

Firewise Landscaping Your Home in the Wildland Urban Interface



By *Gerald Steeley*, Wildland Urban Interface Specialist, Alabama Forestry Commission

Almost every wildfire in the southern United States today threatens individual homes or communities. The reason for this is twofold. One, there are more wildfires in the South than in any other region of the country, and two, there continues to be a steady rise of new homes being built in undeveloped areas. In an average wildfire year, Alabama will experience 4,000 wildland fires that will burn about 40,000 acres. (These numbers are probably low, because not all wildfires get reported.) Furthermore, the South is experiencing unprecedented population growth, resulting in rapid land-use change and profound effects on forest ecosystems. With this increase of human presence and activity, we can only expect that the risk for wildfires (whether arson or accidental) will continue to increase as a result of the influx of new residents in the wildland urban interface.

When people move from the cities to live in the wildland urban interface (where the forest and suburbs blend), they often are unaware of the hazards that wildfires can pose in fire-prone areas to homes and other structures. But, by being informed of these hazards and by developing a basic understanding of the factors that determine fire behavior, interface residents can take action to reduce their homes' vulnerability to wildfire. These homeowners, who take personal responsibility in making their homes "Firewise" will then become partners with the fire service in order to better protect their homes.

On 97% of wildfires, firefighters are able to effectively suppress the fire. But, for the other 3% of the time, wildfires burn so intensely that there is little firefighters can do. Ultimately, the most important person in protecting a house from wildfire is the homeowner who takes steps to **mitigate** or lessen the wildfire hazard or risk before the wildfire occurs.

In its simplest terms, a wildland urban fire is where the fuel feeding a wildfire changes from wildland fuel to urban fuel (homes and other structures). For this to happen, the wildland fire must be close enough for its flying embers and/or

Wildland fires are a natural process. They are nature's way of clearing dead materials from the forest, enriching the soil, and preparing the earth for new growth. Making your home compatible with nature can help save your home and, ultimately, your entire community during a wildfire.

flames to contact the flammable parts of the structure. To determine your home's wildfire risk, see the articles in the Summer 2005 and Fall 2005/Winter 2006 issues of *Alabama's TREASURED Forests* magazine, or go to www.interfacesouth.org/fire/WildfireRAGH.pdf.

Fire Season in Alabama

In a typical year, fire season in Alabama begins in the fall and goes through the following spring. Dry weather and frost in the fall cause grasses and

trees to become combustible. The annual fire season finally ends with summer green-up around the first of May. However, under drought-like weather conditions, the fire season can extend into the summer months, making our fire season virtually year round. This makes the problem difficult to deal with in terms of public and political awareness.

Wildfire Behavior

The landscape surrounding a home or other structure can become **fuel** for a wildfire. This fuel can be in the form of woods, fields, or overgrown vacant lots. Vegetation that is overgrown, continuous, and in close proximity to a home increases the home's vulnerability to wildfire. However, if managed effectively, landscaping can serve as a fuel break, protecting a home in the event of a wildfire.

Topography (terrain) is another factor that influences fire behavior. Fire behavior refers to the intensity at which a fire burns and how it moves. A home located on a steep slope is endangered by a wildfire climbing the slope, because the vegetation ahead of the fire is pre-heated by the fire, causing the fuel to be more flammable, to spread faster uphill, and to produce longer flames. This situation can be mitigated by extending the defensible space from 30 feet to 100 feet on the downhill side (*Figure 1*). When possible, select a home site on level terrain or back at least 30 feet from the edge of a hillside. Forests on southern or southwestern slopes generally have lower humidity and higher temperatures because of the path of the sun.

Consequently, the fire hazard is often higher on these hill sides.

Weather is the third factor that influences fire behavior. Several links to Alabama's fire weather forecast and fire danger rating can be found by clicking on "Fire Weather" on the Alabama Forestry Commission's website at www.forestry.state.us. Dry conditions, low relative humidity, and high winds

increase the risk of wildfires.

Knowing the current weather conditions before burning leaves or other debris, and avoiding burning on high fire danger days will

reduce the number of debris fires that escape and become wildfires. The Alabama Forestry Commission, volunteer fire departments, and city fire departments frequently respond to fires caused by homeowners who were burning small trash fires that escaped and ended up threatening entire subdivisions.

Consider composting or mulching as an alternative to debris burning. Leaves can be composted to produce organically rich soil amendments for gardens and flower beds. Branches and larger brush can be chipped and used as mulch in flower beds to help hold moisture in the soil.

Burning permits can be obtained from the Alabama Forestry Commission by calling the number for your area that is listed on the first page of your local phone book or on the Commission's web site. Before burning trash or other debris, be sure that you are knowledgeable of proper burning techniques and local burning laws.

Firewise Landscaping

To be "Firewise" is to be adequately prepared for the possibility of wildfire. Firewise landscaping, while just one component of Firewise, is an effective tool that homeowners can use to reduce the risk of the wildfire threat by creating a defensible space around their homes.

Firewise planning is a valuable service that landscape architects and designers can offer to homeowners living in fire prone areas. First, a schematic design of the property (Figure 1) is developed that

provides the starting point for which more detailed plans evolve. Information on soil conditions, property contours, property boundaries, irrigation plans, plant descriptions, and plant placement contribute to the final plan. However, there are some simple steps that homeowners can do on their own to make their property Firewise.

A key principle when landscaping to reduce the wildfire risk is to create an area of **defensible space** that extends at least 30 feet outward from the house in all directions. Within this

defensible space, vegetation should be modified to break up the continuity of the plants. The extent to which vegetation is modified is generally determined by the distance from the house, with the areas closest to the house being the most critical.

The practices listed below will help to disrupt the spread of fire through the landscape, and will provide firefighters with sufficient room to operate:

- Highly flammable plants should be removed or isolated.
- Vertical and horizontal separation between plants or plant groups should be created.
- Dead plants and plant materials (e.g. fallen leaves, dead branches) should be removed.

The goal then of Firewise landscaping is to develop a landscape with the design and choice of plants that offer the best fire protection. The selection of plants and mulches, the placement and construction of patios and decks, and areas such as driveways and walks, all provide opportunities both to enhance the property and to provide an added degree of fire protection.

Contrary to what some people might think, Firewise landscaping doesn't mean barren. But on the other hand, we should not "over" plant. A Firewise landscape lets plants and garden elements reveal their innate beauty by leaving space between plants and groups of plants. If we can modify the fuel (vegetation) to produce smaller flames, we don't have to cut everything down within the defensible space around our homes.

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Fire Behavior refers to the intensity at which a fire burns and how it moves. Three factors interact to determine fire behavior in wildland fires: fuels, topography, and weather.

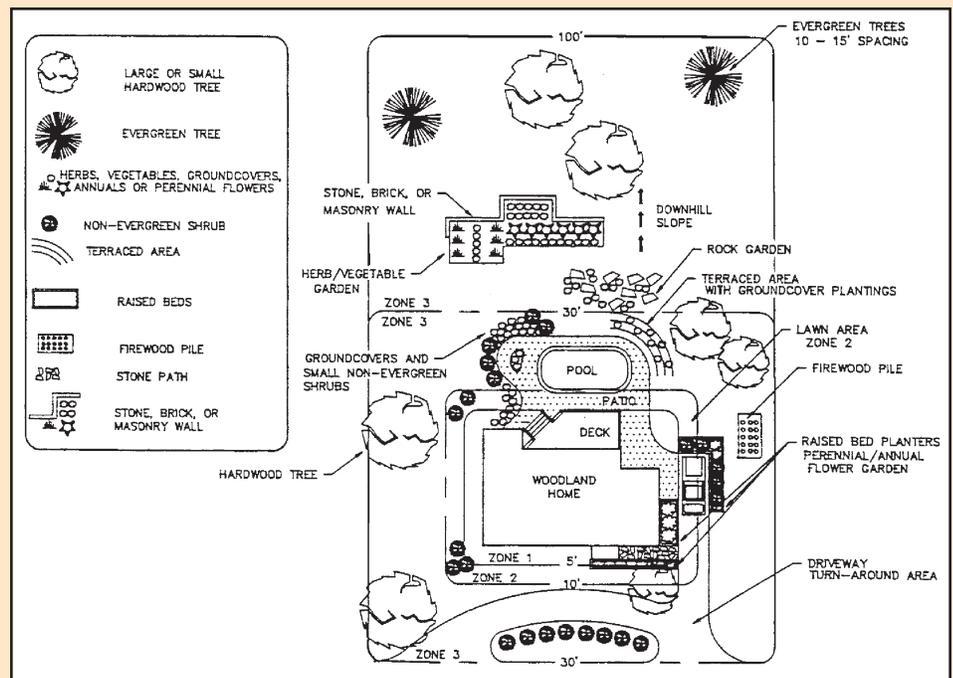


Figure 1. An example of a Firewise landscape site plan depicting zones and plant arrangements. Note that Zone 3 extends out to 100 feet on the downhill slope. The pool can be used as an emergency water supply for fire fighting. (Firewise Landscaping for Woodland Homes, Virginia Cooperative Extension, Publication 430-300)

Firewise Landscaping

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By keeping larger flames (crown fires) further away, we reduce the amount of heat reaching the structure. Most wildfires will burn “fine fuels” in less than one minute and move on. The idea that their forest can burn and their house will survive is foreign to most homeowners. If there isn’t any fuel close to the house, the fire won’t stay long enough to get the house hot enough to burn. This

Three things can set a house on fire: (1) sparks that land on pine needles in the gutter or other nearby flammable material, (2) direct flames from shrubs or bushes close to the house, or (3) intense heat from burning vegetation that causes the house to burst into flames.

allows firefighters the ability to protect the home, or if they have to disengage from fighting the fire for safety reasons, they can return to the scene and follow up after the initial flame front goes through. The flame front of a raging forest fire outclasses any equipment available to firefighters today. Consequently, the firefighters may actually be working a half mile from the fire front. But, in the absence of firefighters, Firewise landscaping allows the home to better survive on its own. After the fire passes your home, you should maintain a fire watch for several hours, rechecking for smoke and fire throughout the house.

Zone Concept

The design objective of the zone concept is to progressively reduce vegetation flammability and fuel volume as we near the structure. Not all publications classify zones the same, but fire officials consistently recommend a defensible space of at least 30 feet of vegetation clearance around the structure on gently sloping ground, and 100 feet or more on slope grades 30% or greater downhill from any structure (Figure 2).

To meet vegetation clearing recommendations, consider designing zones surrounding the structure and extending outward. The zone concept can be applied to a single structure or to a group of structures in a developed community. If the recommended distance goes beyond your property boundaries, contact

the adjacent property owner and work cooperatively on creating a defensible space. Remember, fire burns where the conditions are right (fuel, heat, and oxygen) and does not acknowledge property boundaries or jurisdictional lines of government agencies.

For some areas or subdivisions, substantial removal of wildland vegetation may not be allowed. Please become familiar with local requirements and restrictions before removal of wildland vegetation.

Zones can effectively slow a wildfire’s approach, while reducing its intensity. The basic idea is to break up the continuity of the fuel in order to create a defensible space. These protection zones offer a flexible design technique that may vary for each property, depending on several factors, such as the slope of the terrain, the type of vegetation involved, property boundaries, and many others.

Zone 1: Represents an area 2 to 5 feet from the house cleared of all vegetation. This is the protective area immediately surrounding the house that is maintained as bare ground or covered by rock/gravel. It is the most critical area for fire protection. Have nothing flammable next to the house, including trees, tall grass, leaves, firewood piles, and mulch. The build-up of leaf litter and other debris can give fire a chance to start under porches, decks, and on roofs. Carefully examine decks, overhanging dense vegetation, and trees overhanging the house for possible fire transfer. Regularly clean all pine needles and leaves from the

roof, eaves, and rain gutters. Remove tree limbs within 15 feet of your chimney.

Zone 2: Extends at least 30 feet out from the house as the primary zone of defensible space. Zone 2 consists of plants that are fire resistant and low growing. Maintain a well kept lawn, remove yard debris, and avoid evergreens that catch fire easily and burn quickly, such as red cedar. Use raised beds, rock gardens, herb or vegetable gardens, stone walkways, walls, and patios to create visual interest while maintaining a fuel break. Pine bark mulch in large chunks can be used in this zone. Any trees used in this zone should be kept small and should be at least 10 feet from the house. Allow 10 to 15 foot spaces between tree crowns, and prune trees to a height of 10 to 15 feet up from the ground. An irrigation system will help keep this protection zone green and healthy.

Zone 3: Represents the area between 30 feet to 100 feet away from the house where the reduction in shrub and tree density is less severe. Depending on the slope, leave from 10 to 30 feet separation distance between tree canopies. Clear and thin up to 100 feet on the downhill side from the structure, using a rake or a leaf blower to remove leaves and twigs. On steep slopes, keep soil disturbance to a minimum when removing shrubs and fallen trees to prevent erosion. Although dead leaves can allow fire to spread, removing all leaf litter depletes the soil of nutrients. Shrubs and groundcovers should be well maintained, kept free of dead material, and kept small. Control

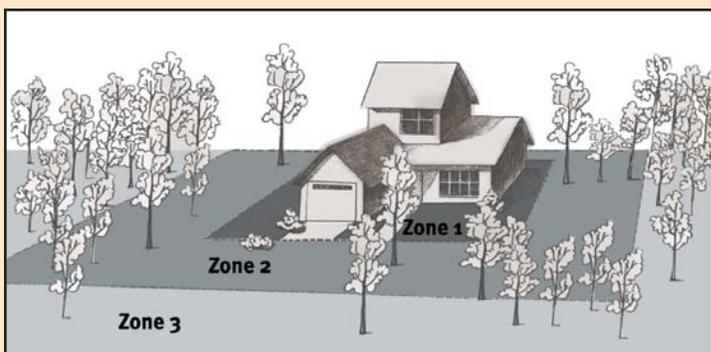


Figure 2. Diagram of defensible space utilizing the zone concept. The area closest to the home needs the most attention. As we extend to the outer zones, there is less danger of a fire igniting a home.

(Wildfire Risk Assessment Guide for Homeowners in the Southern United States, University of Florida)

brush and weeds annually. Steep slopes can be terraced to slow wildfires down. Keep firewood stacks and propane tanks at least 30 feet from the home. If you live in a pine forest, maintain a defensible zone of at least 75 feet on all sides of the house. Give yourself added protection with fuel breaks such as driveways, gravel walkways, and lawns.

Defensible space surrounding a home allows for easy access by firefighting equipment and personnel, and increases the chances of a home surviving even if firefighters are unable to reach the home. This distance varies by the type of wildland vegetation (grasses, shrubs, and trees) growing near the house and steepness of the terrain. Recommendations for defensible space suggest maintaining an area extending at least 30 feet outward from a house with plants that are low in flammability (referred to as Firewise plants).

Land Managers

Individuals who manage larger tracts of woodlands surrounding developed areas can reduce the risk of high intensity fires. Fuel reduction on these lands should focus, but not be restricted to, creating 30-foot wide buffers (fire breaks) at the edges of the property next to residen-

Horizontal Separation Distance Between Tree Canopies

Slope	Gently Sloping	Moderately Steep	Very Steep
	0-20%	21-40%	+41%
Canopy Separation	10 feet	20 feet	30 feet

Note: Horizontal separation distances are measured between canopies (outermost branches) and not between tree trunks.

tial or commercial developments. When prescribed fire is used by qualified professionals to manage these buffers, a zone extending from 50 to 100 feet into the forest or natural area is usually burned. Removal of highly flammable plant species offers further protection.

In addition to prescribed fire, other options for land managers to reduce fuels such as piles of brush and dead branches include selective thinning, mechanical chippers, herbicides, and grazing animals (goats, sheep, or cattle). Land managers need to check local ordinances on the use of these treatments.

Plant Arrangement

Plant arrangement is an important factor in affecting the survivability of a home during a wildfire. Plant arrangement involves surface fuels which include trees up to 6 feet, shrubs, grasses and other herbaceous plants, litter (fallen leaves or pine needles), and downed woody material. There should be both vertical and horizontal separation of plants surrounding a home within the defensible space (Figure 3). Branches of trees should be separated from plants beneath them by at least 10 feet. There should also be at least a 10-foot separation between branches of individual trees, and between branches and structures.

Vegetation is often present at varying heights, similar to the rungs on a ladder. Under these conditions, flames from fuels burning at ground level, such as a thick layer of pine needles, can be carried to shrubs or vines which can ignite still higher fuels, like tree branches. Vegetation that allows a fire to move from lower growing plants to taller ones is referred to as "ladder fuel." The ladder fuel problem can be corrected by providing a vertical separation between the vegetation layers. This could be accomplished by pruning the lower tree branches at least 10 feet from the ground or from the fuel beneath, removing vines

from trees, and by removing or reducing the height of the shrubs.

Carefully grouping plants can reduce flammability problems. For example, when it is not practical or desirable to remove a fire-prone plant, surrounding it with more fire resistant plants reduces danger while sustaining the overall visual impact. Trees can be surrounded with low growing ground cover. Larger growing shrubs can be placed in more open areas or massed in smaller groupings.

Firewise recommends grouping plants in islands at least 10 feet apart to create fuel breaks. The "islands" are separated

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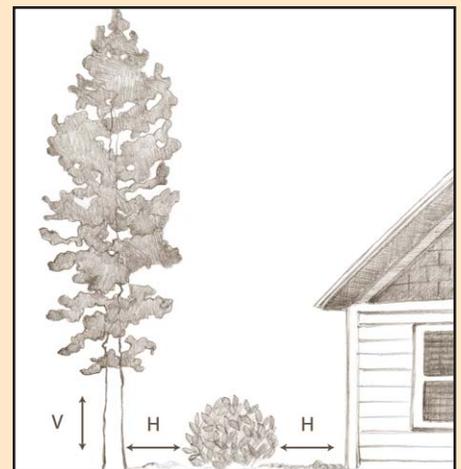


Figure 3. Vertical separation (V) should be maintained between plants and plant groups by removing ladder fuels from this area, and pruning lower branches on trees up to 10 feet from the ground. Horizontal separation (H) should be maintained by separating groups of plants or landscape beds by non-flammable areas (e.g. decorative gravel or stepping stones), and keeping plants at least 2 to 5 feet out from the home.

(Reducing Wildfire Risk While Achieving Other Landscaping Goals, University of Florida and the USDA Forest Service)

Firewise Landscaping

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by less flammable landscaping materials, such as a well maintained lawn or rock.

Basic Firewise Landscaping Guidelines

1. Reduce fuels
2. Eliminate ladder fuels
3. Create fire breaks
4. Provide a defensive space
5. Carefully space trees

Mulching

Mulching can be used in and around landscape beds, but because the flammability of different landscape mulches is still unclear, some precautions should be taken. It is recommended that an area 2 to 3 feet out from the sides of the house be kept clear of mulches. Mulch from yard debris should not be used in the area of defensible space (within 30 feet of the house). Mulches composed of large chunks of wood and bark may maintain moisture for a longer time and ignite slower when exposed to a fire; therefore, they may present less of a fire hazard. Pine straw mulches, which dry out quickly, are highly flammable and should be avoided altogether in a Firewise landscape.

Firewise Plant Selection

One of the more critical elements of Firewise landscaping is the selection of plants. Although all plants burn, some species are less flammable than others. The less flammable plants are more desirable for Firewise landscaping. Selecting landscape plants based on their flammability can be challenging for homeowners and landscapers, as few existing plant guides list Firewise plants or rank plants by their flammability. One publication entitled *Virginia Firescapes Firewise Landscaping for Woodland Homes* (430-300), can be found by going to the Virginia Cooperative Extension Service web site at <http://www.ext.vt.edu/pubs/turf/430-300/430-300.html>. This publication gives a flammability rating of high, medium, or low for deciduous trees, deciduous shrubs, evergreen trees, evergreen shrubs, groundcovers, and vines.

Homeowners can create their own Firewise plant list by following the step-by-step method in the University of Florida Extension publication, *Preparing a Firewise Plant List for Wildland Urban Interface Residents* (Circular 1453), at <http://edis.ifas.ufl.edu/FR151>.

The steps involved in ranking the flammability of landscape plants in the above publication are as follows:

Step 1: Identify the plant species.

Step 2: Select representative plants (refer to southern landscape plant identification books for reference information).

Step 3: Use the flammability key (included in Circular 1453).

Step 4: Rate the species and prepare your document.

“Firewise measures can help make homes and landscapes as beautiful as they are safe. Firewise landscaping techniques can actually improve the aesthetic quality of your home by clearing out dry and dead vegetation, and allowing space between trees and plants.”

*Jim Smalley,
Firewise Communities
Program Manager*

Characteristics of Firewise Plants

- High moisture content.** The moisture content of leaves and branches is the single most important factor influencing the flammability of individual plants. Deep and infrequent irrigation during establishment can encourage a plant to grow deeper roots, reducing plant stress during dry periods.
- Broad and thick leaves.** Thin leaves or needles tend to dry out quickly and ignite easily.

- Low chemical content.** The presence of oils or other chemicals in the leaves and branches can increase flammability.

- Open and loose branching patterns.**

- Deciduousness.** Deciduous plants (those that lose their leaves) are generally less flammable than evergreens.

- Low amounts of dead materials.** The accumulation of dead leaves and branches on plants can increase flammability.

Invasive Plants

The USDA Forest Service lists invasive species as one of four major threats having the greatest impact on the health of our nation’s forest and grasslands. Invasive, or exotic plants, can change the fire behavior of an **ecosystem** and are a growing problem in Alabama. Invasive plants are species not native to an area which have invaded and become dominant. Because they have few or no natural enemies, they reproduce and spread unimpeded at the expense of native plants. Some of these exotic species are highly flammable, such as cogongrass, and can increase the risk to structures in a wildfire. Kudzu is known as “The Vine that Ate the South.” In the spring, kudzu vines can grow up to a foot a day, covering trees and buildings, and adding to the fuel load when a wildfire strikes. Not all non-native plants are invasive, but only those that are fire resistant should be planted or allowed to remain in a Firewise landscape.

Maintenance

It is important to note that a plant’s fire performance can be seriously compromised if not maintained. Over time, plants grow and spread, mulches dry out, leaves and pine needles accumulate. Because the landscape is constantly changing, proper maintenance is the key to keeping it Firewise. A Firewise landscape is a healthy landscape – one whose plants are durable, fire resistant, compatible with the terrain and climate, and well maintained. Plants that are not properly irrigated or pruned, or that are planted in climate zones not generally recommend-

ed for the plant will have increased fire risk and will likely make the mature plant undesirable for landscaping in high fire-prone areas. During drought conditions, most plants will burn if exposed to enough heat, regardless of their flammability.

Irrigation Systems

Irrigation systems help to keep plant tissues filled with water, reducing their flammability. Consider using drip irrigation to save water in shrub beds or with young trees, and sprinklers for the lawn. Trees and shrubs should be deeply watered every 20 to 30 days during the dry season.

Regardless of the type of system, proper care after installation will help ensure that the vegetation will remain as Firewise as possible during the most critical

times of the year. Any plant or grass that becomes dry because of drought is going to become more prone to fire. However, the results of over watering and under watering can be the same – damaged plants and increased flammable litter. Proper watering is essential. An irrigation system will keep the moisture there, making the plant less fire-prone and more Firewise.

Pruning

As trees grow, careful pruning preserves their appearance, structural integrity, and functional values. But pruning also maintains its ability to resist fire. A well-pruned tree heals quickly while poor pruning results in scarring and possible disease. Young, vigorous trees can withstand more severe pruning than older, weaker trees.

Follow these guidelines for healthy pruning:

1. Pruning tree branches at least 6 to 10 feet from the ground helps interrupt the fire's path.
2. Pruning cuts should be clean and smooth, avoiding flush cuts and stubs.
3. No more than 1/3 of a tree's live foliage should be removed at one time to avoid stress.

4. Remove dead and diseased branches from trees. This reduces the potential for fire spreading into the crown.

Fuel Removal

Brush and cuttings from landscape maintenance create another fire hazard. This debris should be promptly and legally disposed of, leaving a clean, neat landscape.

Summary

As we begin to move into the wild-land urban interface areas, we must take into consideration both nature and man, and balance the needs of both. We should

encourage those who live there to be "Firewise" about the landscape. With an understanding of the concepts of fire behavior, you can anticipate the

intensity and movement of a fire. Furthermore, by altering the conditions around your house, you can improve the survivability of your home. Additional fire protection can be gained if homeowners, local landowners, and officials work together to develop fire protection services, water sources, and defensible space for an entire community. 🏡

No matter how well something is planned and installed, the maintenance over the long term will determine just how Firewise a given location and a given property remain.

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