



How to Reduce Wildfire Risk

**TREE CITY USA®
BULLETIN**

No. **41**

Editor: Dr. James R. Fazio • \$3.00

The purpose of this bulletin is to help stop a national tragedy. The annual loss of homes destroyed by wildfire would decrease if more people were aware of the fact that no area of the country is immune to these disasters, that the right use of trees and other vegetation — not necessarily their elimination — can help protect homes, and that some basic principles should guide home construction in forested areas.

“I’ve lost everything I own except what I was wearing.”

“All of a sudden these huge clouds of black smoke appeared and ashes were falling all around the house.”

“I’m only glad we got out alive.”

How many times have you heard words like these on the evening news? It seems like it has become an annual event as forests, grasslands, brush fields, and homes are consumed by the flames of wildfires. But is it inevitable?

“Fire is the dominant fact of forest history,” wrote Stephen H. Spurr and Burton V. Barnes in their book, *Forest Ecology*. Fire has always been as much a part of nature as rain and sunshine. In some areas of the United States, fires cleared the prairie grasses almost annually or burned lightly through pine forests in cycles of 10 to 20 years. Elsewhere, fires were less frequent, but eventually the forests burned. In the 20th century, humans thought they could tame wildfire or rid it from our presence. Only in recent years have we come to understand the folly of this notion and the consequences. Fires will burn, and when natural fires are held in check, dried grass, brush, fallen branches, and an increased density of trees result in a buildup of what experts call fuels. When fuels are combined with dry weather, wind, and an igniting flame, the result is a conflagration.

The loss of homes and other buildings as a result of forest, grass, and brush fires is staggering. Landscaping to reduce the risk of loss from wildfires can go a long way toward ending these annual tragedies.

Into this setting has come a new element in the past 20 to 30 years — homes. Many Americans have a penchant for living in the country, and good roads and technology have made this practical for millions of

families. Unfortunately, when combined with the inevitability of fire, a potentially tragic situation has been created. But while fires can and will happen, there are many ways to reduce the risk of damage to homes.



Arbor Day Foundation®
100 Arbor Avenue • Nebraska City, NE 68410

The Wildland/Urban Interface

The earth, born in fire, baptized by lightning, since before life's beginning, has been and is a fire planet.

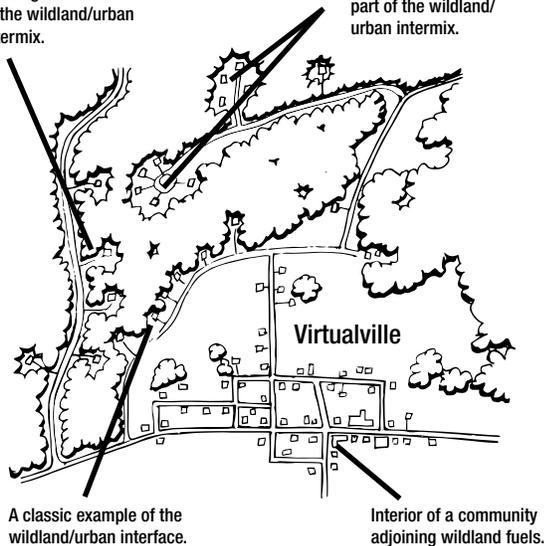
— E.V. Komarek
Tall Timbers Fire Ecology Conference, 1965

It has been said that change is one of the inevitable facts of life. Homes have and will continue to be built in natural settings. And fires will burn in the vegetated landscape. They will burn whether in Maine, Long Island, the Adirondack Mountains, the Deep South, Great Plains, the chaparral of California, or the pine forests of the Rocky Mountains and Pacific Northwest.

Where urban development meets the vegetated landscape, or wildland fuels, at a well-defined boundary, the area is defined as the wildland/urban interface. More typically, development is scattered throughout the wildland fuels, a situation called the wildland/urban intermix. Either way, the wildlands may be old fields, shrubs, forests, or some combination of these. In all cases, if you live in one of these areas, or even in the interior of an interface neighborhood, you should read this bulletin carefully. It could save your home and possibly your life.

Isolated homes and buildings are common in the wildland/urban intermix.

Clusters or small developments are part of the wildland/urban intermix.



The risk of wildfire exists in all parts of the country. Three high-risk areas are shown here, but precautions should be taken even by residents in the interior of Virtualville. High winds and flammable structures have spread flames far into developed neighborhoods, including Oakland, California, where 3,000 dwellings were destroyed in 1991.

More than 700 families lose their homes in wildfires each year. With careful landscaping when a house is built in the forest, its chance of surviving a wildfire increases by 90 percent, according to estimates by the National Fire Protection Association. Trees can — and should — be part of the plan, but their selection, placement, spacing, and maintenance are keys to enjoying their benefits instead of suffering from their liabilities if fire strikes.

ZONE 1: DEFENSIBLE SPACE

30 feet minimum on level ground
100 feet by law in some areas
200 feet on slopes of 40 degrees

This is the most important space if you live in a fire-prone rural area. It is your yard and should be landscaped for leisure and fun but also as a potential barrier to the spread of fire. It must be defensible if you expect fire crews to make a stand there in case of triage, i.e., deciding which structures have a chance of being saved during a wildfire and which will be given up as lost even before the flames arrive.

- ✓ Create a good place for grass lawn and stone or concrete patios.
- ✓ Plant fire-resistant ornamental shrubs that grow no higher than 18 inches.
- ✓ Use fire-resistant broadleaf trees for shade.
- ✓ Prune lower limbs to 6 to 10 feet above ground level.
- ✓ Eliminate foundation conifers, such as junipers.
- ✓ Do not plant conifers in this zone.
- ✓ Minimize or avoid the use of wooden fences and trellises and never attach them to the house.

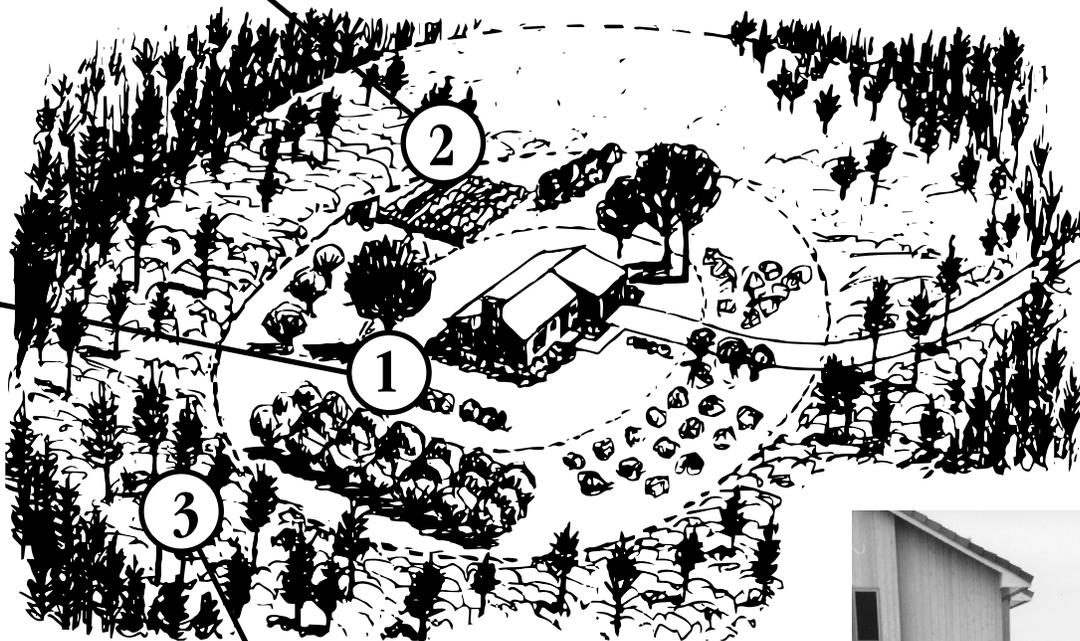
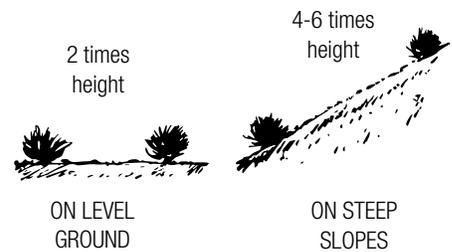
ZONE 2: THE MID-ZONE

30 to 70 feet minimum on level ground

This is an area for landscape trees and shrubs, orchards, and gardens, but not for wild, dense woodland vegetation.

- ✓ Maintain space between ornamental or wild shrubs at least twice as wide as their diameter.
- ✓ Prune lower limbs of trees to 6 to 10 feet.
- ✓ Ideally, use only fire-resistant trees and shrubs in this zone.

Maintain adequate cleared space between ornamental wild shrubs.



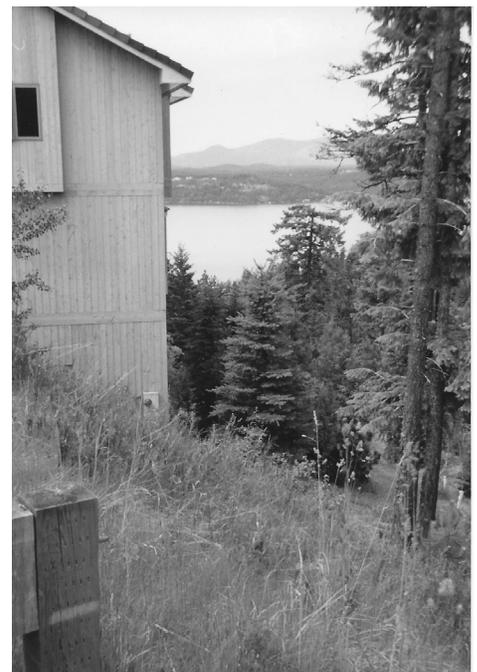
ZONE 3: OUTERMOST ZONE

Outer perimeter no closer than 70 to 100 feet from house on level ground (200 feet is better)

This is the wild forest area, but precautions are still in order.

- ✓ Thin forest trees so that crowns are separated by at least 10 feet (with 5 additional feet for every 10 degrees of slope).
- ✓ Prune to a height of at least 10 feet.
- ✓ Prevent fuel ladders from developing.
- ✓ Occasional dead trees for wildlife are important, but accumulations of dead woody material on the ground, high and/or dense logging slash, or patches of dead trees should be kept to a minimum or eliminated.

Ladder fuels are created when vegetation of different heights is close enough to allow a surface fire to become a crown fire.



Better landscaping is needed around this home to reduce the risk of loss if wildfire sweeps up the steep slope.

Frequent Maintenance Is Essential ...

A well-designed landscape is the first step toward reducing risk from wildfire. Maintaining it properly is the second step, or all the planning and designing will be for naught. Landscape maintenance for fire protection is so basic it is often forgotten. It simply means keeping your grounds clean and tidy and providing the kind of care for your trees and vegetation that they need under any circumstances to stay healthy and vigorous — only in this case with the added benefit of adding to the security of your home.



Landscaping to reduce the risk of wildfire need not mean ugly, barren ground. Landscaping with lawns, fire-resistant trees, and gardens provides beauty as well as protection through defensible space.

A Maintenance Checklist

Clean and Tidy

- ✓ Rake leaves and prevent the accumulation of dead twigs.
- ✓ Keep gutters and roofs free of needles or other natural debris.
- ✓ Do not store old junk or recyclable materials under porches or near the house.
- ✓ Mow your lawn regularly in Zone 1, your defensible zone, and keep grass and weeds short in Zone 2.
- ✓ Stack firewood outside Zone 1.
- ✓ Dispose of cuttings through composting, recycling, or removal from your property.

Care of Vegetation

- ✓ Prune at least annually with three objectives:
 1. Deadwood pruning. Remove dead branches, especially in Zone 1.
 2. Crown height. Maintain trunks clear of branches to a height of 6 to 10 feet.
 3. Clearance. Branches should not overhang or come within 10 feet of the house. None should be within 15 feet of a chimney.

Note: Follow proper pruning methods to prevent the entrance of decay into tree trunks (See *Tree City USA Bulletin No. 8* for more information).
- ✓ Maintain an adequate irrigation system and use it regularly to keep all trees, grass, and other plants at their optimal moisture levels. Consider using drip irrigation to save water in shrub beds or with young trees and sprinklers for the lawn (See *Tree City USA Bulletin No. 17*).
- ✓ Deeply water trees and shrubs every 20 to 30 days during the fire season.
- ✓ To retain soil moisture or cover bare areas, wood chip mulch made from bark can be used at a depth of 2 to 4 inches. It does not ignite readily and is usually safer than bedding plants, which tend to accumulate dry, flammable material beneath them.
- ✓ To help keep roots healthy, use permeable materials for drives, walks, and patios.

FIRE-RESISTANT PLANTS

It is sometimes claimed that there is no such thing as a fire-resistant tree or shrub. All will burn if conditions are right and temperature is high enough. However, plants may be classified as:

Pyrophytes: *fire-prone plants*

Traits include:

- Needle-like or other fine leaves
- Resinous, oily, or waxy foliage or wood
- Loose or papery bark

Examples:

Most conifers • Eucalyptus

Fire-resistant: *less flammable plants*

Traits include:

- Little or no seasonal accumulation of dead leaves
- Non-resinous wood and leaves
- High moisture content of leaves
- Drought-tolerant

Examples:

*Maples • Roses • Aspens • Ashes • Chokecherry
Red-osier dogwood • Littleleaf sumac • Lilacs*

Fire-resistant plants should be selected for their ability to thrive under local soil and climate conditions. Most state foresters and Cooperative Extension offices can suggest those suitable locally. Lists are readily available and worth obtaining before building a new house or re-landscaping to reduce wildfire risk.

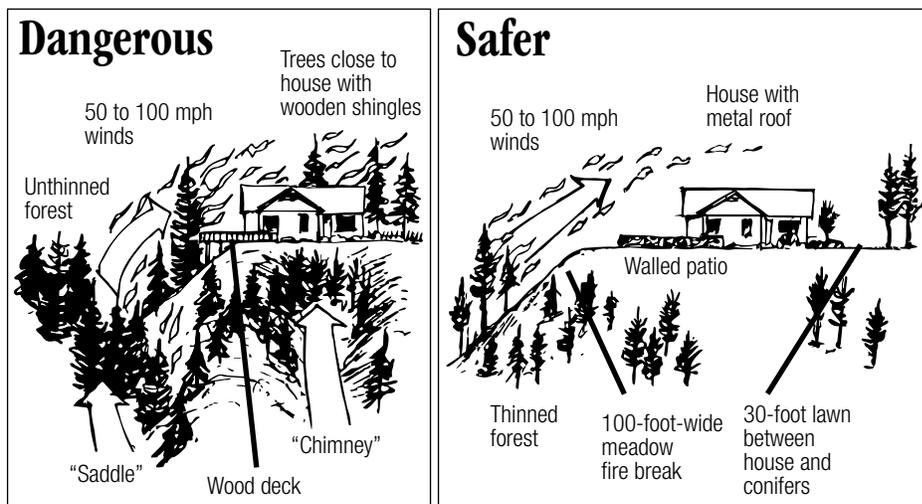
... So Are Location, Design, and Materials

Landscaping and grounds maintenance can do a lot to keep wildfire away from dwellings, but where a building is located and how it is built can also help ward off disaster. This is especially important because of spot fires started ahead of the main fire by embers blowing in the wind or the fire's convection currents.

BUILDING MATERIALS

It should go without saying that fire-resistant building materials should be used in fire-prone areas. However, every year houses go up in flames because this was ignored during the planning stage of building a home. When building or remodeling, insist on:

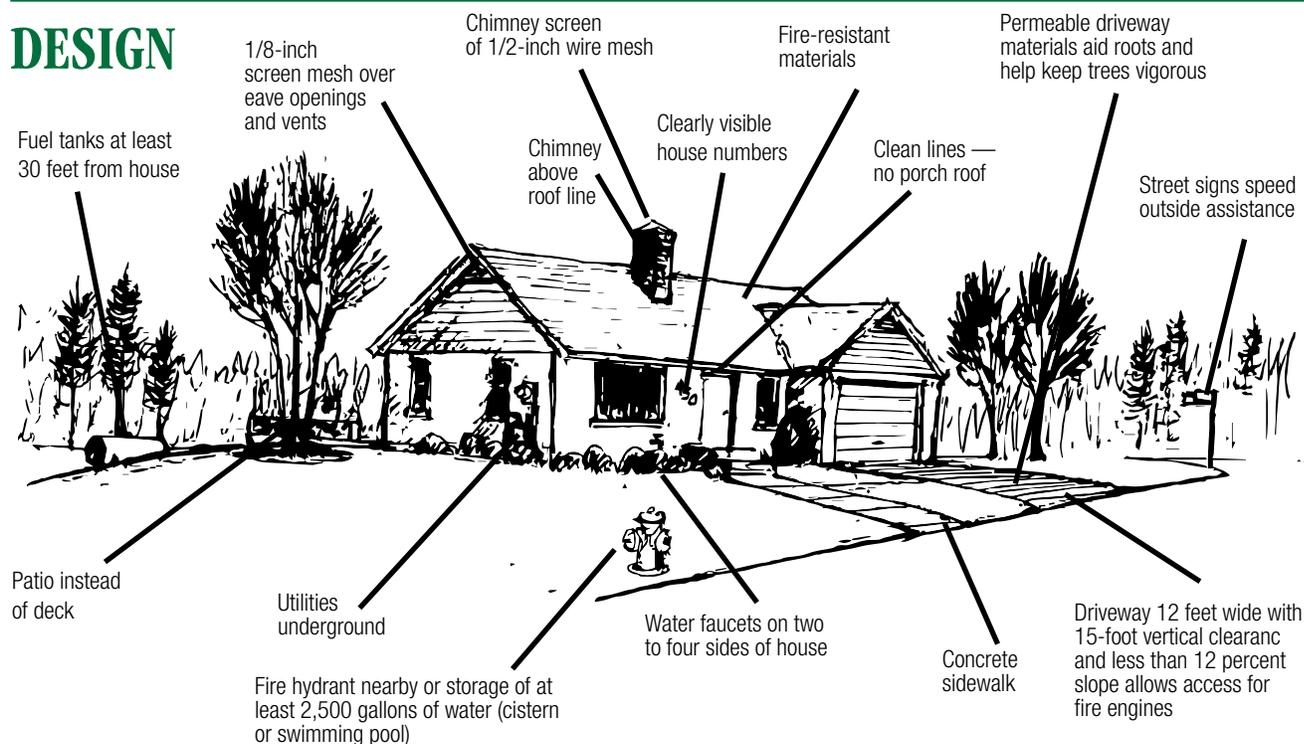
- Noncombustible roof materials such as Class-A asphalt shingles; slate, clay, or terracotta tiles; metal; or concrete products — not wood shingles
- A fire-resistant subroof
- Fire-resistant siding (such as stucco or masonry, not vinyl and trim)
- Double pane and tempered glass for windows and sky lights; smaller vs. larger windows
- Non-flammable screening shutters for windows and skylights



LOCATION

The edges of cliffs and hillsides provide a great view, but they are also prone to sliding and even more prone to being caught in the path of flames sweeping up slopes. When possible, select a home site in level terrain or back at least 30 feet from a drop-off. Topographic saddles and canyons in wildland areas are also dangerous because of the pre-heating that can occur as fires move uphill.

DESIGN



Are Wildland Fires an Urban Forestry Issue?

Not long ago the answer to this question would have been no. Today, it is a different story. Increasingly, cities and countrysides are blending together. Firefighting forces were once separated into forest fire crews and city engine companies. Today, the wildland firefighters are being called on to protect homes and fight structural fires, often in rugged, wooded terrain.

Urban foresters and municipal or county tree boards must pay closer attention to planning and zoning affairs that will help homeowners and firefighters end the disastrous annual toll from fires at the wildland/urban interface. Special interest groups often prevent the passage of state laws or local ordinances that would help reduce the risk of wildfire damage. Education and political action are needed to counter this opposition, develop favorable public opinion, and bring about action that will prevent the loss of homes and human lives where residences mix with the fields and forests of America.



Effective Education Is Needed

Many people do not realize the danger they are in when they build or move into a home at the wildland/urban interface. There is no lack of available literature, videos, or public speakers to make people aware of the problem and what they can do about it. However, holding a workshop one evening at city hall will not do the job. People who live in interface or intermix homes are often busy professionals or active young people who are unlikely to attend well-intentioned meetings or workshops. A better approach is to organize an active, local information campaign and take the message to homeowners rather than expecting them to come to the message. This can be done with:

- Informative door hangers or fliers for newspaper boxes. Distribution can be a tree board activity or a Scout service project.
- Public service announcements for local radio, TV, and newspapers.
- Free safety inspections of individual properties. This has been done in some communities using a checklist and is a very effective method for making a homeowners aware of wildfire risk and specifically what they can do to reduce it.

Fuel Reduction Has A Role

Ever since New Mexico's disastrous Los Alamos Fire that resulted from an escaped controlled burn, the idea of reducing fuel by prescribed fire has been even tougher than ever to sell to a skeptical public. People also do not like the idea of smoke from fires they know are intentionally ignited. However, fire as a management tool in the hands of professionals does have a role in preventing wildfires. Research should be encouraged, and the door to using this tool should not be closed by legislation. In its simplest form, this issue comes down to the fact that fire-prone land will burn. It is a matter of how and when it will be done.

Regulations

Most people don't like regulations by whatever name — ordinances, laws, planning and zoning requirements, or insurance company standards. Perhaps these were not needed on the real frontier, but the wildland/urban interface is a modern community with public services expected by its residents. For example, when wildfire strikes, who does not want a fire engine and crew to come to the rescue? That is not the time to discover that it is impossible because local bridges were not built to bear the weight of a fire truck or that the rustic road is too narrow or too steep for emergency vehicles. Similarly, when homes burn because simple measures as outlined in this bulletin were ignored, the insurance payments run in the millions of dollars annually, and these costs are borne by all.

Here are some of the actions proposed by professional firefighters that would help reduce unacceptable risks from wildfire:

- Bury utility lines underground, thus reducing the possibility of fire starts from wires during windstorms.



As communities spread into the surrounding countryside, the prevention of wildfire losses is increasingly becoming an urban forestry issue. Tree boards, arborists, and urban forestry professionals have an important role to play, especially in the public education and political action aspects of this serious problem.

- Construct streets and roads wide enough to accommodate emergency vehicles but not so wide as to cause excessive tree removal. Consider such measures as requiring off-street parking during fire season to provide full emergency vehicle access on narrower, tree-friendly streets.
- Encourage cooperation between fire personnel and developers to locate roads and fire hydrants where they will be out of the path of chimney-like fire surges.
- Install good street signs, even in rural settings, and encourage well-numbered and marked homes to aid emergency workers and speed assistance.
- Enact appropriate building codes, such as a prohibition on wood shake roofs in fire-prone areas. This would not only benefit individual homebuilders and owners, but would help stop the spread of fires in a community.
- Enact state laws that:
 - * Create a statewide fire mobilization plan that facilitates mutual assistance across political boundaries.
 - * Provide a means for reimbursement to fire jurisdictions that incur expenses assisting beyond their boundaries.
 - * Address issues of liability and protection for state forest services when there is a need to protect communities or fight structural fires.
 - * Identify and provide public awareness of areas with high wildfire hazard levels, as is done with flood zones.

Always Check Locally

Smokey reminds us: Only you can prevent wildfires. Likewise, you need to know local laws. As a result of recent fires in the wildland/urban interface, several states are developing stringent new requirements for buildings in fire-prone areas. Check with local fire officials for the latest standards in your area, as well as other tips on making your home in the woods safe as well as enjoyable.

Other Sources of Information

Publications Related to Tree City USA Bulletins

Back issues of all Tree City USA Bulletins are available online at arborday.org/bulletins for \$3 each. The Urban and Community Forestry Program in many state foresters' offices also maintains supplies of the bulletins for public distribution. Of special interest to homeowners in fire-prone areas:

- No. 1 How to Prune Young Shade Trees
- No. 2 When A Storm Strikes
- No. 4 The Right Tree for the Right Place
- No. 6 How to Hire an Arborist
- No. 8 Don't Top Trees
- No. 17 How to Landscape to Save Water
- No. 19 How to Select and Plant a Tree
- No. 26 Understanding Landscape Cultivars

Forest Fires: Behavior & Ecological Effects

By Edward A. Johnson and Kiyoko Miyanishi

Living With Fire: A Guide for the Homeowner

Free tabloid packed with useful information. Contact:

New Mexico Forestry Division
P.O. Box 1948
Santa Fe, NM 87504-1948

National Fire Protection Association Standard

The National Fire Protection Association has published criteria about procedures and practices that can reduce the risk of wildfire damage to homes and other property. The purpose of this authoritative publication is to help fire agencies, land use planners, architects, developers, and local governments provide safer developments in areas where wildfires might occur.

To purchase a copy of this guide, ask for NFPA299, *Standard for Protection of Life and Property from Wildfire* (17 pp., \$27, plus shipping and handling). It is available from the association at the following address or free at its website, nfpa.org.

National Fire Protection Association
P.O. Box 9101
Quincy, MA 02269-9109
Phone: 617-770-3000

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Website Directory

***California Fire Safe Council* firesafecouncil.org**

The home page of a council considered to be a model of the kind of statewide partnerships that can be used to promote wildfire risk awareness and to reduce those risks.

***Firewise* firewise.org**

An online education project of the National Fire Protection Association, National Association of State Foresters, federal agencies, and others.

***National Fire Protection Association* nfpa.org**

The NFPA is a nonprofit organization that was founded in 1896 to help reduce fire hazards through education and the development of codes and standards that reduce risk.

Smokey Bear Fire Prevention Materials

- **Ad Council/U.S. Forest Service**
smokeybear.com

Smokey's official home page, designed mostly for the education of children.

- **The Woodland Catalog**
smokeybeargifts.com

The most complete online source for commercial Smokey Bear wildfire prevention items.



The Tree City USA program is sponsored by the Arbor Day Foundation in cooperation with the U.S. Forest Service and National Association of State Foresters. To achieve national recognition of being named as a Tree City USA, a town or city must meet four standards:



TREE CITY USA®

STANDARD 1: A Tree Board or Department

STANDARD 2: A Tree Care Ordinance

STANDARD 3: A Community Forestry Program with an Annual Budget of at Least \$2 Per Capita

STANDARD 4: An Arbor Day Observance and Proclamation

Each recognized community receives a Tree City USA flag, plaque, and community entrance signs. Towns and cities of every size can qualify. Tree City USA application forms are available from your state forester, the Arbor Day Foundation at arborday.org/treecity, or your state forestry agency.

Local Information

Most states have literature available for individual landowners, for handouts at meetings, or for use in neighborhood awareness campaigns. Contact your state forester's office, Cooperative Extension, or the U.S. Forest Service.

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