A Guide for Protecting Communities From Wildfire

Photo provided by David Perry, staff photographer, Lexington Herald-Leader

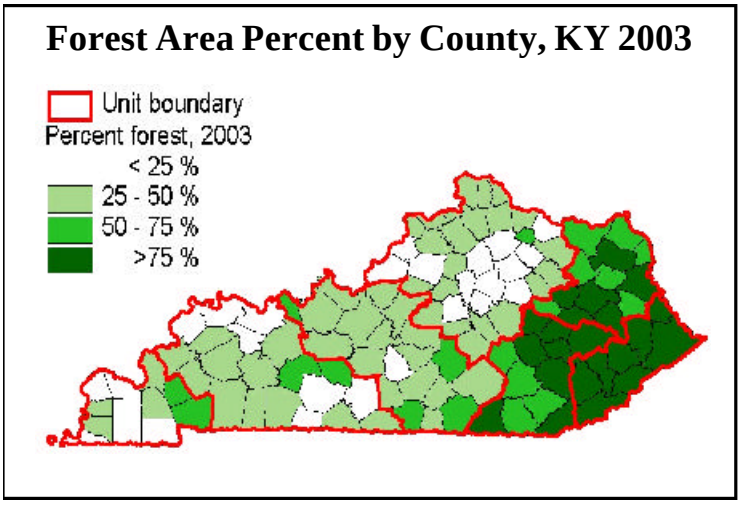
Commonwealth of Kentucky
Energy and Environment Cabinet

KY Office of Insurance

Table of Contents

Growth Demands Responsibility

Wildland fires occur throughout the state with the highest occurrence in eastern Kentucky. Eastern Kentucky's forests are not wilderness areas. Homes, churches and buildings are scattered throughout the forests making almost every wildland fire a threat to residents and workers.



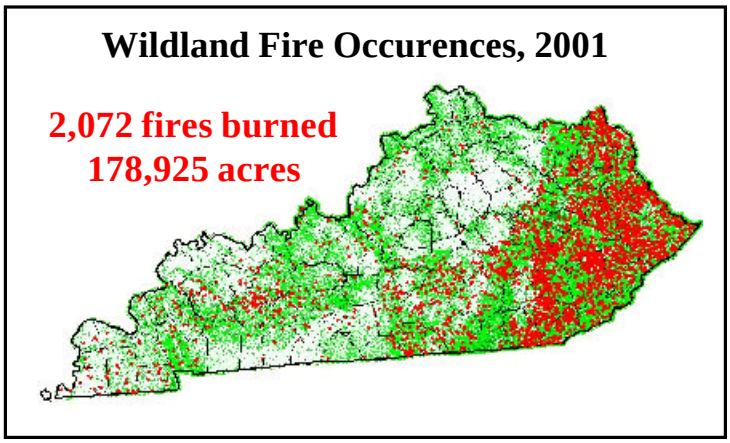
Graphic provided by USFS - 2004 KY FIA Data Report

Kentucky's forests cover 11.9 million acres or 47 percent of the state. This is a decrease of 769,000 acres, a 3 percent net loss, since the previous forest inventory in 1988. The decrease is primarily due to urban development and mining.

The Cumberland Plateau and the Appalachians in the eastern portion of the state are the most heavily forested. The central and western portions of the state, although less densely forested, account for 50 percent of the total forestland area.

Private landholders are the dominant owners of Kentucky's timberland (89 percent). Nine percent is public land, administered by local, state or federal agencies. Slightly more than half of the public land is managed by the USDA Forest Service. Forest industry accounts for the remaining 2 percent of timberland.

The Kentucky Division of Forestry responds to an average of more than 1,400 wildland fires annually. This does not include those suppressed by the USDA Forest Service on national forest land or those wildland fires controlled by volunteer fire departments.



Graphic provided by KY Division of Forestry

These wildland fires burn an average of 65,000 acres annually, threatening thousands of homes.

Maintaining a Margin of Safety

Photo provided by U.S. Forest Service

Since Jan.1, 2000, wildland fires have destroyed 99 structures and three homes. A total of 1,808 structures along with 436 homes have been saved. These improvements have a combined value of nearly $100 million. The potential for catastrophic losses continues to escalate as citizens construct homes in and adjacent to forests.

Arson continues to be the number one cause of wildland fires. Arson has been responsible for fifty-six percent of the wildland fires suppressed by the Kentucky Division of Forestry during the past 10 years. The burning of debris, such as trash and other materials, is the next leading cause at 27 percent.

As Kentuckians continue to move to forested areas, what can be done to protect them from wildland fires?

This guidebook has been provided as a tool to help you put measures in place to reduce potential loss of life and property and to control the costs of services.

These measures include:

* Enacting and enforcing fire safe building standards.
* Constructing adequate road and water systems in rural developments.
* Developing land-use planning and building codes for safe development.

This guidebook offers basic information and recommended fire safety standards so that land-use policies and zoning criteria can be developed to help reduce the possibilities of wildfire disaster. It should also be noted that different models for addressing wildfire hazards through zoning and building codes exist in other regions. For example, Summit County, Colo., utilizes a building permit process that has effectively addressed wildfire hazards.

Use of NFPA Standards

This document makes numerous references to various standards set by the National Fire Protection Association (NFPA). NFPA policy allows public authorities with lawmaking or rule

making powers to use their standards in local ordinances. For further information contact: Sec National Fire Protection Association, Secretary, Standards Council, P.O. Box 9101, 1 Batterymarch Park, Quincy, MA 02269-9101; phone: 1-617-770-3000 or visit the NFPA website at http://www.nfpa.org.

Protecting Property From Wildfire

If you are planning to develop or move to an area where homes are intermixed with woodlands, the homes may be in jeopardy and the lives of the residents may be at risk. Conditions must be just right for a wildfire to start and spread. Three factors that can influence fire behavior: weather, topography and fuels. These components affect the likelihood of a wildfire starting, the speed and direction of its spread, the intensity at which it burns, and the ability to control and extinguish it.

Fuel is required for any fire to burn. Fuel can consist of living vegetation (trees, shrubs, grasses and wildflowers) and dead plant material (dead trees, dried grasses, fallen branches and pine needles). The amount, size, moisture content, arrangement and other fuel characteristics influence ease of ignition, rate of fire spread, length of flames and other fire behaviors.


Photo provided by www.firewise.org

Dry, hot and windy conditions increase the likelihood of a major wildfire. These conditions make ignition easier, allow fuels to burn more rapidly and increase fire intensity. Topography, or the lay of the land, plays a major part in how fast a wildfire spreads. Steep slopes are the greatest topographical influence on fire behavior. As the steepness of slope increases, fire spreads more quickly. A home at the top of a fuel-covered slope is in greater jeopardy than one on flat ground or at the base of the slope in a wildfire. South and southwest facing slopes usually have more intense fires.

Planners, developers and local officials need to take these fire components into consideration early in the planning phase of the development. Much of the wildfire threat to a home or neighborhood can be reduced or eliminated by applying Firewise principles during and after construction.

Firewise Landscaping Guidelines

Typically, in a wildland/urban interface problem (human development meeting undeveloped wildland) an uncontrolled wildfire can spread from wildland vegetation to encroaching structures or can spread from a structure to surrounding vegetation.

One of the most critical concepts in dealing with the wildland/urban interface problem is that of defensible space (the area around a structure in which vegetative fuels have been modified and/or reduced to slow the spread of a wildfire).

There are three benefits of defensible space:

* Room for the fire service to operate and surround the fire;
* Creation of a buffer for the structure to survive the wildfire on its own;
* An opportunity to prevent fire spread from the structure to surrounding vegetation or vice versa.

Firewise landscapes provide defensible space, protect structures from approaching wildfire and reduce the potential for a structure fire spreading to the wildland. Defensible space should initially be provided by the developer and later maintained by the homeowner. Coniferous trees, such as pines and spruces, create special hazards that should be addressed when providing defensible space around a structure. Many people do not view the plants growing on their property as a threat. All vegetation including native and non-native plants can serve as potential fuel for a wildfire. If vegetation is properly maintained, a wildfire can be slowed, the length of flames shortened and the amount of heat reduced. All of these factors can assist firefighters in defending your home.

Photo provided by KY Division of Forestry

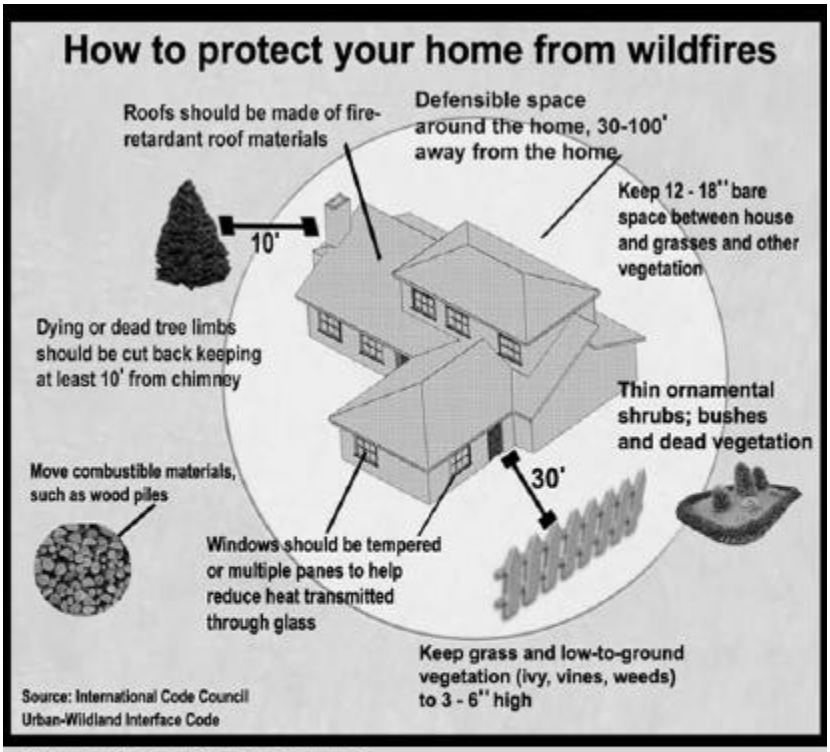
Things you can do:

* Remove annuals and prune perennials after they have gone to seed or when the stems become overly dry.
* Rake up leaves and other litter as it builds up through the season.
* Mow or trim grasses to a low height within 30 feet of your home.
* Remove plant parts damaged by snow, wind, frost or other agents.
* Prune all plants, trees and shrubs in a timely manner; this is critical. Pruning not only reduces fuel volumes but also maintains healthier plants for your home's defense system.

Maintenance provides fire safety. Over time, plants grow and spread, mulches dry out, and leaves and pine needles accumulate. All contribute to the fuels from which a fire grows. Proper maintenance improves property appearance and helps protect homes from wildfire.

Within the 30 Foot Fuel Break Area:
This fuel break is the primary defensible space zone. Within this zone, steps should be taken to change the type of combustible vegetation present, reduce the amount of burnable vegetation, and/or eliminate highly hazardous coniferous vegetation.

Maintain an area free of combustible materials within 30 feet of all structures. This strip is the first section of your defensible space and reduces the threat of a surface fire coming in direct contact with a structure. Within this area, use noncombustible landscaping materials, such as gravel, marble chips, concrete or mineral soil. Trees in this 30-foot area should be pruned to a height of 6 to 10 feet. Space trees so that the edges of crowns are 10 to 16 feet apart.



International Code Council
Tips for Building Smarter, Safer, Stronger

*Use fire-resistant materials (including house paint) for exterior walls and siding.
*Consider residential sprinkler systems than can extinguish fire that can ENTER house.
*Keep access clear to home for emergency vehicles.
*TAKE ACTION BEFORE A FIRE. Ask your local fire department for help in developing a fire protection plan. Review plan on a regular basis.

For more detailed information visit: WWW.ICCSAFE.ORG

Keep this fuel break free of anything that could burn. Remove small trees, household debris, brush and ground fuels such as leaves or pine needles. A green lawn or rock garden makes a good fuel break, but grass must be kept watered and cut, and dead grass must be removed. Stone, brick or masonry walls also make good fuel breaks when they are free of vegetation. They can be located either inside or outside the fuel break area.

Beyond the 30-Foot Fuel Break Area:
Thin trees to provide 10 feet of open space between the crowns of adjacent trees. Prune branches away from power lines. Also prune lower branches to 10 feet above the ground. Remove small shrubs, scrub growth, ground litter and dead trees.

Fire Resistant Plants:
There are no "fireproof" plants. However, many common plants naturally resist fire and are characterized by low oil content, leaves that stay moist and low ground litter production. While all plants will burn if conditions are severe enough, the following plants are adapted to Kentucky and have fire resistant characteristics:

Common Ground Covers: periwinkle, ajuga, pachysandra and sedum

Common Shrubs: spirea, barberry, lilac, viburnum and witch-hazel

Common Trees: ash, redbud, oak, locust and dogwood

This is by no means a complete list. For recommendations of additional fire resistant plants, contact the Kentucky Division of Forestry, University of Kentucky Cooperative Extension Service or go to http://www.firewise.org.

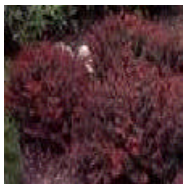

Periwinkle


Ajuga

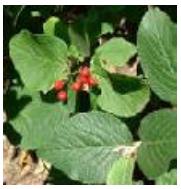

Pachysandra


Sedum


Spirea


Barberry

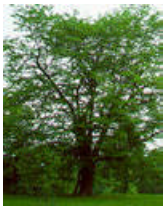

Lilac

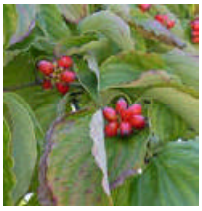

Viburnum


Witch-hazel


Ash


Redbud


Locust


Dogwood

Photos provided by Cooperative Extension Service

Planning Ahead - Vehicular Access

Roads and streets should be safe and accessible for emergency equipment and civilian evacuation. The road system should provide access for fuel breaks and required greenbelts. All vehicular access and gates servicing such access should meet the specifications provided in this document. All roads should be designed and constructed to allow emergency vehicle access according to standards published by the American Association of State Highway and Transportation Officials but should also meet the minimum requirements set forth in this document. Private roads, streets and driveways should meet NFPA 1141, Fire Protection for Planned Building Groups. Please visit http://www.constructionbook.com/nfpa-1141 -standard-for-fire-protection-in-planned-building-groups-2008-edition-114108/nfpa-code/.

Photo provided by www.firewise.org

Access Routes:
All developments should have multiple access routes. Access routes should be designed to accommodate planned traffic flows and use looped road networks.

Road Easements and Rights-of-Way:
Easements and rights-of-way should be wide enough to accommodate the roadway, shoulder, vegetation modifications and other local requirements on or along roads or streets. Where necessary for compliance with this standard, easements should be obtained from adjacent property owners.

Roadways:
All roads and streets should be graded and surfaced and of sufficient design to support the weight of 20-ton vehicles. Roadways should be a minimum of 24 feet wide and should provide for simultaneous access for emergency vehicles and the evacuation of residents.

Grades should not be greater than 10 percent. Roadways should be designed to prevent pooling of water on the road surface.

All curves should have a minimum radius of 100 feet, measured at the center line.

Photo provided by www.firewise.org

Shoulders:
There should be an improved gravel shoulder, with a minimum width of 4 feet on each side of the traveled surface.

Parking:
Where parking will be allowed along the roadway, at least 9 feet of improved width should be provided.

Dead-End Roads:
Dead-end roads should not exceed 600 feet in length in areas of extreme hazard classification. They should not exceed 1,000 feet in other areas. All dead-end roads should have a turnaround at the closed end of at least 100 feet in diameter. In areas of low wildfire hazard severity, hammerhead-T turnarounds may be used to provide 3-point turnaround capability.

Driveways:
All driveways should provide a minimum unobstructed width of 12 feet and a minimum unobstructed height of 14 feet every 400 feet along the driveway's length. Driveways over 200 feet long should provide a turnaround within 50 feet of the building or structure.

Gated Entrances:
All gates should provide a clear opening at least 2 feet wider than the roadway and should be located at least 30 feet from the public right-of-way. Gates should open inward, allowing a vehicle to stop without obstructing the public road.

Signage:
All roads, streets and buildings should be designated by names or numbers on signs clearly visible and legible from the roadway to facilitate location of a fire and to avoid delays in response. All public and private roads and streets should be identified by a name or number in a consistent system that provides for sequenced, or patterned, numbering and unique naming within each jurisdiction.

Photo provided by www.firewise.org

Street and road signs should be located at intersections. Signs should be readable from all directions of traffic flow for a distance of at least 100 feet and should be mounted 6 to 8 feet above the road surface. Signs should be in a horizontal orientation. Letters, numbers and symbols should be at least 4 inches high, with a half-inch stroke, reflective, and of a contrasting color to the background. Signs should be installed prior to final acceptance of road improvements. All buildings should have a unique address and street number. Letters, numbers and symbols used to indicate addresses should meet the same standards as street signs, except they need not be reflective.

Emergency Water Supplies

Some provision should be made to provide water for fire suppression in rural areas. This section is provided to help evaluate emergency water supplies and how they are designed, constructed, and maintained. It is especially intended to assist in evaluating emergency water supplies for rural developments of more than one housing unit.

Mapping of all ponds and wells should be available and encouraged. Water should be available to provide a minimum fire flow of 250 gallons per minute for two hours. Static water supplies should be designed and constructed to conform to NFPA 1231 Standard on Water Supplies for Suburban and Rural Fire Fighting and include the use of dry hydrants. Please visit the web site, http://www.nfpa.org/aboutthecodes/AboutTheCodes.asp?DocNum=1231for more information regarding this standard. In rural areas of Kentucky, ponds, creeks, dry hydrants and other water sources are critical to ensuring adequate water supplies for firefighting efforts.

Dry Hydrant - photo provided by www.firewise.org

Local Stream - photo provided by www.firewise.org

Fire Agency Notification:
The appropriate authorities should be notified in writing before any water system is constructed or altered, and before site development or construction of any building takes place so that fire protection needs can be evaluated and sufficient water supplies established.

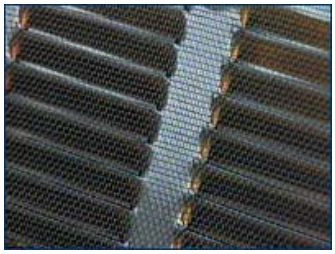
Signing Water Supplies:
Each hydrant or access to water should be identified with a fire-resistant reflecting sign with the words “Draft Water” or “Pressure Water.” Signs should have letters at least 4 inches high with a half inch stroke, reflective and of contrasting color, and should be located near the water access.

Structural Design and Construction Guidelines

All new buildings to be constructed in rural areas shall be designed and constructed to comply with the applicable codes as adopted by the Commonwealth of Kentucky. The Kentucky Residential Code (KRC) is applicable to one- and two-family dwellings and accessory structures. The Kentucky Building Code (KBC) is applicable to all commercial buildings regardless of size or occupancy. Please visit the web site, http://dhbc.ky.gov/ for more information.
Structures and developments in or adjacent to wildland fire hazard areas should be located, designed and constructed to minimize the possibility of ignition from a wildfire and to minimize the spread of a structural fire to the wildland.

Roofing:
Roof coverings should meet Class C standards or the minimum as determined by the referenced building code standards. Subdivision covenants, conditions and restrictions should not require the use of roof covering materials that are not classified as meeting Class C roof covering requirements.

Asphalt Shingles



Wire Mesh Vent

Cantilever Balcony

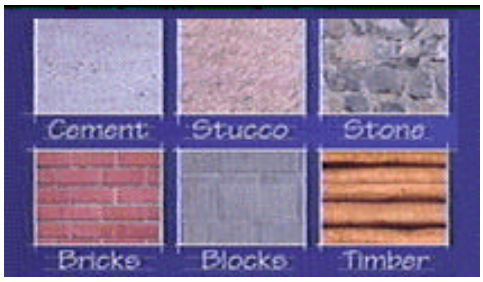
Photos provided by www.firewise.org

Vents:
All vents in roofs, gables and eaves should be screened with corrosion-resistant, noncombustible wire mesh with openings no larger than one quarter inch. (NOTE: This is a requirement of both the KRC and KBC.)

Overhangs and Stilt Construction:
Eaves, cantilever balconies and other overhangs should be enclosed with half-inch nominal sheathing or the equivalent. Decks and other structures with stilt construction should have their undersides completely enclosed with one-half inch nominal sheathing, or an equivalent material. Unusable space beneath should be screened.

Windows:
All windows and glazed openings within 30 feet of concentrations of vegetative fuels should be provided with closable, solid, exterior shutters, especially in areas of highly hazardous fuels, such as pine or spruce.

Exterior Walls:
Exterior walls should be constructed of at least one-half inch sheathing or an equivalent material. Exterior sheathing should extend from the roof line to ground level.



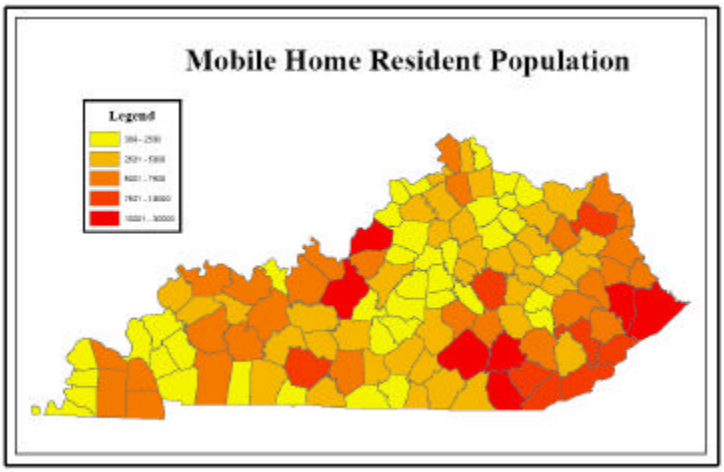
Examples of Fire-Resistant Exterior Walls - photo provided by www.firewise.org


Chimney with Venting and Spark Arrestors - photo provided by www.firewise.org

Chimneys and Flues:
All chimneys and flues should be provided with an approved spark arrestor made of 12-gauge welded or woven wire mesh with holes no larger than one-half inch. A 10-foot clearance should be maintained between all chimney or flue outlets and any obstruction or vegetation.

Spark arrestor shall mean a chimney device constructed in a skillful-like manner. The net free area of a spark arrestor shall not be less than four times the net free area of the outlet of the chimney. The spark arrestor screen shall have heat and corrosion resistance equivalent to 12-gauge wire, 19-gauge galvanized wire or 24-gauge stainless steel. The opening shall not permit the passage of spheres having a diameter larger than one-half inch and shall not block the passage of spheres having a diameter of less than three-eighths inch.

Manufactured Homes:
Manufactured homes should meet all applicable construction and safety standards and should be provided with full skirting constructed of one-half inch nominal sheathing or an equivalent material. All porches and sundecks should be constructed of fire-resistant materials and should have their undersides enclosed with one-half inch nominal sheathing or the equivalent. No homes should be located or set without the approval of the manufactured housing section of the State Fire Marshal's Office. Please visit the web site, http://dhbc.ky.gov/sfm/Pages/default.aspx for more information.



Graphic provided by KY Office of Housing, Buildings and Construction

Controlling Open Burning

Debris burning is one of the highest risk activities in rural areas. It accounts for more than 27 percent of all wildfires in Kentucky. Debris burning typically takes place in close proximity to rural structures. Local communities and fire departments should strongly consider taking steps to address this risk.

Reducing the Risk of Debris Fires:
There are many steps local governments can take to reduce the risk of wildfire that debris burning poses. There are alternative methods of disposing of these materials that do not involve the risk of wildfire. Yard wastes such as leaves and needles can be plowed into garden areas to enrich the soil. Local and state regulations may address other open burning issues. The Kentucky Division of Waste Management, Division of Forestry and Division for Air Quality should be consulted, as well as local officials.

Composting Yard Wastes:
Brush can be chipped and used as a ground cover outside of the 30-foot fuel break area. Small to moderate amounts of leaves can be chopped with a lawn mower and allowed to decompose on the lawn.

Another approach is to limit debris burning to certain types of materials during periods of low fire risk. For example, debris burning could be limited to brush and large woody material only, during those periods when the ground is snow-covered.

Graphic provided by KY Division of Forestry

Insurability in Intermix Areas
In addition to the safety concerns, insurance companies have other issues related to wildland intermix. Historically, insurance companies have viewed the fire peril with more scrutiny than wind, hail or theft. That focus has changed in recent years due to the high number of claims from weather-related catastrophes, which can occur anywhere. However, as more structures are being built in the intermix areas, fire exposure is again catching the attention of insurance underwriters.

Insurability in Intermix Areas

Many of the defensible space recommendations listed in this document are also insurance underwriting characteristics that homeowner or farm owner rates are based upon. Items such as water supply and vehicular accessibility are key not only in ratemaking, but also in whether the insurance company will accept the risk at all. A fire hydrant located within a few yards of the property can yield a premium savings while a structure that is largely inaccessible to fire department vehicles would likely be declined. Firewood, gas, oil, brush growth, etc., located near the structure would also likely raise a red flag to an insurance underwriter concerned with fire exposure.

There are mitigation initiatives that can either produce insurance discounts or at least persuade a concerned underwriter that a risk is of an acceptable nature. Typically, underwriters look for structures located within five miles of a responding fire department. A local fire hydrant, like that mentioned above, is preferred. The structure needs to be visible and accessible from a main highway and the insured would need to have utility service, notably phone service, to call the responding fire department in the event of an emergency. Fire/burglar alarms typically earn a discount on a policy, while automatic sprinkler systems are so successful at mitigating the fire damage that a discount is guaranteed by statute.

Massive Tire Fire - Photo provided by Tire Recycling Management Association of Alberta, Canada

Construction Debris Fire - Photo provided by CA Firesafe Council

Community Action Planning

Community Wildfire Protection Plans:
The Healthy Forests Restoration Act (HFRA) passed by Congress in 2003 provides communities with a tremendous opportunity to influence where and how federal agencies implement fuel reduction projects on federal lands. A Community Wildfire Protection Plan (CWPP) is the most effective way to take advantage of this opportunity. Communities with a CWPP in place will be given priority for funding of hazardous fuels reduction projects carried out under the backing of the HFRA.

The *minimum requirements* for a CWPP as described in HFRA are:

* *Collaboration:* A CWPP should be collaboratively developed by local and state government officials, in consultation with federal agencies and other interested parties.
* *Prioritized Fuel Reductions:* A CWPP should identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatments that will reduce the risk from wildfire for communities.
* *Structural Ignitability Treatment:* A CWPP should recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan.

Organize a Firewise Council or Board:
If the community is determined to have homes in the wildland/urban interface that are considered at risk, community representatives create a multi discipline Firewise council or board that can include homeowners, fire professionals, local government officials, and/or members of other interested groups. Members should be informed that developing a Wildland/Urban Interface Firewise Plan often takes as long as six months.

Conduct Home Risk Assessments:
At the organizational meeting of the Firewise board a date is scheduled for the Firewise coordinator or specialist to meet with fire department personnel for training in completing the Kentucky Wildland Fire Risk and Hazard Severity Assessment forms for homes in the wildland/urban interface.

Develop a Firewise Plan:
Upon completion of the individual home assessments, the Firewise board uses it as a basis for developing a Firewise plan that contains agreed-upon, area-specific solutions to its wildfire issues. All members of the Firewise board must concur with the final decisions. Their recommendations are presented to, and approved

by, the Firewise coordinator. The coordinator may, at that time, work with the community to seek project implementation funds, if necessary. Local solutions are implemented following a schedule designed by the local Firewise board and Firewise coordinator.

Sponsor Annual Firewise Day(s):
The Firewise plan prepared by the Firewise board contains specific action items that can be implemented by homeowners with assistance from the Kentucky Division of Forestry and/or the local fire department. When they are executed, they are called "Firewise Days." A Firewise Day must be held each year in order to maintain recognition status. Firewise Days can include chipping days, public awareness events, brush cleanups, etc.

Invest a Minimum of $2/Capita:
Firewise communities are able to quantify their concern about the wildfire issue. To this end, they are willing to invest $2/capita in Firewise projects each year. This means that in a community of 200 residents, $400 will be invested in projects named in the plan prepared by the Firewise board. Volunteer hours, use of equipment and time spent by fire department personnel staff can be included in this figure, as can state or federal grant dollars.

Certification as a Firewise Community:
Firewise Communities/USA recognition status is achieved when the Firewise coordinator approves the community's completed Firewise plan and after the community has completed one Firewise project. At that time, a board member can download the Firewise Communities/USA application form from the program's Web site, www.firewise.org/usa. Upon certification by the Kentucky state forester, the Firewise coordinator forwards the completed application to the national Firewise program office. A special ceremony will be held in the community after certification as a Firewise Community/USA with all agencies and organizations involved in the process.

Graphic provided by www.firewise.org

Continued Certification:
A permanent Firewise task force, committee, commission or department is created that will maintain the program into the future. Recognition renewal must be completed by Dec. 31 each year. Recognized communities submit documentation indicating continued community participation to the Firewise coordinator. Renewal forms are downloadable at www.firewise.org/usa.

For more information on preparing a Community Wildfire Protection Plan go to: http://www.safnet.org/publications/cwpp_oct08.pdf or contact the Kentucky Division of Forestry at 502-564-4496.

Appendix A - State Government Resources and Contacts

Kentucky Division of Forestry
http://forestry.ky.gov/

Office of Housing, Buildings and Construction
http://dhbc.ky.gov/

Office of Insurance
http://insurance.ky.gov

Area Development Districts
http://www.bgadd.org/index1.html

Division for Air Quality
http://air.ky.gov/

Division of Waste Management
http://waste.ky.gov/

Governor's Office for Local Development
http://www.dlg.ky.gov

Result of Using Defensible Space Techniques - Photo provided by CA Firesafe Council

Result of **Not** Using Defensible Space Techniques - Photo provided by CA Firesafe Council

THE CHOICE IS YOURS!

Appendix B - Other Resources for Additional Information

Federal Emergency Management Agency
http://www.fema.gov/

Wildland/Urban Interface Fire Hazards
http://www.firewise.org/Information

Firewise Construction
http://www.interfacesouth.org/products/publications

Firewise Landscaping
http://www.firewise.org/Search.aspx?q=firewise%20landscaping

Fire Safe Council
http://www.firesafecouncil.org/

Kentucky Firewise Program
http://forestry.ky.gov/wildlandfiremanagement/

National Fire Plan
http://www.forestsandrangelands.gov/

National Fire Protection Association
http://www.nfpa.org

National Firewise Program
http://www.firewise.org

National Wildfire Coordinating Group
http://www.nwcg.gov/

Southern Center for Wildland-Urban Interface Research and Information
http://www.interfacesouth.org/

U.S. Fire Administration
http://www.usfa.fema.gov/

Wildland Urban Fire Research
http://www.firelab.org