire Behavior

## THE FIRE ENVIRONMENT

Three factors influence wildland fire behavior: **WEATHER, TOPOGRAPHY, AND FUEL**

These components affect the likelihood of a fire starting, the speed and direction at which a fire will travel, the intensity at which it burns, and the ability to control and extinguish it. We cannot realistically change weather or topography, but fuels (or vegetation) can be modified. Opportunities to reduce wildfire risk lie in proper management of vegetation and use of building materials.



## THE HUMAN ENVIRONMENT



### FUEL

Fuel is required for any fire to burn. In regard to wildland fire, fuels consist of live and dead vegetation, such as trees, shrubs, grasses, and their debris. Structures also become a potential source of fuel when they are in the vicinity of a wildfire. The amount of fuel, its moisture content, arrangement, and other characteristics influence fire behavior.



### WEATHER

Dry, hot, and windy weather increases the likelihood of a major wildfire to occur. These conditions make ignition easier, allow fuels to burn more rapidly, and increase fire intensity. High wind speeds, in particular, can transform a small, easily controllable fire into a catastrophic event in a matter of minutes.



### TOPOGRAPHY

Since heat rises, steepness of slope greatly influences fire behavior and rate of fire spread. Slopes with south and southwest aspects tend to be drier and more prone to ignition. Steep, narrow drainages and canyons act like chimneys when wildfires occur.



### HUMAN

When people choose to build or buy homes in high-hazard fire areas, their homes are potential fuel. Untreated wood shake and shingle roofs, narrow roads, limited access, lack of proper landscaping, inadequate water supplies, and inadequately planned subdivisions increase the risk of wildfire to people and their property.



# EXAMPLES OF SOUTHWEST FIRE BEHAVIOR

Presented below are six types of vegetation common to the Southwest. Computer-generated estimates are shown to demonstrate how vegetation would burn under the following conditions: wind speed of 20 mph, flat terrain, and typical moisture content of living and dead vegetation in the summertime. Fire behavior will vary as wind, slope, and moisture change.



**FLAME LENGTH 8 FEET**  
3,000 ACRES CAN BURN IN ONE HOUR  
TRAVELS AT 4 1/2 MPH

**GRASS & DESERT SCRUB:** Native grasslands occur throughout the Southwest from 70-5,900 feet. Grasses can dry out rapidly and burn quickly, creating fast, low-intensity fires. Invasive grasses and plants (weeds) may act as a carrier of fire. Fire in desert scrub will behave similarly to grasslands when annual and/or invasive plants are contiguous and dry, especially after a wet winter in the desert.



**FLAME LENGTH 10 FEET**  
150 ACRES CAN BURN IN ONE HOUR  
TRAVELS AT 1 1/2 MPH

**PONDEROSA PINE FOREST:** Depending upon the elevation and aspect, Ponderosa pine can transition from pinyon-juniper to mixed-conifer and aspen at higher elevations (6,000-8,000 feet). The ground cover often consists of tightly packed needles, twigs, old logs, and grass.



**FLAME LENGTH 8 FEET**  
10 ACRES CAN BURN IN ONE HOUR  
TRAVELS AT 1/4 MPH

**MIXED CONIFER:** This type consists of white fir, Douglas-fir, and spruce. Found at higher elevations above 7,000 feet, this type usually consists of the densest forest with the heaviest fuel loading.



**FLAME LENGTH 55 FEET**  
1,000 ACRES CAN BURN IN ONE HOUR  
TRAVELS AT 3 MPH

**RIPARIAN AREAS:** Typically a heavy brush type consisting of cottonwood, willow, sycamore, mesquite, ash, alder, exotic saltcedar, and/or other streamside vegetation. It occurs along water edges, floodplains, and adjacent terraces at all elevations. High-intensity fires are very common; however, low intensity fires in this type may also be destructive.



**FLAME LENGTH 16 FEET**  
500 ACRES CAN BURN IN ONE HOUR  
TRAVELS AT 3 MPH

**PINYON-JUNIPER WOODLANDS:** Pinyon pine and juniper characterize this vegetation type, and are usually found on slopes between 4,000-7,000 feet. When fires occur, they are typically moderate to high intensity, and have the potential to kill pinyon pine and juniper trees as well as other woody shrubs.



**FLAME LENGTH 47 FEET**  
3,600 ACRES CAN BURN IN ONE HOUR  
TRAVELS AT 8 1/2 MPH

**TALL CHAPARRAL:** Chaparral vegetation, found from 3,000-5,500 feet, typically consists of a mix of shrub species, such as shrub live oak, mountain mahogany, manzanita, hollyleaf buckthorn, desert ceanothus, and other shrub species. Grasses and half-shrubs may also be present. Dense chaparral is especially dangerous when it is growing down slope from a house.



# FREQUENTLY ASKED QUESTIONS

## WHAT IF MY HOME IGNITION ZONE OVERLAPS WITH MY NEIGHBOR'S?

If your home ignition zone overlaps with that of your neighbor, talk with your neighbor about things you both can do to decrease the chance of our homes igniting either from wildland fire or of one house catching the other on fire. The Firewise® Community program truly is a community effort, and it takes effective communication and agreement amongst affected property owners to create conditions conducive to creating survivable (or defensible space).

## HOW DO I DETERMINE SPACING BETWEEN TREES AND SHRUBS?

Spacing between trees and shrubs can be determined by understanding the fire behavior your property will exhibit. Although there is no hard and fast rule about spacing, the goal is to break up the horizontal and vertical continuity of the trees and shrubs so that fire cannot move along the ground or up into the trees (ladder fuels). Vegetation type, topography, and weather patterns all determine fire behavior. If you are unfamiliar with the fire behavior in your community area, contact your local fire department, Arizona Department of Forestry and Fire Management, or federal land management agency to gain insight on specific conditions affecting fire behavior.

## WHY DOESN'T EVERYONE LIVING IN A HIGH WILDFIRE HAZARD AREA CREATE SURVIVABLE SPACE?

The specific reasons for not creating a survivable



AFTER CREATING SURVIVABLE SPACE

space are varied. Some individuals think "it won't happen to my home." Others do not believe the costs (time and money) would outweigh the benefits. Others have failed to implement survivable space practices because of lack of knowledge or misconceptions. The key is to mitigate the places and materials where embers can ignite the building and reduce fire intensity as wildfire nears the house.

## DOESN'T THE FIRE DEPARTMENT PROTECT MY HOME FROM WILDFIRE?

During a major wildfire, it is unlikely there will be enough firefighting resources available to defend every home. In these instances, firefighters will likely select homes they can safely and effectively protect. Even with adequate resources, some wildfires may be so intense that there may be little that firefighters can do to prevent a house from burning. The key is to reduce places where embers can ignite the structure or adjacent fuels. Consequently, the most important person in protecting a house from wildfire is not a firefighter, but the property owner. And it's the action taken by the owner before the wildfire occurs (such as proper landscaping) that is critical.

## HOW IMPORTANT IS ROOFING MATERIAL?

Very important. The roof is the largest surface area of most structures and the most vulnerable part to wildfire. It can easily catch fire from wind-blown embers of a wildfire. Use Uniform Building Code class A roofing materials, such as fiberglass-reinforced asphalt shingles, slate or clay tile, or metal.

## DO I HAVE TO SCREEN MY VENTS AND DECKS? WILL KEEPING DECKS CLEAN PREVENT A FIRE FROM STARTING UNDER MY DECK?

It is recommended that you screen all vents, as vents allow easy access by embers into both the attic and basement of your house. 1/8" screening material is recommended for all types of vents. Decks should be clean of flammable material, both on deck and below it. If the deck is too low to get underneath and clean, screening is recommended. Decks high enough to walk/crawl under or get a rake/leaf blower under do not need screening, but the homeowner must maintain diligence in keeping it clear of flammable materials. Do not store firewood under a deck.



## FREQUENTLY ASKED QUESTIONS

### WHAT IS DEFENSIBLE SPACE?

Defensible space refers to that 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 structural protection without risking homeowner or firefighter lives. Sometimes, a defensible space is simply a homeowner's properly maintained yard.

### WHAT IS SURVIVABLE SPACE?

In the 1980's the term "defensible space" was coined to describe vegetation management practices aimed at reducing the wildfire threat to homes. The focus of defensible space was to provide greater opportunity for structural protection by firefighters. However, in many cases, firefighting resources are not always available to defend every home. Survivable Space is therefore the modification and maintenance of landscape design, fuels, and building materials that makes a home ignition caused by wildfire unlikely, even without direct firefighter intervention.

### WHAT IS A FIRE ADAPTED COMMUNITY?

As homeowners, we have the most power to modify fuel conditions on our own properties, but it is not enough to only treat personal property. We need to work together to create survivable space for the entire community, including potential greenbelt/fuelbreaks, adequate infrastructure and planning in preparation for wildfire, and other measures. Call your local county Extension office, fire department, or Arizona Department of Forestry and Fire Management to learn how you can help to play a role in making your community better able to survive wildfire.

### DOES HAVING SURVIVABLE SPACE GUARANTEE MY HOUSE WILL SURVIVE WILDFIRE?

No. Under extreme conditions, almost any house can burn. But having survivable space will significantly improve the odds of a home withstanding a wildfire.

### WHAT IS FIREWISE®?

Firewise® is a mind-set and action of overcoming the challenges necessary for communities in fire-prone ecosystems to live with wildfire. Our goals are to create conditions that reduce wildfire intensity in communities and neighborhoods and to prevent home ignitions. It is a multi-agency program that encourages the development of defensible and survivable space and the prevention of disastrous wildfire.

### 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, what is growing adjacent to their homes can have considerable influence upon the survivability of their houses. All vegetation, including naturally occurring native plants and ornamental plants in the residential landscape, is potential wildfire fuel. If vegetation is properly modified and maintained, a wildfire can be slowed, the length of flames shortened, and the amount of heat reduced, all of which assist firefighters in defending the home against an oncoming wildfire.

### WHAT IS HARDSCAPE?

Hardscape is the use of non-organic materials when landscaping. It includes use of boulders, rocks, stones, and gravel in the landscape design to create different aesthetic results. In addition, the use of rock materials can provide a natural looking, low-maintenance, water-wise landscape and buffer zone that are resistant to wildfire.



BEFORE CREATING SURVIVABLE SPACE

## THE LIMITATIONS OF WILDLAND FIREFIGHTING

Many people assume that when a wildfire starts, it will be quickly controlled and extinguished. This is an accurate assumption 97% of the time. For most wildfires, firefighters have the ability, equipment, and technology for effective fire suppression. Three percent of the time, wildfires burn so intensely that there is little firefighters can do. Even airtankers and helicopters cannot be expected to save every home in these cases. Presented below are firefighter tactics as they relate to wildfire flame length. Compare this to the flame lengths shown in "Examples of Southwest Fire Behavior" on the previous page.



FLAME LENGTH	EFFECTIVE FIRE SUPPRESSION TACTICS
Less than 4 feet	Fireline, constructed with hand tools such as shovels and axes, can be effective at the front of the fire.
4 to 8 feet	Bulldozers and other heavy equipment will be needed to construct an effective fireline. Where bulldozers are not available, fire engines with hoses and water will be required to "knock down" the flames before the fire crews with hand tools can be effective. Otherwise, fire crews must construct a fireline at a considerable distance from the fire.
8 to 11 feet	Airtankers with fire suppressing retardant or helicopters with water are required to reduce the fire's rate of spread before fireline construction by crews or bulldozers can be effective.
More than 11 feet	Direct fire suppression efforts will be ineffective. Retreat to existing roads, streams, and other barriers. Burn out fuels between the fireline and the advancing fire front.

## SURVIVABLE SPACE

### WHAT IS SURVIVABLE SPACE?

Survivable Space has evolved from the term Defensible Space (see Frequently Asked Questions on pg. 20-21). It is the modification of landscape design, fuels, building materials, and maintenance that make a home ignition caused by wildfire unlikely, even without direct firefighter intervention. The size of the survivable space area is usually expressed as a distance extending outward from the structure and all attachments such as a deck. This distance varies by the type of wildland vegetation growing near the house and steepness of the terrain.

On the "Vegetation and Slope Influence" chart presented on the next page, find the vegetation type and percent slope that best describes the area where your house is located. Then find the recommended survivable space distance for your situation.

For example, if your property is on flat land surrounded by grassland, your survivable space distance will extend out at least 30 feet from the sides of the house. If your house sits on a 25 percent slope and the adjacent wildland

vegetation is dense or has tall brush, you will need to reduce hazardous fuels out to at least 200 feet from your home.

If the recommended distance goes beyond your property boundaries, contact the adjacent property owner to work cooperatively on creating survivable space for both properties. The effectiveness of survivable space increases when multiple property owners work together. The local assessor's office can provide assistance if the owners of adjacent properties are unknown. Do not work on someone else's property without their permission.

Temporarily mark the recommended distance with flagging tied to shrubs, trees, or stakes around your home. This will be your treatment area for survivable space.

Please note that these are recommendations made by professional fire managers and firefighters experienced in protecting homes from wildfire. They are not requirements nor do they take precedence over local ordinances.

## VEGETATION AND SLOPE INFLUENCE TO DETERMINE DISTANCE FOR SURVIVABLE SPACE

SLOPE		0 TO 20%	21 TO 40%	+ 40%
VEGETATION TYPE	<b>GRASS/DESERT</b> Wildland grasses, weeds, desert scrub, and widely scattered shrubs with grass understory. Typically found between 1,200 and 4,500 feet elevation, but often at higher elevations as well.	<b>30ft.</b>	<b>100ft.</b>	<b>100ft.</b>
	<b>SHRUBS</b> Tall chaparral, riparian areas and pinyon-juniper mixed with chaparral type. Typically found between 3,000 and 5,000 feet elevation.	<b>100ft.</b>	<b>200ft.</b>	<b>200ft.</b>
	<b>TREES</b> Forested areas such as mixed conifer, Ponderosa pine, and pinyon-juniper. Typically found between 5,000 and 8,000 feet elevation. If vegetation type is widely spaced and substantial grass or shrub understory is present, use appropriate vegetation type above.	<b>30ft.</b>	<b>100ft.</b>	<b>200ft.</b>

## READY, SET, GO!

The Ready, Set, Go! Program seeks to share information with residents on what you can do to successfully prepare for a wildland fire. Speak with your local fire department about your area's threat for wildland fire and learn more about the wildland-urban interface (WUI).

### READY - Be ready. Be Firewise®. (reference pages 7-17)

Take personal responsibility and prepare long before the threat of a wildland fire so your home is ready in case of a fire. Create defensible space by clearing brush away from your home. Use fire-resistant landscaping and harden your home with fire-safe construction measures. Assemble emergency supplies and belongings in a safe place. Plan escape routes and make sure all those reading in the home know the plan of action.

### SET - Situational awareness. (reference page 18)

Pack your emergency items. Know how to receive and stay aware of the latest news and information on the fire from the local media, your local fire department and public safety.

### GO - Act early! (reference page 19)

Follow your Personal Wildland Fire Action Plan (see website below). Doing so will not only support your safety, but will allow firefighters to best maneuver resources to combat the fire.



For more information, visit the RSG website at [www.wildlandfirersg.org](http://www.wildlandfirersg.org).

## WILDFIRE EMERGENCY GUIDELINES

### EVACUATION

#### PRE-EVACUATION NOTICE

- Residents will be advised by either law enforcement or firefighters of potential hazards and the possibility of evacuation. Residents should prepare to evacuate, using the checklist on page 18 (When Fire is Nearby) as a guide. Residents may also choose to evacuate at this time, and do not have to wait for the official evacuation order to do so; leave a note on the front door, firmly attached, that states that all residents have evacuated.

#### EVACUATION ORDER

- When the county sheriff or designated official gives the order to evacuate, immediately follow instructions regarding travel routes and safe locations to congregate. Let the official know that you are either evacuating or sheltering-in-place (stay on the property).

#### LIFTING THE EVACUATION NOTICE

- Evacuation notices may stay in effect for several days. They will be rescinded when it is determined that the threat is over.

### IF YOU ARE UNABLE TO EVACUATE WHEN A FIRE APPROACHES:

#### SHELTER IN PLACE

- Stay inside your house away from outside walls.
- Keep all doors closed but leave them unlocked.
- Keep your entire family together and REMAIN CALM. Remember if it gets hot in the house, it is four to five times hotter and more dangerous outside.
- Bring garden hoses inside the house so embers don't destroy them.
- Stay hydrated.
- Ensure you can exit the home if it catches fire.
- Fill sinks and tubs for an emergency water supply.
- Place wet towels under doors to keep smoke and embers out.

#### AFTER THE FIRE PASSES

- Check the exterior, roof, and under deck immediately, and extinguish all sparks and embers. If you must climb on the roof, use caution.
- Check inside the attic and underneath decks for hidden burning embers.
- Check your yard for burning woodpiles, trees, fence posts, or other materials.
- Stay clear of all downed power lines.

#### RETURN TO YOUR HOME

- The county sheriff or local law enforcement will determine when it is safe for residents to move back into their homes.
- Be alert for downed power lines and contact your gas or electric company before turning utilities back on.

### THE SIX "Ps" OF IMMEDIATE EVACUATION:

- People and Pets! → And other livestock too
- Papers → Important documents
- Prescriptions → Pills and eyeglasses
- Pictures → Irreplaceable memories
- Personal Computer → Information on hard drives, tablets, phones, & disks
- Plastic → Credit cards, ATM cards, & cash

# WILDFIRE EMERGENCY GUIDELINES

Should a community be threatened by wildfire, the occupants may be advised to evacuate by law enforcement or fire officials. The purpose of evacuation is to protect people from life-threatening situations. Homeowners have the right to “shelter-in-place”, or stay on the property if they so desire. However, homeowners that shelter-in-place and then change their minds and wish to evacuate later have often hindered firefighting efforts.

## WHEN A WILDFIRE APPROACHES

### BEFORE THE FIRE

- Collect valuables, important documents, medications, and other personal items in one place and be ready to evacuate if necessary.
- What you can fit into your vehicle is what you can take (make priorities by what is replaceable and what is not).
- Maintain a mobile survival kit. This includes first aid kit, emergency tools, battery powered radio and flashlight, extra batteries, car keys, credit cards, water, and non-perishable food. Also consider blankets and sleeping bags.
- Review the Ember Awareness Checklist to ensure you have addressed as many of the recommendations as possible.
- Make sure your children’s and pet’s needs are met.
- Clearly post name/address so it can be seen from the street.
- Establish and practice a family evacuation plan and meeting location. Know who you will notify about the evacuation. Know where you will get fire updates.
- Be prepared to be directed by law enforcement or traffic control personnel; follow their directions.
- Drive travel routes in advance so that you will be prepared.
- Have checklist and map ready.
- Have means of transporting pets and livestock readily available.

### WHEN FIRE IS NEARBY

- Park your vehicle facing out. Put your valuables in the car. Place the car keys where you can find them.
- Dress appropriately. Have sturdy shoes, long pants and shirt, gloves, and handkerchief.
- Confine or secure pets to one room or area. Prepare them to be transported.
- Move all flammable furniture (including outdoor furniture) to the center of the home or storage.
- Leave your electricity on and leave some lights on. Turn on all exterior lights.
- Close shutters, blinds, and heavy drapes. Remove lightweight window dressings.
- Close fireplace dampers and fireplace screens.
- Shut all doors and windows, both exterior and interior. Leave doors unlocked.
- Place a note attached to front door stating names of all evacuees, time and date of evacuation, destination, and contact information.
- Connect garden hose to spigot and leave buckets full of water around the house. Do not turn on water.
- Place a ladder outside for roof access.
- Turn off propane tanks and gas at the meter.
- Bring combustible items from the exterior of the house inside (patio furniture, toys, door mats, etc.).



# THE HOME IGNITION ZONE

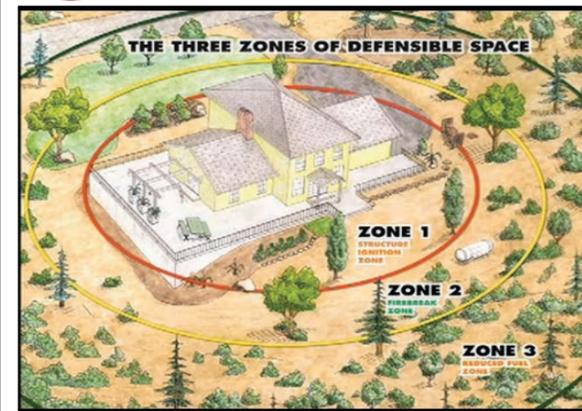


Figure 1: The three survivable-space zones around a home or other structure.

Your house is more likely to withstand a wildfire if grasses, brush, trees, and other common forest fuels are managed to reduce a fire’s intensity. Survivable space is the modification of landscape design, fuels, building materials, and maintenance that would make a home ignition caused by wildfire unlikely, even without direct firefighter intervention. Create a survivable space around your structures by removing, reducing, relocating, and replacing fuels and vegetation to slow the spread of wildfire. Include detached garages, storage buildings, barns and other structures in your plan. Survivable space involves a series of management zones in which different treatments are used. Not all properties extend into each zone. See Figure 1 for a general view of the relationships among these management zones.

## ZONE 1

### INTENSIVE FUEL REDUCTION ZONE

This is the Intensive Fuel Reduction Zone. It is the area of maximum modification and treatment. It consists of an area of at least 30 feet around the structure in which flammable materials and vegetation are removed and replaced with non-flammable decking or decorative stone and well-placed fire-resistant plants and groundcover. This distance is measured from the outside edge of the home’s eaves and any attached structures, such as decks or stairways.

- Trees here are considered part of the structure, (the fewer the better) and are at least 10 feet from the structure. Choose deciduous trees over coniferous or fire-prone ones.
- Remove “ladder fuels” from beneath trees.
- Keep plantings within 3 to 5 feet of the walls to a minimum, especially if structure sides are flammable. Decorative gravel, flagstone, or concrete decking is recommended in this area.
- Dry grass next to flammable structural components can easily ignite and carry fire that may cause a home ignition.
- Succulent plants and other low growing, fire-resistant plants and groundcover are acceptable.
- Do not stack firewood or store other combustibles in this zone.
- Remove branches overhanging or touching the roof to a distance of a least 10 feet. Remove all branches within 15 feet of the chimney.

### ZONE 1 TIPS

- Avoid using high resin, fire-prone plant materials, as burning embers and surface fires can easily ignite them.
- Succulent ground covers are good choices as are flowerbeds and vegetable gardens.
- Broadleaf and/or deciduous trees are also good choices. Try to plant trees so that branches do not reach the structure, or prune branches back at least 10 to 15 feet away, especially near chimneys.
- Keep grasses and lawns mowed short and at least 3 to 5 feet away from structures as they dry out quickly during fires and can be ignited easily by embers.
- Look for fuel ladders of any sort, from plants to building materials, and rearrange or remove plants or other fuels as necessary.
- Using gravel, flagstone, or non-flammable decking adjacent to structures can be an effective strategy to reduce the possibility of home ignition.

Be Ember Aware! In Zone 1, remove the “fuses” next to or near structures that provide opportunity for wildfire and embers to cause home ignition. Common fuses include dry grass, stacked fuelwood, ladder fuels, and fire-prone plants such as juniper. See page 17.

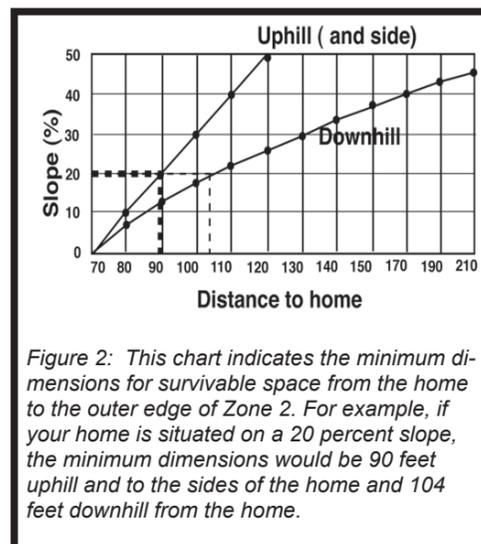


# SURVIVABLE SPACE MANAGEMENT ZONES

## ZONE 2 MODERATE FUEL REDUCTION ZONE

The size of Zone 2 depends on the slope of the ground where the structure is built. Typically, survivable space should extend at least 100 feet from the structure. See Figure 2 for the appropriate distance for your home's survivable space. Within this zone, the continuity and arrangement of vegetation is modified. Remove stressed, diseased, dead, or dying trees and shrubs. Thin and prune the remaining larger trees and shrubs. Be sure to extend thinning along either side of the driveway all the way to the main access road. These actions help eliminate continuous fuel surrounding a structure while enhancing fire safety and the aesthetics of the property.

- Thin trees and shrubs at least 10 feet between crowns, and more if on a steep slope. Crown separation is measured between canopies (outermost branches of a plant), not between stems.
- Prune under large trees to a height of 10 feet. Remove ladder fuels from under trees.
- Propane tanks should be at least 30 feet from any structures, preferably on the same elevation as the house. Keep flammable vegetation at least 10 feet away from these tanks. Use non-flammable fencing for screening if desired.
- Stack firewood and woodpiles at least 30 feet away and uphill from structure. Keep flammable vegetation at least 10 feet from woodpiles.
- Dispose of slash (limbs, branches, and other woody debris) removed from your trees and shrubs by chipping or by piling and burning as permitted. If desired, no more than two or three small, widely spaced brush piles may be left for wildlife purposes. Locate these toward the outer portions of your survivable space.



### ZONE 2 TIPS

- Use broadleaf trees to replace or buffer native pines and junipers in this area. Having more deciduous trees than evergreens in this area is a good strategy to keep flames on the ground and out of the trees.
- Isolated or small groupings of trees or shrubs are best to create screening and privacy.
- Many species of cacti and succulents such as prickly pear or agave can thrive in mountain climates and should be considered for this area.
- Native grass lawns and recreated meadows are also possibilities for this zone. Use drought resistant and low water use species. Seed a cleared area with native species, combinations of warm and cool season perennial grasses, and annual and perennial wildflowers.
- Keep grasses and wildflowers under eight inches high, especially when dry or dormant.
- Walkways and paths can be effective for breaking up fuel continuity so that it is difficult for a fire to carry.

## EMBER AWARENESS



# Ember Awareness Checklist

- Wood Roof**  
Replace wood shake and shingle roofs with fire-resistant types such as composition, metal and tile.
- Roof Openings**  
Plug openings in roof coverings, such as the open ends of barrel tiles, with non-combustible materials.
- Roof Debris**  
Routinely remove plant debris, such as pine needles, leaves, branches and bark, from the roof.
- Skylights**  
Replace plastic skylights with types constructed of double-pane glass. One of the panes should be tempered glass. Close skylights if wildfire is threatening.
- Spark Arrester**  
Install an approved spark arrester on chimneys.
- Windows**  
Replace single-pane, non-tempered glass windows with multiple-pane, tempered-glass types. Close all windows if wildfire is threatening.
- Vents**  
Cover attic, eave and foundation vents with 1/8-inch wire mesh or install new vent types designed to prevent ember entry. If wildfire is threatening, consider covering vent openings with pre-cut plywood or aluminum foil folded several layers thick and stapled.
- Rain Gutters**  
Keep rain gutters free of plant debris during fire season. Consider using rain gutter covers to reduce maintenance.
- Siding**  
Fill gaps in siding and trim materials with a good quality caulk and replace poor condition building materials.
- Woodpiles**  
Move firewood stacks and scrap lumber piles at least 30 feet from the house or other buildings.
- Patio Furniture**  
Place combustible patio furniture, such as lounges, tables and hammocks, inside the house or garage if wildfire is threatening.
- Deck Boards**  
Replace deck boards that are less than one inch thick or that are in poor condition with thicker, good condition boards. Use metal flashing between the deck and the house.
- Deck Debris**  
Remove plant debris from the gaps between deck boards, the gap between the deck and house, and lying on top of the deck.
- Porch and Deck Accessories**  
If wildfire is threatening, remove combustible materials from the porch and deck including newspapers, wicker baskets, door mats, pine cones and dried flower arrangements, and place BBQ propane tanks indoors.
- Under the Deck**  
Remove plant debris, wood piles and other easily ignited materials from under decks. Consider enclosing the open sides of the deck with siding materials that are properly vented or 1/8-inch wire mesh to reduce maintenance and deter ember entry. Do not use wooden lattice to enclose decks.
- Flowerboxes**  
Remove wooden flowerboxes from beneath windows if wildfire is threatening.
- Eaves**  
Cover open eaves with sheathing, such as plywood or fiber-cement board. Use tongue and groove joints or other intricate joint types and don't use butt joints.
- Flowerbeds**  
Replace wood mulches with noncombustible types and remove plant debris, including dried grass and flowers, dead leaves and dead branches from flowerbeds next to the house, other buildings and next to wooden fences. Replace ornamental junipers with low-growing deciduous shrubs or flowers under irrigation.
- Vehicles**  
Close vehicle windows. Back into the garage and close the garage door or park away from the house.
- Garage Door**  
Adjust garage doors to achieve as tight a fit as possible with the door frame. Consider using trim around the garage door opening to reduce the size of gap openings. Close the garage door if wildfire is threatening.
- Garbage Cans and Recycling Bins**  
Use garbage cans covered with tight fitting lids near the house or other buildings. Move newspaper recycling bins indoors.
- Wooden Fences**  
Maintain wooden fences in good condition and create a noncombustible fence section or gate next to the house for at least five feet.

# SURVIVABLE SPACE CHECKLIST

## 5. VEGETATION MAINTENANCE

Keeping your survivable space effective is a continual progress. Before fire season, review the survivable space checklist and take action accordingly. Follow the “Four Rs of Survivable Space” to maintain your property.

<b>REMOVE</b>	<ul style="list-style-type: none"> <li>Rake up leaves and litter before and during fire season, but leave layer of decomposing plant matter (duff) if present.</li> </ul>
<b>REDUCE</b>	<ul style="list-style-type: none"> <li>Prune or trim trees and shrubs annually as needed.</li> </ul>
<b>REPLACE</b>	<ul style="list-style-type: none"> <li>Add non-flammable hardscape elements such as boulders, pathways, and other features.</li> <li>Replace fire-prone plants with fire-resistant plants.</li> </ul>
<b>RELOCATE</b>	<ul style="list-style-type: none"> <li>Keep firewood, fuel tanks, and other combustible debris (wood scraps, grass clippings, leaf and compost piles, etc.) to at least 30 feet from structures.</li> </ul>

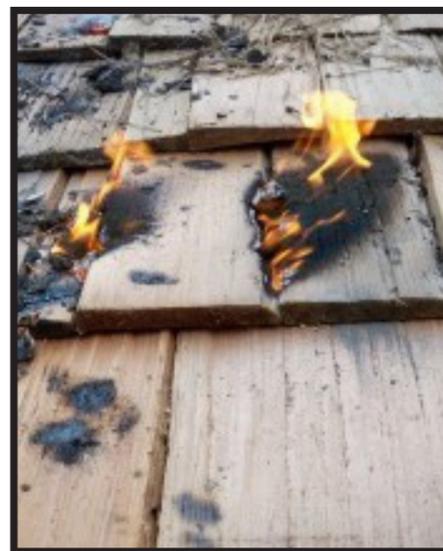
## 6. EMBER AWARENESS

During a wildfire, thousands of embers can rain down on your roof and pelt the side of your home like hail during a storm. If these embers become lodged in something easily ignited on or near your home, the home will be in jeopardy of burning. Embers coming into contact with flammable material is the major reason why homes are destroyed during wildfire.

Common materials that become embers during wildfire include pine cones, branches, tree bark, and wooden shingles. Depending on fire intensity, wind speed, and the size of materials that are burning, embers can be carried more than a mile ahead of fire. Consequently, even homes located blocks away from the actual flame front are vulnerable to ignition and complete destruction.

By being Ember Aware and taking action ahead of time, a homeowner can substantially reduce the risk of home ignitions. Your home can survive when the embers arrive.

For more information, go to <http://www.livingwithfire.info/be-ember-aware>.



# SURVIVABLE SPACE MANAGEMENT ZONES

## ZONE 3 MANAGED WILDLAND ZONE

This is the Managed Wildland Zone. This is an area of native vegetation. This zone may extend at least 200 feet from the structure.

- Typical management objectives for areas surrounding home sites or subdivisions are: recreational use; aesthetics; ecological health and vigor; barriers for wind, noise, dust, and visual intrusions; and possibly limited production of firewood, fence posts, and other natural resource commodities.
- Specific thinning requirements depend on species and land objectives. Thinning improves the forest stand by removing trees that are damaged, attacked by insects, infected by disease, or are of poor form or low vigor. The remaining trees should be the larger and healthier trees in the stand.
- A limited number of wildlife trees are appropriate in Zone 3. Make sure dead trees pose no threat to power lines or fire access roads.
- It is a good idea from the standpoint of personal access and safety to prune trees along trails and fire access roads. Pruning helps reduce ladder fuels within the tree stand, thus keeping a fire on the ground, instead of in the crowns.
- Any approved method of slash treatment may be acceptable for this zone, including piling and burning, chipping, or lop-and-scatter. Check local ordinances and your local fire department for guidance.
- The effectiveness of survivable space increases when multiple property owners work together.



**BEFORE**



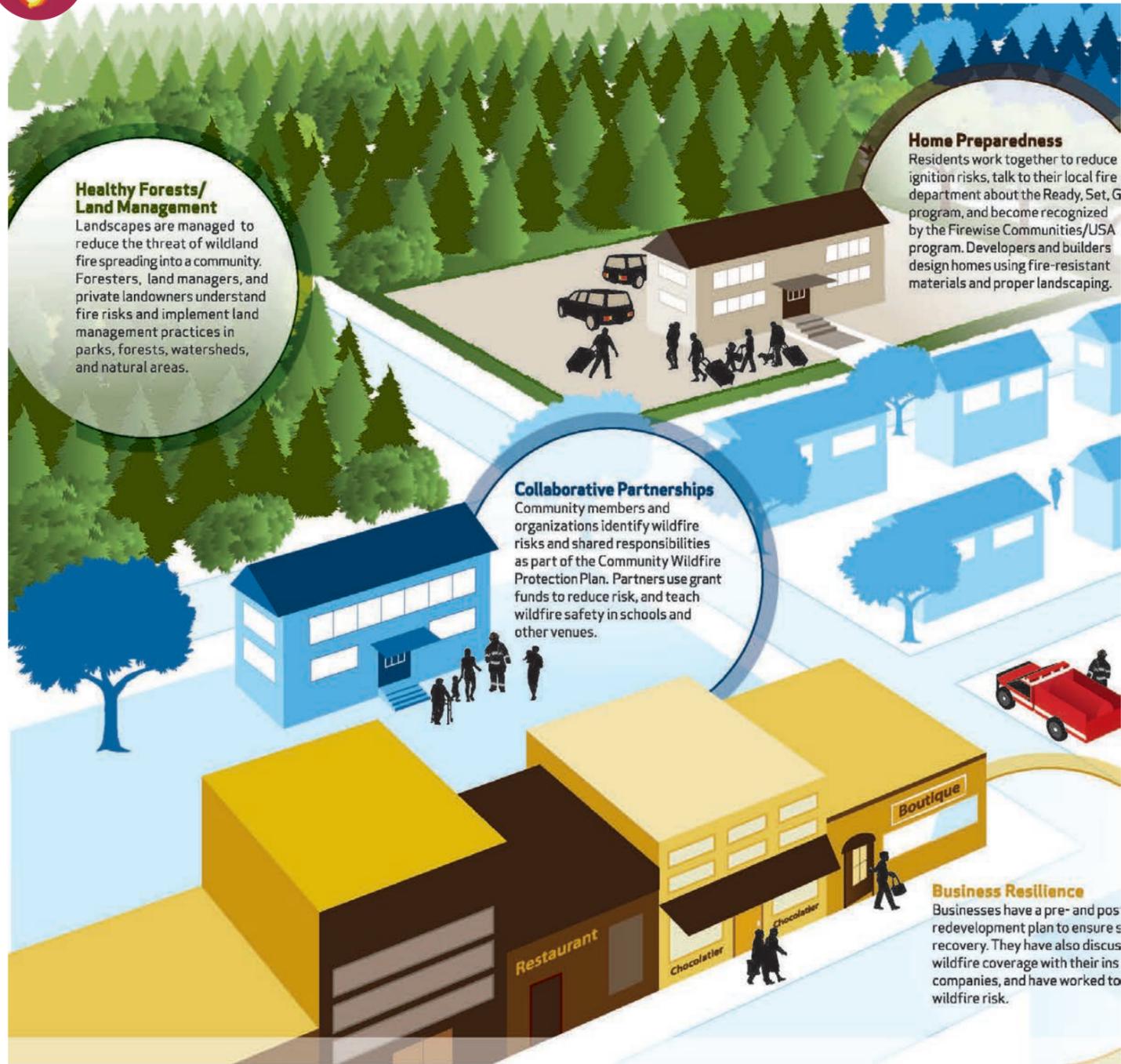
**AFTER**

### ZONE 3 TIPS

- Proper thinning and pruning in this zone will make a significant difference protecting your home structures.
- Re-sprouting of shrubs will happen and is acceptable. Monitor re-sprouting regularly to guard against the creation of ladder fuels, and thin and grub again when necessary.



# THE FIRE-ADAPTED COMMUNITY



## What does a fire adapted community look like?

Fire is a natural part of our environment. As we choose to live in areas where wildfires occur, we must adapt the way we design, build and live within these areas to prepare our communities for wildfire. A fire adapted community understands its risks and takes actions

that minimize harm to residents, parks, and other community assets. Actions empower all community members in their environment. To learn more about a fire adapted community, visit [www.fireadapted.com](http://www.fireadapted.com)

# SURVIVABLE SPACE CHECKLIST

## 4. "LEAN AND CLEAN"

The area adjacent to your house is particularly important in terms of an effective survivable space. It is also the area that is usually landscaped. Within an area extending at least 30 feet from the house, the vegetation should be kept:

- Lean – small amounts of flammable vegetation and plants are kept healthy.
- Clean – no accumulation of dead vegetation or other flammable debris.

The "Lean and Clean" checklist provides actions necessary for the areas adjacent to your structures:

### THE "LEAN AND CLEAN" CHECKLIST

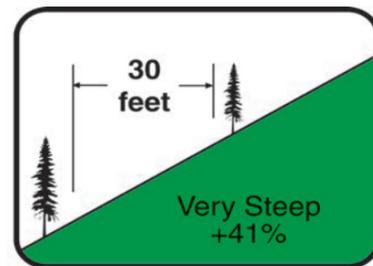
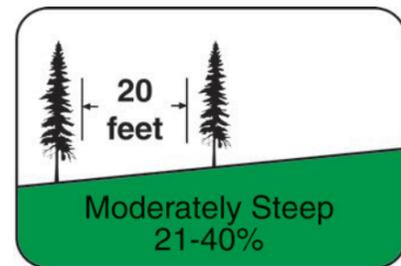
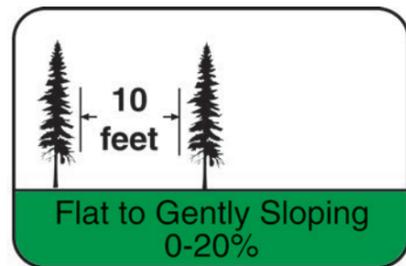
- Use low growing herbaceous (non-woody) or succulent plants near structures. Herbaceous plants include succulent ground covers such as bedding plants, bulbs, and perennial flowers.
- Use mulches, rock, and non-combustible hard surfaces (concrete sidewalks, brick patios, pavers, and asphalt driveways). Break up continuity of vegetation with hardscape features such as decorative rock, gravel, and stepping-stones to slow the spread of fire.
- Space deciduous ornamental trees and shrubs as individual plantings or as groups of plants. The plants nearest to structures should be more widely spaced and smaller than those farther away. Use small, irregular clusters and islands, not large masses.
- Most wildland shrubs and trees should be removed from this zone and replaced with the above practices.
- Minimize the use of fire-prone and resinous shrubs and trees (such as juniper, manzanita, pine, and most species of arborvitae) and tall exotic grasses.
- Tree limbs within 15 feet of a chimney, encroaching on power lines, or touching the house should be removed.
- Keep area free of dry leaves, branches, grass, debris, and other fine fuels.
- Check with your homeowner's association or community to see if permits are required. If codes interfere with fire protection, they should be updated.

# SURVIVABLE SPACE CHECKLIST

## 2. BREAK UP CONTINUOUS VEGETATION

Sometimes vegetation occurs in a continuous layer of fuel. The possibility of wildfire increases as the vegetation becomes more continuous and dense. In desert areas, this especially includes annual grasses and weeds. To reduce fire intensity, adequate spacing needs to be created in the vegetation. The recommended practice is to remove and "break-up" vegetation to provide separation between plants. Whether you have grass, shrubs, or trees around your home, you need to consider the influence of slope. Regardless of vegetation type (grass, shrubs, or trees), slope is an important influence.

For example, in a forested area, consider the following examples as a reference:



**NOTE:** Spacing distances are measured between canopies (outermost branches of a plant), not between trunks or stems.

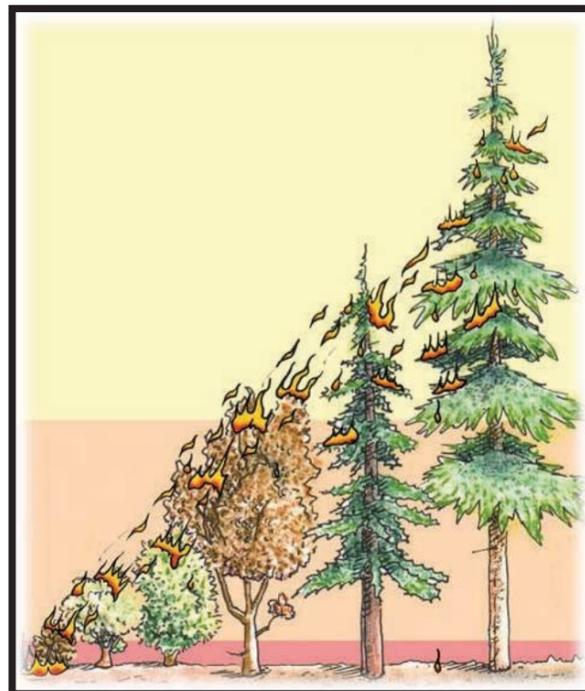
Not only do steep slopes affect fire behavior, they are more vulnerable to erosion. When removing shrubs and trees from steep slopes, try to keep soil disturbance to a minimum. To reduce soil erosion, it may also be necessary to replace the vegetation you remove with fire-resistant plants.

## 3. LADDER FUELS

Vegetation is often present at varying heights, similar to the rungs of a ladder. Under these conditions, flames from fuels burning at the ground level, such as a thick layer of pine needles, can be carried to shrubs that can ignite branches and trees above. Vegetation that allows a fire to move from lower plants to taller ones is referred to as "ladder fuels." The ladder fuel problem can be corrected by creating a separation between the vegetation layers.

This may be accomplished by removing lower tree branches, reducing shrub height, or both. Shrubs may also be removed. A common rule of thumb is a vertical separation of three times the height of the lower fuels.

Photo Credit: Butte County Fire Safe Council and FireSafeHelp.com



**Government Participation and Planning**  
Local government officials are engaged in wildfire issues, provide leadership, participate in the Community Wildfire Protection Plan, adopt and enforce fire-resistant building codes or ordinances, support community preparedness efforts, and provide resources.

**Fire Department Planning**  
Fire departments and other first responders are well prepared for wildland fire scenarios through training, community risk assessments, and participation in the Ready, Set, Go! program and local Community Wildfire Protection Plan.

homes, businesses, schools, and churches. These collective members to be safer and more resilient by working together about making your community wildfire resilient.

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**FIRE ADAPTED COMMUNITIES®**

As homeowners, we have the most power to modify fuel conditions on our own properties, but it is not enough to only treat personal property. We need to work together to create survivable space for the entire community, including potential greenbelt/ fuel breaks, adequate infrastructure and planning in preparation for wildfire, and other measures. Call your local county Extension office, fire department, or Arizona Department of Forestry and Fire Management to learn how you can help to play a role in making your community better able to survive wildfire.

# ZONE LANDSCAPING – FIREWISE® PLANT MATERIALS

Creating survivable space around your home is one of the most important and effective steps you can take to protect you, your family, and your home from wildfire. All vegetation, naturally occurring and otherwise, is potential fuel for fire. Plant choice, spacing, and maintenance are critical; where and how you plant can be more important than which species you use. Some important things to remember about plants are:

- No plant species is totally “fireproof”.
- Moisture content is the most important factor influencing flammability.
- Plants with high resin content tend to be most readily flammable. Many native plants in arid environments, such as manzanita, juniper, and pine, are resinous.
- Deciduous plants tend to be most fire resistant because leaves have high moisture content.
- Isolated or small groupings of trees or shrubs are best. Treat groups as individual vegetation units.
- Use boulders, flagstone, rock walls, and other non-organic hardscape materials to separate planting areas.

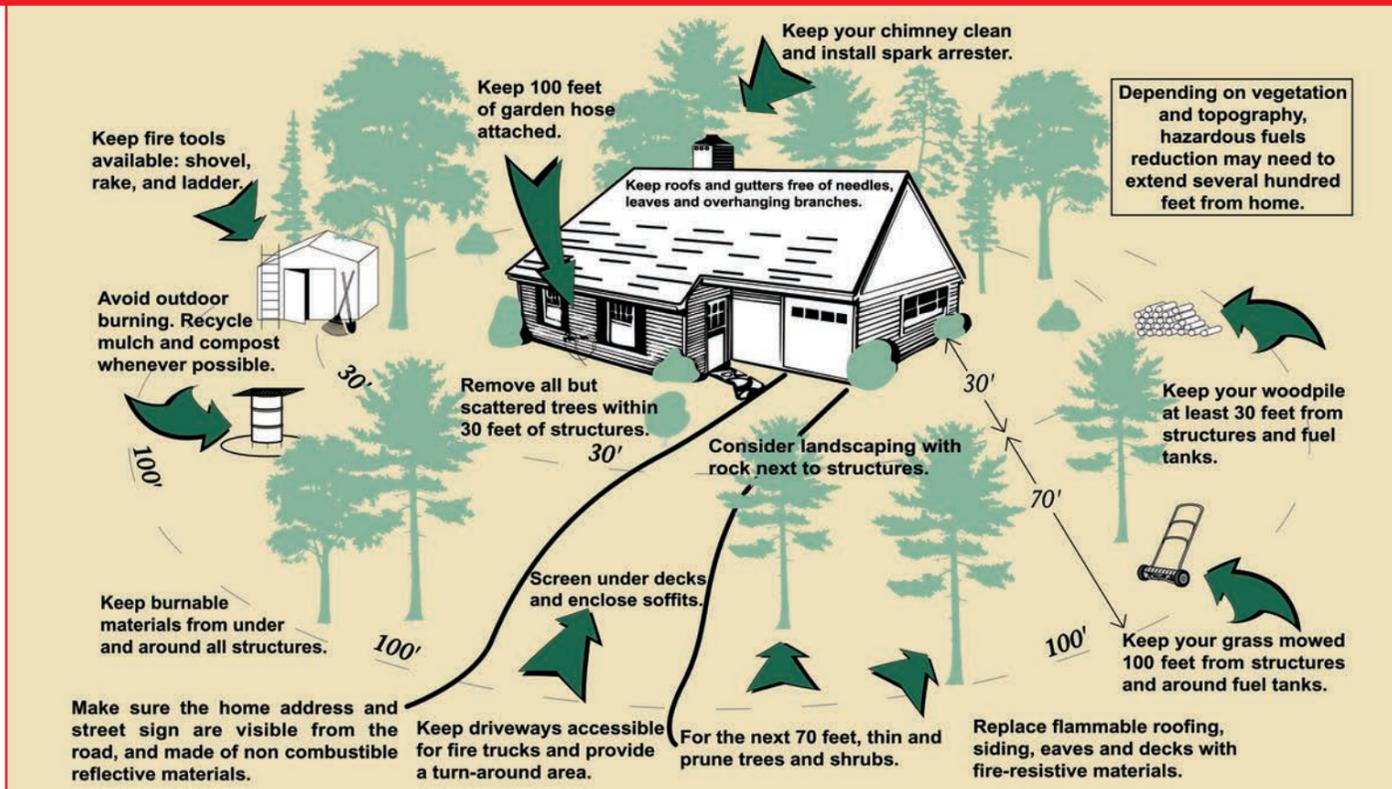


Contact your local county Extension agent, fire department, or Arizona Department of Forestry and Fire Management to get more information on Firewise® plant species appropriate for your area.

# SURVIVABLE SPACE CHECKLIST

SURVIVABLE SPACE CHECKLIST	
THIS CHECKLIST IS A GUIDE, NOT AN EXHAUSTIVE LIST. ANY "NO" ANSWERS SHOULD REQUIRE TREATMENT.	
	<b>YES</b> <b>NO</b>
1. HAS DEAD VEGETATION WITHIN THE RECOMMENDED SPACE BEEN REMOVED?	<input type="checkbox"/> <input type="checkbox"/>
2. HAS CONTINUOUS DENSE COVER OF SHRUBS AND/OR TREES BEEN BROKEN UP?	<input type="checkbox"/> <input type="checkbox"/>
3. HAVE LADDER FUELS BEEN REMOVED?	<input type="checkbox"/> <input type="checkbox"/>
4. IS THE AREA SURROUNDING STRUCTURES "LEAN AND CLEAN" TO A DISTANCE OF AT LEAST 30 FEET?	<input type="checkbox"/> <input type="checkbox"/>
5. ARE VEGETATION AND OTHER FUELS SURROUNDING STRUCTURES REGULARLY MAINTAINED?	<input type="checkbox"/> <input type="checkbox"/>
6. IS YOUR HOME EMBER AWARE?	<input type="checkbox"/> <input type="checkbox"/>

## SUMMARY: PROTECT YOUR HOME FROM WILDFIRE



## 1. RECOMMENDATIONS FOR DEAD VEGETATION

Dead vegetation includes dead trees and shrubs, dead branches lying on the ground or still attached to living plants, dried grass, flowers and weeds, dropped leaves and needles and stacks of firewood. Most dead vegetation should be removed from the recommended survivable space area. However, a thin layer of pine needles, leaves, and twigs may be desirable to allow for soil mulch and erosion control. The actions below are recommended:

<b>REMOVE</b>	<ul style="list-style-type: none"> <li>• Standing dead and downed trees and shrubs.</li> <li>• Dead leaves, branches, twigs, and needles on mature trees to a height of 15 feet.</li> <li>• Debris from roof and rain gutters.</li> <li>• Dried out grasses, weeds, and wildflowers, especially next to and near structure.</li> </ul>
<b>REDUCE</b>	<ul style="list-style-type: none"> <li>• Layers of pine needles, leaves, twigs and cones to a depth of three inches or less.</li> </ul>
<b>REPLACE</b>	<ul style="list-style-type: none"> <li>• Replace dead vegetation with fire-resistant plants that lower fire intensity and reduce soil erosion as appropriate.</li> </ul>
<b>RELOCATE</b>	<ul style="list-style-type: none"> <li>• Firewood and other combustible debris (wood scraps, grass clippings, leaf and compost piles, etc.) to at least 30 feet uphill from structures.</li> </ul>