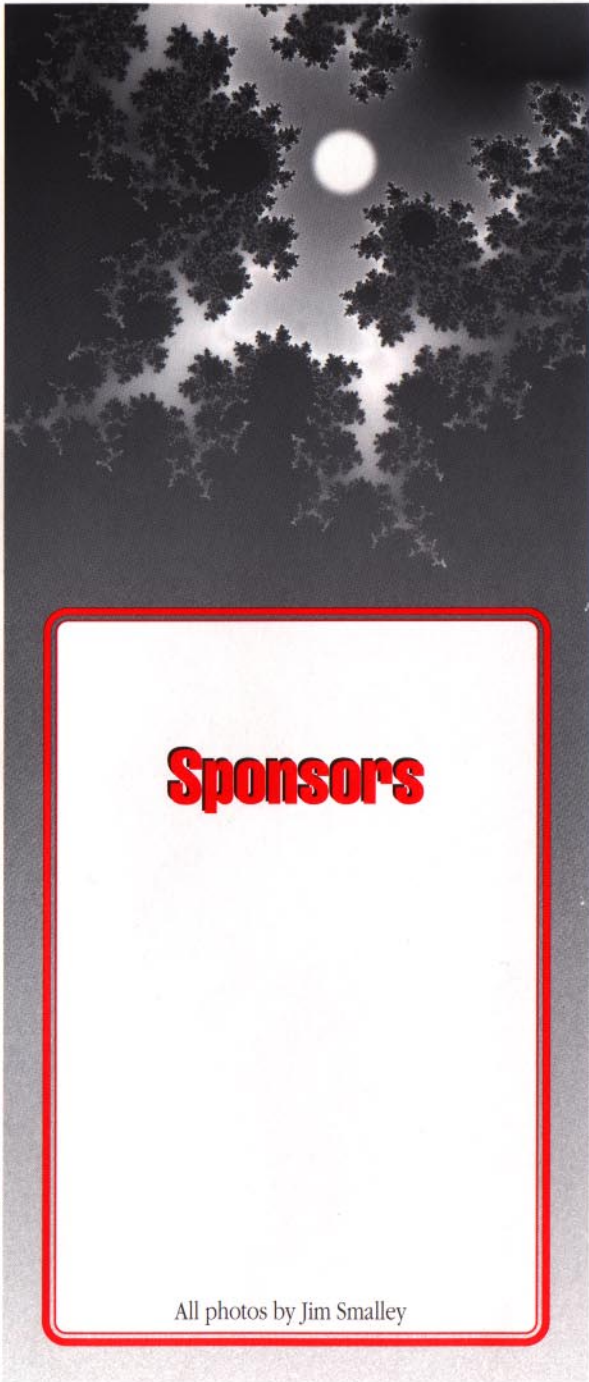


**FIRE PROTECTION
IN THE WILDLAND/URBAN INTERFACE:**

EVERYONE'S RESPONSIBILITY





**FIRE PROTECTION
IN THE WILDLAND/URBAN INTERFACE:**

EVERYONE'S RESPONSIBILITY



**A PUBLICATION OF THE
NATIONAL WILDLAND/URBAN INTERFACE FIRE PROTECTION PROGRAM**

sponsored by the

NATIONAL ASSOCIATION OF STATE FORESTERS

NATIONAL FIRE PROTECTION ASSOCIATION

UNITED STATES DEPARTMENT OF AGRICULTURE FOREST SERVICE

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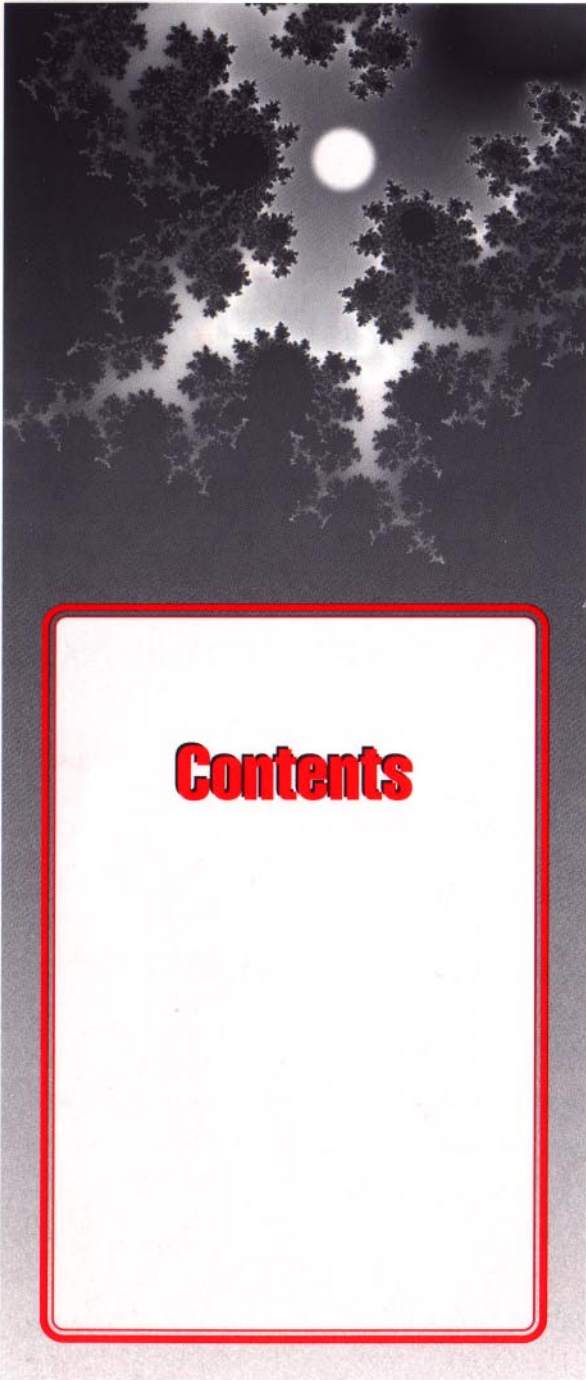
Bureau of Land Management

Bureau of Indian Affairs

Fish and Wildlife Service

National Park Service

UNITED STATES FIRE ADMINISTRATION



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EVERYONE'S RESPONSIBILITY



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FIRE PROTECTION IN THE WILDLAND/URBAN INTERFACE

Interface and Intermix

The National Wildland/Urban Interface Fire Protection Program originally used the term “interface” in a generic way to describe any area where potentially dangerous combustible wildland fuels were found adjacent to combustible homes and other structures.

As uncontrolled fires in these wildland/urban interface areas became more of a concern to fire protection agencies and affected residents, the term came to be more narrowly defined.

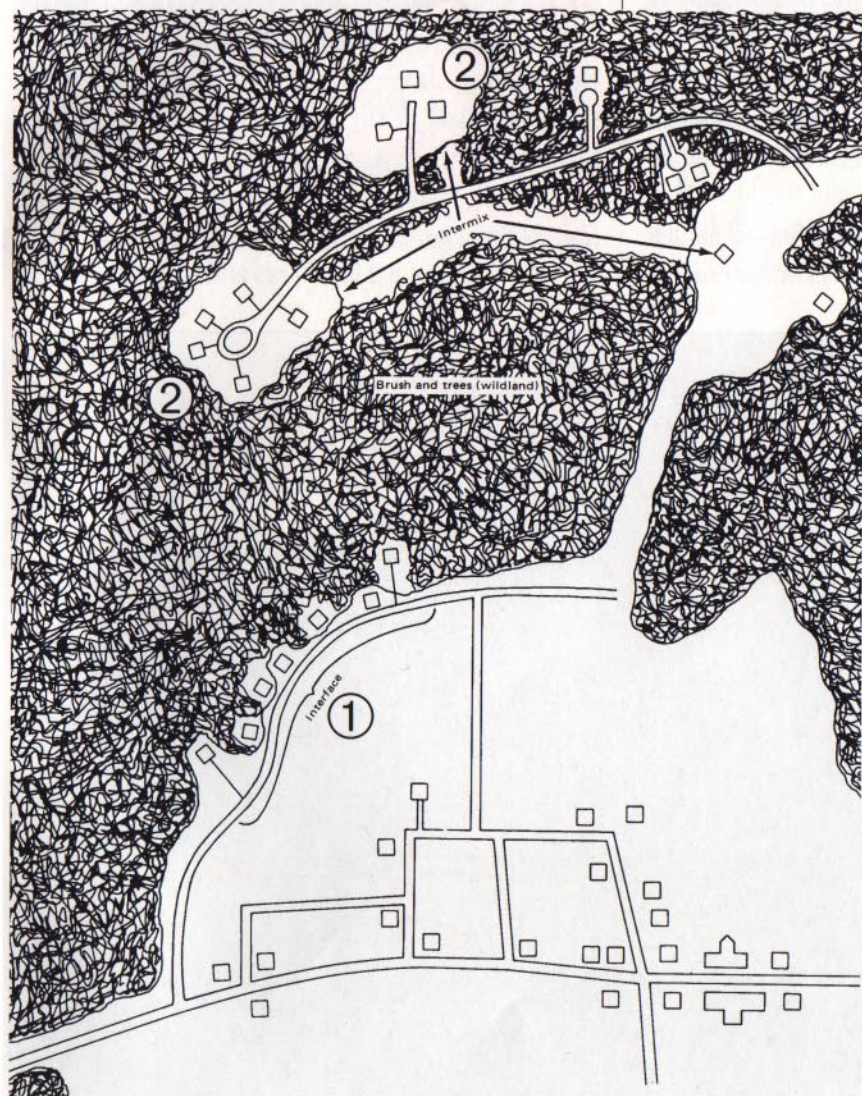
NFPA 299, *Standard for Protection of Life and Property from Wildfire*, 1991 edition,

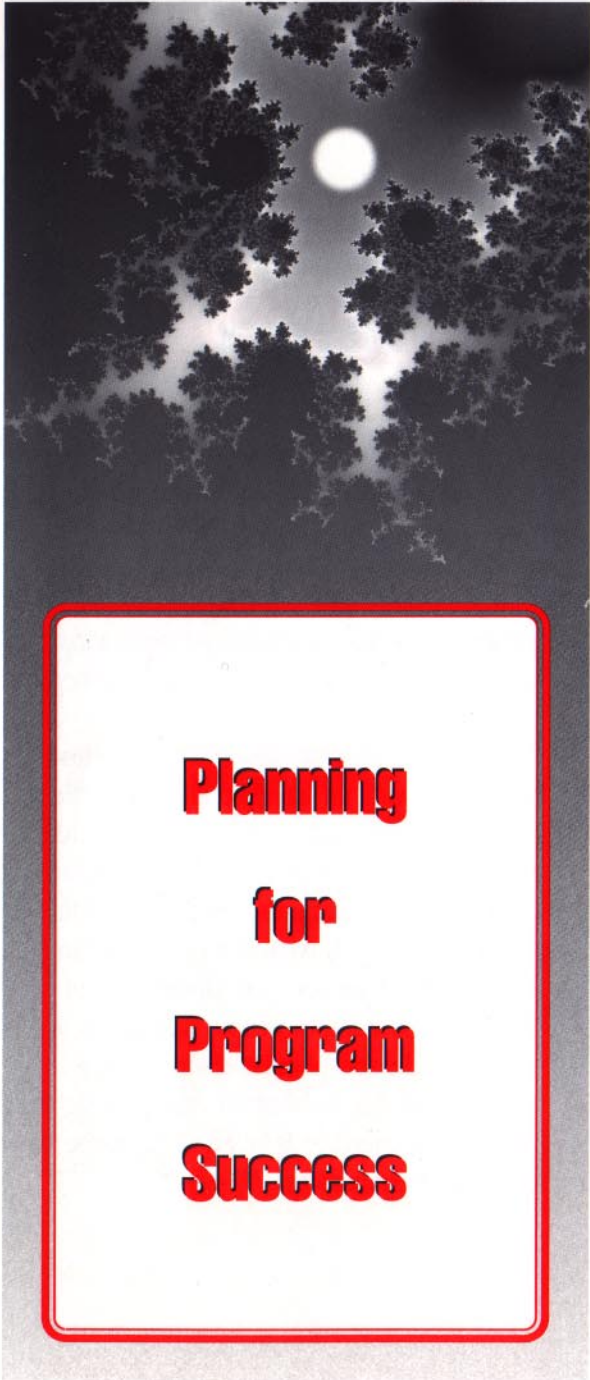
defined wildland/urban interface as “an area where development and wildland fuels meet at a well-defined boundary.

Meanwhile another term, wildland/urban intermix, served to differentiate a more specific type of area. NFPA 299 defines this intermix as “an area where development and wildland fuels meet with no clearly defined boundary.”

The diagram shown here from NFPA 299 illustrates both terms, showing an interface area ① as the first wave of structures adjacent to dense wildland vegetation. The intermix areas ② show as individual homes or pockets of structures completely surrounded by wildland fuels. Each type of wildland/urban area has unique fire protection considerations, but both represent a single trend of people wanting to live in scenic and less densely populated surroundings.

Throughout this publication the generic term wildland/urban interface is used to describe both interface and intermix areas.





Wildland/urban interface areas exist wherever homes are nestled among trees and other combustible vegetation. Whether near large urban areas or in remote rural locations, interface areas exist all over the United States. These areas are increasing in number for very simple reasons: usually they offer such benefits as scenic beauty, economy and escape from the pressures of previous city life styles as well as current city careers.

These advantages of interface living have been enough to generate and sustain a significant population shift from urban living to increased living among the forests and wildlands.

One problem in all of this is that fire—a natural element in any forest or wildland—will under predict-

able conditions sweep through the vegetation that is adjacent to a combustible home in the interface. Major wildland fires can quickly grow to sizes that require armies of fire fighters to control. When major fires do occur, they easily jump from burning vegetation to nearby homes.

The scope of the problem first reached wide national attention in 1985, when wildland fires across the country damaged or destroyed 1,400 homes. It became clear that most home-owners who were moving to the scenic wildland/urban interface were not fully aware that they were living with increased risks from fire.

Even fire officials who were aware of the implications of these increasing fires were facing conflicts from the differences of wildland fires and structural fires.



“

**Each level of government,
and ultimately each citizen,
shares the responsibility
for both fire protection
and fire prevention.**

”

House fires are traditionally controlled by municipal fire fighters using hoses and water from established fire mains and hydrants. As structural fire fighters in a densely built-up city, they depend on rapid response to catch the fire while it is still relatively small, so that less water will be needed.

Wildland fire fighters, on the other hand, are traditionally funded by agencies whose mission is to protect the wildlands and their valuable natural resources themselves. These fire fighters are equipped and trained to attack the broad, fast-moving fronts of wildfires indirectly, usually by establishing a defensible perimeter in front of the fire and clearing out all fuel along the line of the perimeter. When the wildfire advances as far as the cleared line, the flames will become starved of fuel.

Fires in the interface present disadvantages for both types of fire fighters. Most interface areas do not have established water systems providing the large volumes of water needed for structural fire fighting. Meanwhile, the number of homes throughout an interface area made

the perimeter control method of fire control not very efficient to those home owners who were on the same side of a defensible perimeter as the fire itself.

An aerial view of an interface area can demonstrate another consideration. From an airplane window, a single glance might encompass a broad, uninterrupted expanse of forest. Yet part of that scene may include the

edge of a national forest, numerous private homes, commercial areas, and separate jurisdictions of the state, the county and individual towns. It is easy to see that if wildfire began to sweep across this expanse of forest, it would not directly be affected by the separate lines of jurisdiction that exist on maps and organizational charts. Attacking the fire would clearly be a joint effort of all of the affected jurisdictions.

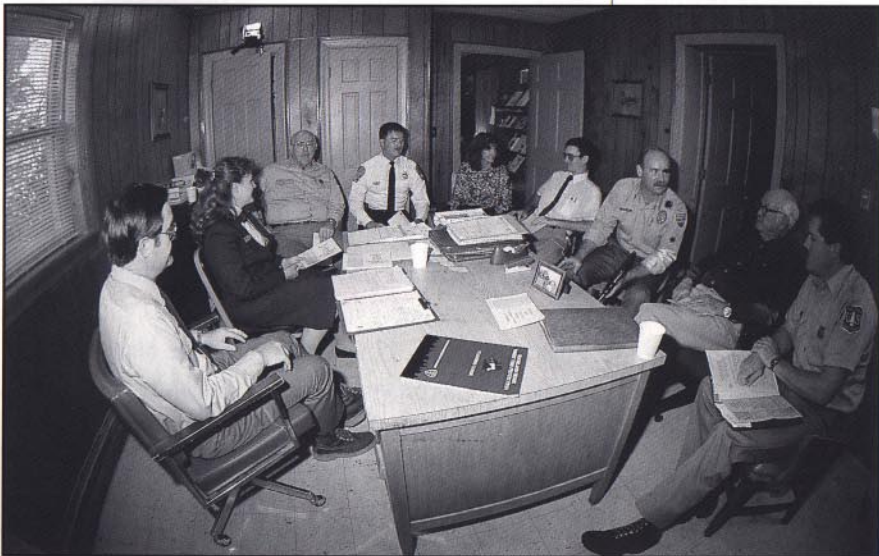
Fire protection in interface areas is not the responsibility of any single agency. Every fire affects numerous organizations and the entire community. When wildland/urban interface fires occur, community services are strained; natural resources, homes and precious family possessions are destroyed; and jobs, civic pride and even lives can be lost.

Even when separate agencies learn to work together more effectively to control fires, their joint effort is still not enough to prevent all fires. Individual homeowners must do their part to minimize the risks faced by their individual interface structures.

Recent history, including the disastrous record of 1985, demonstrates how the issue of interface fires cannot be simply pushed into a corner and ignored. Such attitudes isolate one resource from another, and there is no cooperation to solve the growing problem and threat of wildland/urban interface fires.

This booklet is a companion publication to a videotape that looked at three communities where attitudes are changing, where wildland/urban interface fire protection has become...everyone's responsibility.

Planning interface fire protection cannot be left to "the other guy." Each level of government, and ultimately each citizen, shares the responsibility for both fire protection and fire prevention.



6

Successful programs in the three communities highlighted in this publication share the following five traits, among others.

“

Secure interagency cooperation

- Obtain the commitment of the separate agencies to work together
- Examine your problems together
- Set joint goals and objectives
- Develop programs and policies
- Approve and implement the plan
- Evaluate and revise the program as needed

”

■ Identify the particular interface fire problems of the community

Though many equate wildland fires to the western United States, the potential for devastating fires exist in all states and affect communities of any size. Interface fire problems *are* different in different parts of the country. The Pine Barrens of New Jersey are vastly different from the sloping California hillsides covered in chaparral, but both can threaten nearby home-owners. Lightning fires are a regular danger in the West, but lightning is insignificant as a cause of wildfires in Virginia and other eastern states.

■ Define roles for the affected agencies and individuals

Changing attitudes and behavior is a complex task even when the goal seems simple: to reduce the threat from fire faced by interface homes. The value of involving all of the affected agencies and individuals has long been understood. Once the goal has been defined and the team has been selected, the roles of the team members must be defined to improve efficiency and to prevent wasted or duplicated effort. The best organizational effort will be able to harness the strengths of each team member. Roles are best defined when the process is done formally, in writing.

■ Secure interagency cooperation

The value of interagency cooperation is clear: a team/group can accomplish more than an individual when the goal affects a large number of people. The tough part is getting separate agencies with different priorities and perspectives to work together. To help this cooperative process, the National Wildland/Urban Interface Fire Protection Program published a video entitled *Building Interagency Cooperation: A Six-Step*

Process to Help You Improve Your Fire Protection Effectiveness. The six steps are:

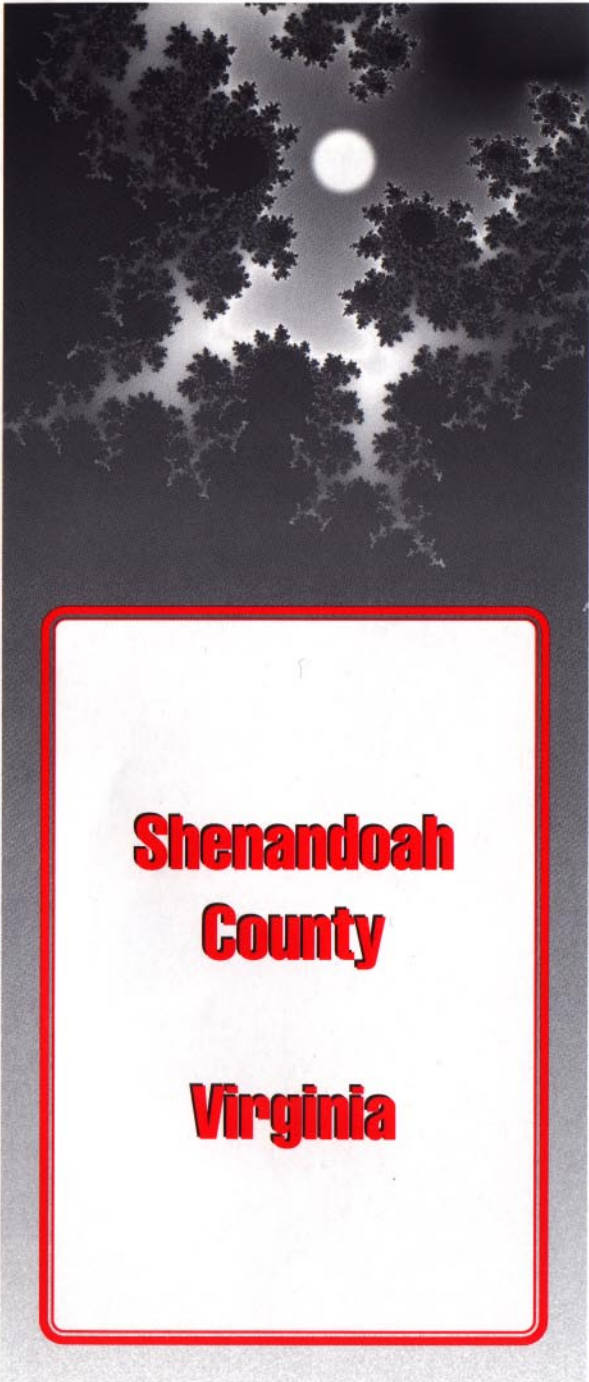
- Obtain the commitment of the separate agencies to work together
- Examine your problems together
- Set joint goals and objectives
- Develop programs and policies
- Approve and implement the plan
- Evaluate and revise the program as needed

■ Develop public support

If lack of public awareness of interface fire safety contributed to the dangerous conditions seen in many areas, better public education will be a key element in improving those conditions. The first task, and the hardest, is to get the public's attention. In this sense, there are many publics. The fire services are a public, builders are a public, and home-owners are a public. To reach varied publics with such a wide demographic range requires an extensive and intensive media campaign involving a maximum sharing of information about every aspect of the problem. Examples of some projects and publications are listed in the Appendix.

■ Implement, coordinate and evaluate programs

Ultimately, it takes action to change public attitudes and behavior regarding fire safety. The successful programs profiled in this booklet show that there is no single answer or approach that will produce perfect fire safety in every community under all conditions. Good planning is essential, but eventually those plans must be translated into programs that are implemented and coordinated to keep them on target. After the programs get under way, an objective evaluation helps measure the success and serves to refocus efforts as needed to improve success.



Shenandoah County covers more than 325,000 acres along Interstate I-81 and I-66 corridors leading to the Washington, D.C. metropolitan area. More than half of the acreage is in forestland and another 20 percent is part of the George Washington National Forest. The population is just over 31,000.

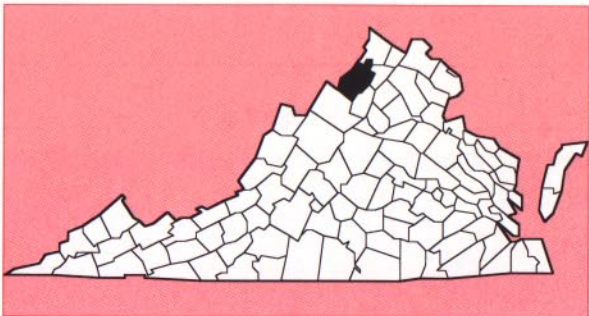
Identify fire problems

The Virginia Department of Forestry understands that the problems of forest fires and homes are inseparable. Forest fires can endanger and burn homes. Fires that start as structural fires can spread to the forest. Although the threat of wildfire is not as great in Virginia as in some other parts of the country, wildfire officials were fully aware of the growing potential. Shenandoah County had experienced three recent wildland/urban interface fires that had burned 10 or more homes each. Local officials naturally wanted to prevent future disasters.

Virginia's good overall record of avoiding disastrous fires contributed to an element of complacency, which can be seen by the inadequate attention to fire protection planning for home sites and recreation areas by woodland home residents and developers.

To gain useful information the Department of Forestry in 1979 began a survey of the number of development areas in the Commonwealth (a development was

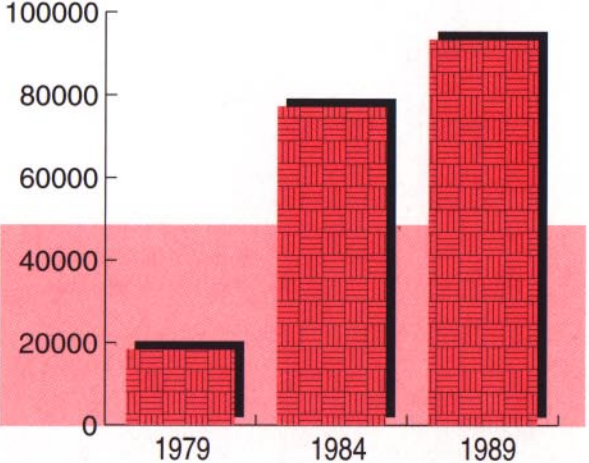
Year	Woodland Developments	# Dwellings
1979	524	18,303
1984	1,724	77,053
1989	2,443	93,271



Shenandoah County. Close to Washington, DC, but with half of its area forested.

defined as 10 or more homes...individual homes in close proximity to forested areas were too numerous to count) that were potentially threatened by wildland fire. Growth in the number of developments could be seen in subsequent surveys in 1984 and 1989.

Going up! The number of woodland homes in organized developments is increasing rapidly in Virginia. An update of these figures is due for 1994.



Firesafe in the Interface



Creating an identity. The Virginia Department of Forestry created this logo to provide more recognition and focus to the Initiative.

Define roles

Affected agencies and individuals in Shenandoah County established the Wildland/Urban Interface Fire Protection Demonstration Initiative in 1991. A major goal was to increase the public awareness of the wild-fire problems occurring due to the shift from urban to more rural living,

A full-time program coordinator served to provide regular contact and communications. This Wildland/Urban Fire Coordinator was an important part of Virginia's effective planning effort.

"It's my opinion after seeing how this has worked," says the Shenandoah County Fire Marshal, "that it is necessary to have a coordinator. Each of the various

players—the organizations and the people—have very busy schedules, and no one has time to implement it all on their own. Having a facilitator can coordinate the organizations and the people so that you help things to happen in a much shorter span of time, and you make sure those things *do* happen."

Implement programs

Using the results of the Department of Forestry surveys of wildland homes, the Initiative began to analyze the major risk areas in the county. A forest fire hazard rating system and a mapping system became important tools for the analysis.

Sixty woodland subdivisions were chosen to be the



WOODLAND HOME FOREST FIRE HAZARD RATING

Subdivision name: _____

Fire Department jurisdiction: _____

Location: _____

Tax map # _____ Date established: _____

	X		+		+		+		+		=	
①		②		③		④		⑤		⑥		▲

Fuel Hazard Rating multiplied by the **Slope Hazard Rating** plus the **Structure Hazard Rating** plus the **Safety Zone Rating** plus the **Emergency Access Rating** plus **Other Factors Rating** equals the **FIRE HAZARD RATING**

Number of acres: _____ Number of homes built: _____
 Number of lots: _____ Number of homes under construction: _____

If you photocopy this form, use the blank reverse side to note additional information or special features.

SAFETY ZONE RATING

Choose the predominant range that best represents the number of homes that do not have at least 30 feet of defensible space (safety zone) between home and fuel.

- 30% of homes [3 points]
- 31–60% of homes [6 points]
- 61–100% of homes [10 points]

Safety Zone Rating Total: ④

ADDITIONAL FACTOR RATING: OTHER

- Most roads and streets are not marked with names or numbers on clearly visible signs [2 points]
- Subdivision entrance is not marked [2 points]
- Individual home locations or addresses are not marked [2 points]
- Power lines are not buried [2 points]
- Area does not have municipal water sources [2 points]
- Area does not have static water sources [2 points]
- Area is more threatened due to special situation such as high density of homes and distance from fire department [2 points]
- How easily can area be plowed or raked for fireline, based on steepness or rockiness?

Easy 1.....2.....3.....4.....5 Difficult

Plow line: _____ [points]
 Hand line: _____ [points]

Other Factors Rating Total: ⑥

FUEL HAZARD RATING

Choose the predominant type.

- Light, low-hazard fuels [1 point]
(Short grasses, weeds, few shrubs, or mature hardwoods with no understory)
- Medium-hazard fuels:
 - Woodland [2 or 3 points]
(Mixed upland forest with fairly open understory with leaf litter and small shrubs)
 - Small, flashy fuels [2 or 3 points]
(Abandoned fields; brush, large shrubs, small trees, cedars, tall grasses)
- High-hazard fuels:
 - Woodland [4 points]
(Mixed upland forest with heavy large brush, evergreens, downed trees & limbs, and ladder fuels)
 - Large, flashy fuels [5 points]
(Evergreen timber stands)

Fuel Hazard Rating Total: ①

SLOPE HAZARD RATING

Choose the predominant slope range.

- Mild slopes, 0–5% [1 point]
- Moderate slopes, 6–15% [2 points]
- Steep slopes, 16–25% [3 points]
- Extreme slopes, 26% or greater [4 points]

Fuel Hazard Rating Total: ②

STRUCTURE HAZARD RATING

Choose the predominant combination of design characteristics. (Ratings occurring between those shown shall be assigned where they represent areas of mixed structures)

- Noncombustible roof and noncombustible siding materials [1 point]
- Noncombustible roof and combustible siding materials [3 points]
- Combustible roof and noncombustible siding materials [7 points]
- Combustible roof and combustible siding materials [10 points]

Structure Hazard Rating Total: ③

ADDITIONAL FACTOR RATING: ACCESS

Other factors may be permitted in addition to those listed.

MEANS OF ACCESS FOR EMERGENCY VEHICLES

- There is only one means of access into the subdivision [3 points]
- Road width(s) does not allow 2-way emergency vehicle traffic (Road surfaces less than 16 feet wide) [3 points]
- Road grade(s) are more than 15% [2 points]
- Dead-end roads do not have adequate turnarounds, such as a 100-ft cul-de-sac [3 points]
- Existing bridge size(s) limit some access of emergency equipment [3 points]

Emergency Vehicle Access Rating Total: ⑤

How to use the Fire Hazard Rating Form

Mark the box to choose the predominate type of fuel.
Record the points associated with that choice at ❶.

Mark the box to choose the predominate slope range.
Record the points associated with that choice at ❷.

Mark the box to choose the predominate structural materials of the roof and siding.
Record the points associated with that choice at ❸.

Mark the box to choose the predominate range of safety zone.
Record the points associated with that choice at ❹.

Mark the box to choose the means of access for emergency vehicles.
Record the points associated with each marked choice at ❺.

Mark the box to choose the additional factors of the subdivision.
Record the points associated with each marked choice at ❻.

Do the arithmetic indicated in the selected rating sections in the space provided to produce the final hazard rating.

WOODLAND HOME FOREST FIRE HAZARD RATING

Subdivision name: _____ Fire Department jurisdiction: _____
 Location: _____ Tax map # _____ Date established: _____

Fuel Hazard Rating multiplied by the Slope Hazard Rating plus the Structure Hazard Rating plus the Safety Zone Rating plus the Emergency Access Rating equals the FIRE HAZARD RATING

Number of acres: _____ Number of homes built: _____
 Number of lots: _____ Number of homes under construction: _____

FUEL HAZARD RATING
 Choose the predominant type. [1 point]
 Light, low-hazard fuels (Short grasses, weeds, low shrubs, or mature hardwoods with no understory)
 Medium-hazard fuels: [2 or 3 points]
 Woodland (Mixed upland forest with fairly open understory with leaf litter and small shrubs)
 Small, flashy fuels (Abandoned fields; brush, large shrubs, small trees, cedars, tall grasses)
 High-hazard fuels: [4 points]
 Woodland (Mixed upland forest with heavy large brush, evergreens, downed trees & limbs, and ladder fuels)
 Large, flashy fuels (Evergreen timber stands)
 Fuel Hazard Rating Total: _____

SLOPE HAZARD RATING
 Choose the predominant slope range. [1 point]
 Mild slopes, 0-5% [2 points]
 Moderate slopes, 6-15% [3 points]
 Steep slopes, 16-25% [4 points]
 Extreme slopes, 26% or greater
 Slope Hazard Rating Total: _____

STRUCTURE HAZARD RATING
 Choose the predominant combination of design characteristics. (Ratings occurring between those shown shall be assigned where they represent areas of mixed structures)
 Noncombustible roof and noncombustible siding materials [1 point]
 Noncombustible roof and combustible siding materials [3 points]
 Combustible roof and noncombustible siding materials [7 points]
 Combustible roof and combustible siding materials [10 points]
 Structure Hazard Rating Total: _____

MEANS OF ACCESS FOR EMERGENCY VEHICLES
 Other factors may be permitted in addition to those listed.
 There is only one means of access into the subdivision [3 points]
 Road width(s) does not allow 2-way emergency vehicle traffic (Road surfaces less than 16-foot wide) [3 points]
 Road grade(s) are more than 15% [2 points]
 Dead-end roads do not have adequate turnarounds. [3 points]
 Existing bridge size(s) limit some access of emergency equipment [3 points]
 Emergency Vehicle Access Rating Total: _____

SAFETY ZONE RATING
 Choose the predominant range that best represents the number of homes that do not have at least 30 feet of defensible space (safety zone) between home and fuel. [3 points]
 30% of homes [6 points]
 31-60% of homes [10 points]
 61-100% of homes
 Safety Zone Rating Total: _____

ADDITIONAL FACTOR RATING: OTHER
 Most roads and streets are not marked with names or numbers on clearly visible signs [2 points]
 Subdivision entrance is not marked [2 points]
 Individual home locations or addresses are not marked [2 points]
 Power lines are not buried [2 points]
 Area does not have municipal water sources [2 points]
 Area does not have static water sources [2 points]
 Area is more threatened due to special situation such as high density of homes and distance from fire department [2 points]
 How easily can area be plowed or raked for fueline, based on steepness or rockiness? Easy 1.....2.....3.....4.....5 Difficult [points]
 Plow line: _____
 Hand line: _____
 Other Factors Rating Total: _____

Fire Hazard Rating Results

0-19 points:	Low risk
20-39 points:	Medium risk
40-60 points:	High risk

primary focus of the analysis, with 27 subdivisions rating as high risk and 33 rating as medium risk from wild-fire threat. The analysis also identified other forested areas that would be at high risk if they were later developed. All of these risk areas were color-coded on a map so that anyone could tell at a glance how their subdivision rated.

Secure interagency support

Another critical part of the program is securing the help of other agencies and individuals that can and want to cooperate.

Under the slogan *Firesafe in the Interface*, the Initiative involved an eight-member advisory committee with representatives from county government, developers, planners, fire departments, the USDA Forest Service, home-owners and the insurance field. Each member brought a unique perspective to the group and also served to constantly remind each separate interest that the solution would require a joint effort. The advisory group meets bimonthly and is ready to review any new subdivision plans and to comment as needed on fire protection. Having a clear focus for the program also helps to rally support for fire safety.

Through the representation of various broader interests, any such advisory group can help see that woodland home fire protection information becomes incorporated into county or local comprehensive plans or zoning and subdivision ordinances, in addition to the voluntary plans or covenants of individual resorts or developments.

In Shenandoah County, the advisory group re-



searched and developed a suggested model wildfire ordinance to establish minimum wildfire protection standards for future design and construction of structures and developments within wildfire risk areas. The model ordinance provides for basic emergency access and perimeter wildfire protection. Copies of this model ordinance may be purchased from the Shenandoah County Fire Marshal, 109-D, West Court Street, Woodstock, VA 22664.

Major wildfires typically spread across several jurisdictions and require interagency cooperation to control the fire. Recognizing this, the Virginia Department of Forestry and the Shenandoah County Fire and Rescue Association sponsored a one-day course held in Woodstock in 1993 on *Strategy and Tactics in the Wildland/Urban Interface*. It was designed for fire fighters who may find themselves in a command position in a

wildland/urban interface incident. This course provided participants with the information and skills necessary to establish command, perform size-up, develop and implement an action plan, and organize the incident for fire control.

The brochure for the course warned: "Most fire departments in Virginia will never have an incident that will test their resources and suppression capabilities more than a wildland/urban interface incident."

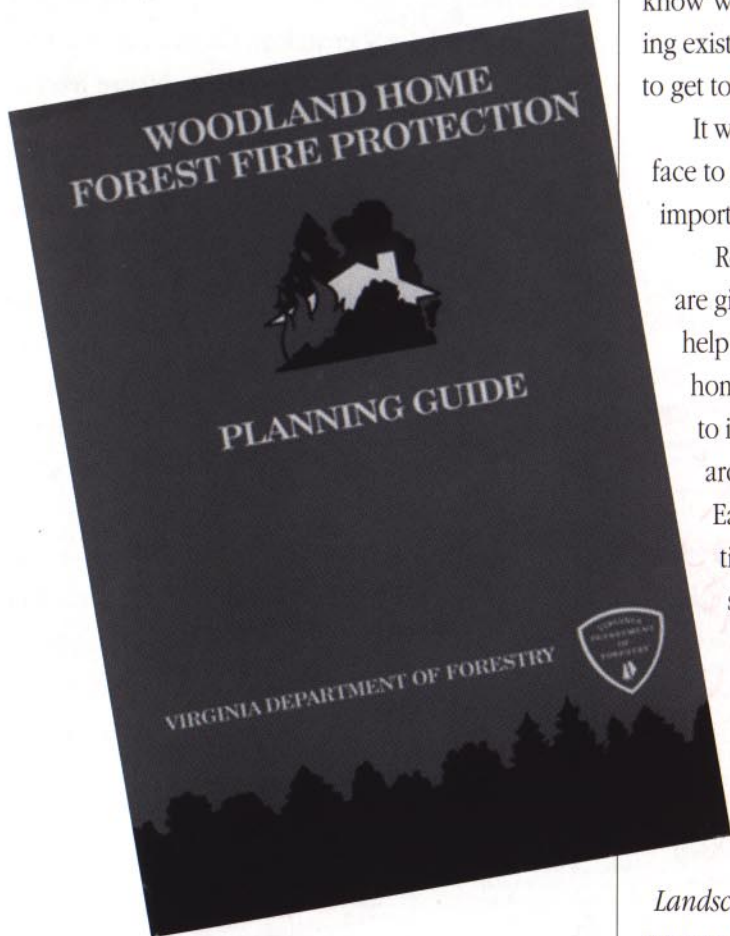
Develop public support

Using the information obtained from the hazard analysis of woodland developments in the county, the program coordinator continued to broaden the level of participation and support.

"There are two ways that we are working," says Wildland/Urban

ACCESS		YES	NO
EMERGENCY VEHICLES CANNOT EASILY REACH THIS HOME		___	___
THE ROAD IS TOO STEEP (GREATER THAN 15% GRADE)		___	___
THE ROAD IS TOO NARROW, AND CANNOT ACCOMMODATE TWO-WAY TRAFFIC		___	___
THE ROAD IS WINDING WITH SHARP TURNS		___	___
THERE IS NO PLACE FOR LARGE VEHICLES TO TURN AROUND		___	___

WOODLAND HOME FOREST FIRE SAFETY CHECKLIST		YES	NO
THE HOUSE		YES	NO
UNTREATED WOOD SHAKE ROOF	___	___	___
FLAMMABLE SIDING MATERIALS	___	___	___
HOME LOCATED ON A SLOPE	___	___	___
HOME BUILT ON POLES OR PILINGS	___	___	___
WOODEN DECK FACING OR OVERHANGING A SLOPE	___	___	___
LARGE GLASS WINDOWS FACING A SLOPE	___	___	___
DECK, PORCH, VENTS NEED TO BE SCREENED-IN TO KEEP OUT SPARKS	___	___	___
CHIMNEY DOES NOT EXTEND ABOVE THE ROOF LINE	___	___	___
CHIMNEY SPARK ARRESTER MISSING	___	___	___
ROOF AND GUTTERS COVERED WITH DEBRIS	___	___	___
AROUND THE HOUSE		YES	NO
LACK OF A FIRE-SAFE ZONE, 30-100 FEET AROUND THE HOME	___	___	___
INADEQUATE CLEARANCE OF WEEDS, TALL GRASS AND BRUSH	___	___	___
LEAVES ARE NOT RAKED	___	___	___
TREES AND SHRUBS ARE TOO CLOSE TOGETHER AND NEED TO BE THINNED, ESPECIALLY IF THEY ARE FLAMMABLE EVERGREENS.	___	___	___
TREES ARE NOT PRUNED 15 FEET FROM THE BOTTOM UP, AND BRUSH AND DEBRIS CAN SERVE AS LADDER FUELS UNDER TREES OR NEAR STRUCTURES	___	___	___
TREE LIMBS OVERHANG ROOF, OR ARE WITHIN 15 FEET LATERALLY, OF A CHIMNEY	___	___	___
HOUSE LOCATION OR ADDRESS IS NOT CLEARLY MARKED	___	___	___
FIREWOOD AND OTHER BURNABLES ARE STORED TOO CLOSE TO THE HOUSE (WITHIN 30 FEET)	___	___	___
THERE IS AN ABUNDANCE OF MULCH NEAR WOODEN STRUCTURES	___	___	___



Information kit: The Virginia Department of Forestry created this detailed information kit to explain to the public and interested agencies about how the Shenandoah County advisory committee was established to develop and guide the progress of a model woodland home fire protection program. Public information is essential in developing public support.

Fire Coordinator Cindy Frenze. “We get everyone together who might be involved in a fire and let them know what and where the problems are.” Approaching existing home-owners associations is an “easy way to get to talk to everyone at once.”

It will not be possible to speak with every resident face to face, so printed and broadcast material is also important.

Residents in at-risk areas of Shenandoah County are given a Woodland Home Fire Safety Checklist to help them evaluate the conditions around individual homes. The checklist asks “yes-or-no” questions to identify what factors contribute to wildfire hazard, but it does not produce a numerical rating. Each “yes” answer gives residents a list of conditions that need to be improved to improve fire safety.

Any resident or building owner can also request an individual evaluation leading to a numerical hazard rating.

Other printed material developed by the Initiative and the Virginia Department of Forestry included a brochure, *Firewise*

Landscaping for Woodland Homes, that offered guidance on landscaping to improve fire protection. Tips were given for vegetation and clearance patterns in three zones of protection around a woodland home: within five feet of the home; between five and 30 feet; and from 30 to 100 feet from the home.

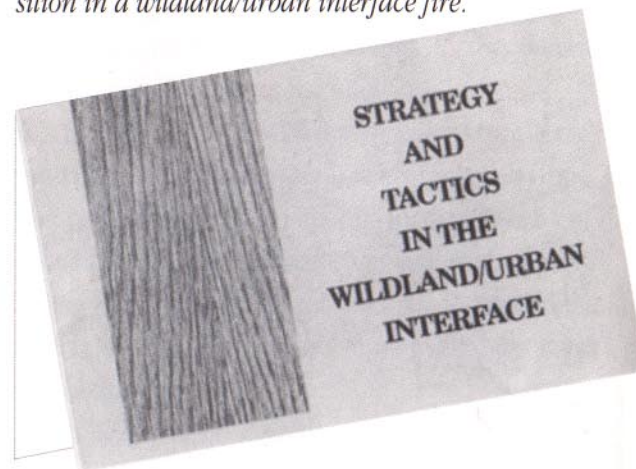
A *Firesafe Building Materials List* provides suggested fire-resistant building materials for woodland homes. These materials are recommended for use in

both siding and roof. The danger of wooden shingles for the most vulnerable part of a home—the roof—are discussed, along with the danger of wooden decks, especially if they overhang steep slopes and flammable vegetation.

A mini-brochure designed to be left hanging on a doorknob was distributed. It included general tips for woodland home fire safety.

The public education effort expanded in 1992. A special wildland/urban interface fire safety conference, *Planning for Fire-Safe Development in the Wildland Area*, was sponsored by the Initiative. There was no registration fee for the one-day conference and lunch was provided. The conference featured a field trip to review fire-safe planning in a model woodland devel-

Securing interagency cooperation: The conference announced on this brochure was designed to help fire fighters who might find themselves in a command position in a wildland/urban interface fire.





A home in a woodland setting is a home surrounded by forest fire fuel and in real danger, if a wildfire is on the loose. Areas where homes meet the forest are called the Wildland/Urban Interface. You can help minimize the fire threat to your home and family by following a few safety steps.

DEFEND YOUR SPACE IN THE INTERFACE

- ◆ Make a fire safe zone around your home. Remove flammable vegetation and leaves at least 30' from the house, and at least 75' if you live in a pine forest, and up to 100' on the downhill side.

DON'T ADD FUEL FOR THE FIRE - BREAK THE 'CHAIN'

- ◆ Examine your house and yard. What can catch fire or carry it to your home?
- ◆ Have nothing flammable within 5' of the house. Occasional trees and shrubs should be at least 10' from the house.
- ◆ Evergreens catch fire easily and burn quickly. Prune lower limbs, thin out the trees or remove them from the safety zone.
- ◆ Leave yard trees and shrubs no closer than 15'-20' apart. Prune lower limbs 15' from the ground.
- ◆ Remove limbs overhanging the roof and chimneys.
- ◆ Clean gutters and roof of leaves and needles.
- ◆ Store firewood and other burnables 30'-100' away from the house.
- ◆ Use fire resistant building materials. Avoid wood shingle roofs.

BE HOMESAFE IN THE INTERFACE

- ◆ Make sure firefighters can find your home. Mark your house location and roads clearly. Can fire trucks get to your home from the road?
- ◆ Have and practice an escape route and plan.
- ◆ Follow State and Local Burning Laws! No outdoor burning March 1-May 15 before 4 pm within 300' of woodland, brushland or field, containing dry grass or other flammable material.
- ◆ Burn Safely! Attend to outdoor fires until they are completely safe and dead out. Most fires are started by people!
- ◆ Dispose of wood ashes in a metal bucket. Soak with water before dumping.
- ◆ Keep fire tools readily available (garden hose, shovel, rake, and ladder).

If you have any questions about protecting your property from forest fire, please contact:

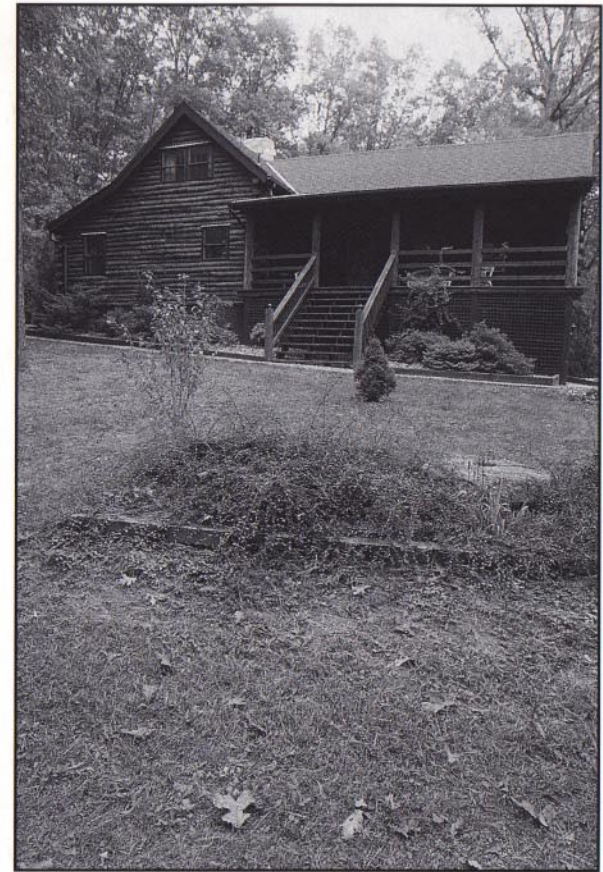
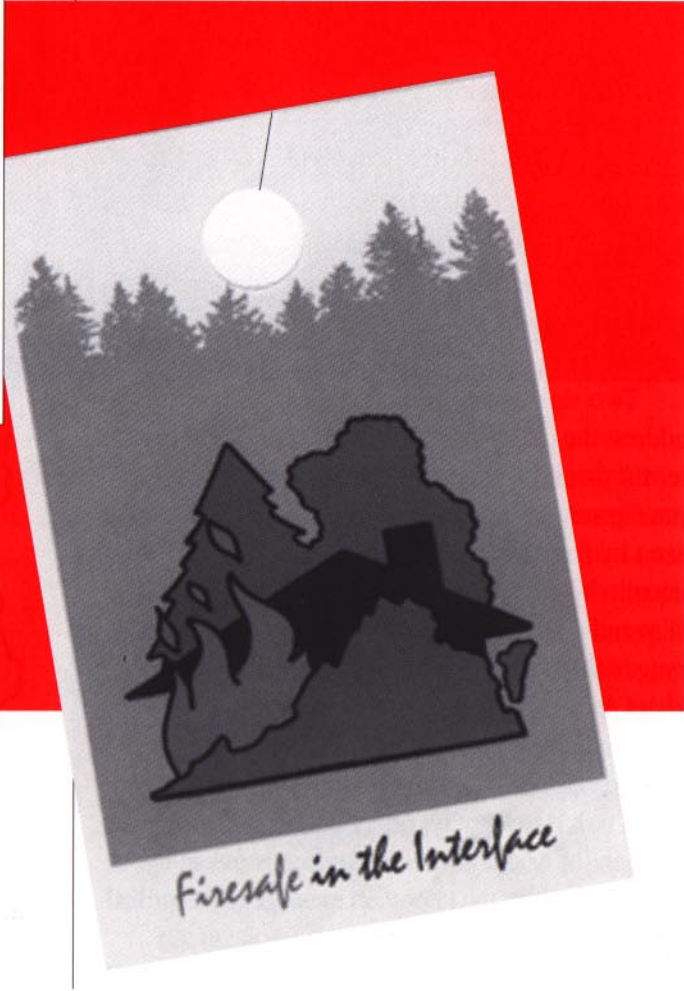


VIRGINIA
DEPARTMENT OF FORESTRY
STATE HEADQUARTERS
P.O. BOX 3788
ALEXANDRIA & MCCORMACK RD.
CIVILIL, VIRGINIA 22303-0788
OFFICE (804) 877-8583
V/TDD 877-8583
FAX 204-3389
EEO/AA

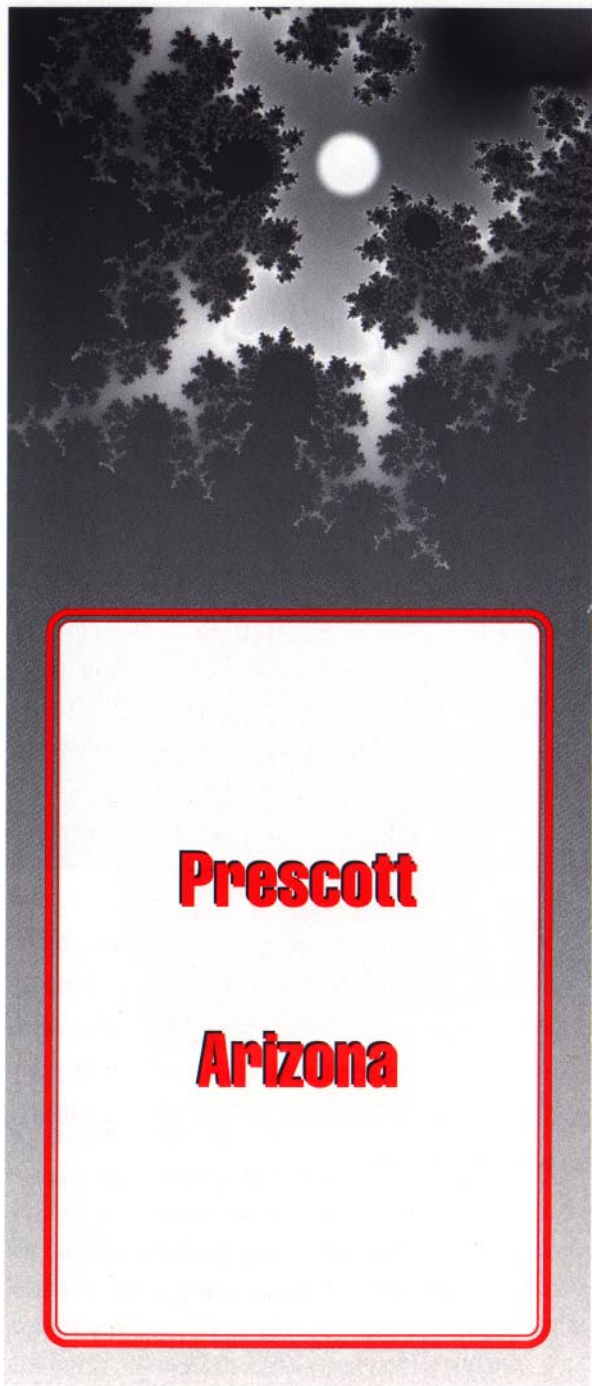
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opment. Other presentations included an overview of the county's forest fire hazard rating system.

Showing the benefits of interagency cooperation once again, the Information and Education Branch of the Virginia Department of Forestry assisted the county by producing a 10-minute video, *Firesafe in the Interface: Protecting Shenandoah County Woodland Homes*.



Success often comes not in leaps and bounds, but in small steps toward a common goal. In Shenandoah County, a small success occurs each time a home-owner takes the available literature and acts on it. As the program thrives, it becomes a model for other counties in Virginia and elsewhere.



Prescott has many qualities that contribute to a growing population base, including mild climate, clean air, beautiful vistas, wildlife, nearby recreational opportunities in more than a million acres of national forest land, and opportunities for solitude. All of this is within 80 miles of the Phoenix metropolitan area, where some three million residents live and seek climatic relief in the hot summers.

With all of these advantages, it is not surprising that the mountainous Prescott area and its valleys have been growing at a phenomenal rate for the last 10 years.

Identify problems

One of the principal challenges facing land managers, planners and government officials in the Prescott area is how to deal with urban growth into forested regions. The increased risk from catastrophic wildfire was a major concern, but other concerns were the demand for recreational access, wildlife conflicts and road access.

Two simple concepts were followed in order to address the problems of the Prescott area. In the short term it would be necessary to develop community and interagency understanding of the potential problems seen by fire officials. Over the long term it would be equally important to develop public interest, leadership and continuity to develop the wide and evolving range of interface problems across the entire county.

A broad-based response to these challenges was the creation in 1990 of the Prescott Area Wildland/Urban Interface Commission in 1990. The Commission's stated task is to identify, prioritize and guide the management of wildland/urban interface issues in the region and to carry the important message of fire protection responsibility to the public.

Secure interagency cooperation

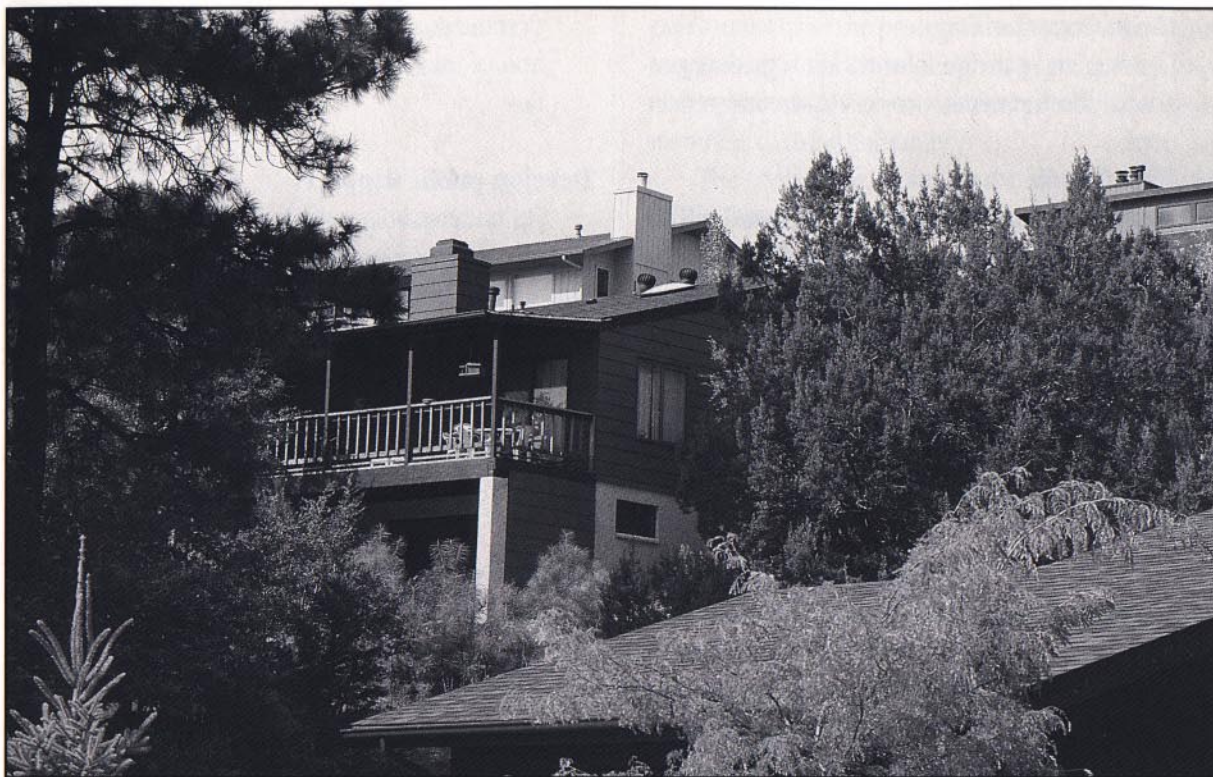
Balancing the increased risk of wildfire across a diverse region meant addressing the problems of multijurisdictional operations. Within the area are several fire districts, a municipal fire department, state land agency and USDA Forest Service—all having fire management responsibilities and reporting to different governmental jurisdictions.

Created in the name of interagency cooperation, the Prescott Area Wildland/Urban Interface Commission includes five jurisdictions and organizations:

- City of Prescott
- Yavapai County
- Central Yavapai Fire District
- Arizona Department of Forestry
- Prescott National Forest, USDA Forest Service



Popular vistas: *The mountainous Prescott area and its valleys have been growing at a phenomenal rate...*



The foundation on cooperation was clearly articulated in the Commission's statement of purpose: "Only through a cooperative effort among these entities and with the citizens of these communities can the multifaceted challenges posed by development of the wildland areas in the Prescott basin be addressed. In view of these considerations, these entities desire to establish an enduring basis for such cooperation and assistance and, therefore, hereby enter into this Memorandum of Understanding."

Define roles

The memorandum of understanding between the Prescott Area Wildland/Urban Interface Commission

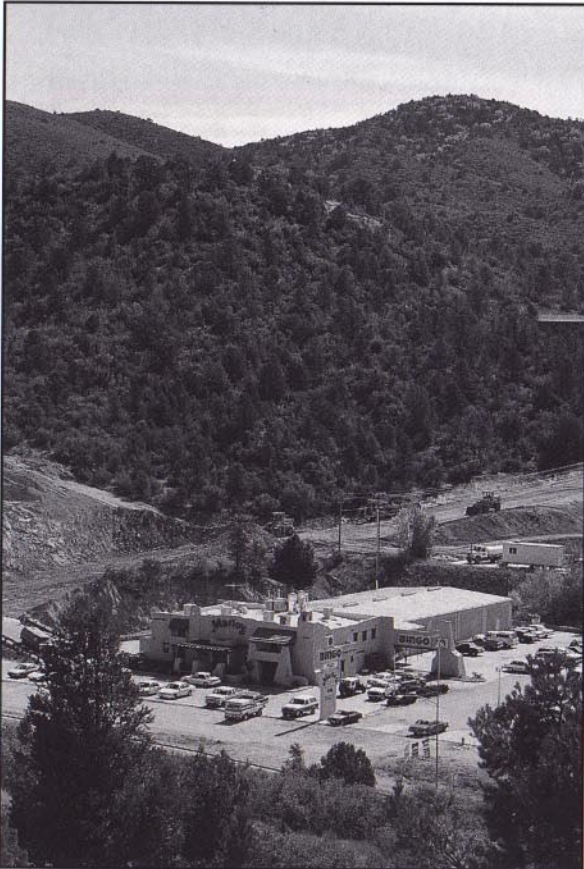
and the cooperating agencies defines what roles the participants would have. The Commission, for example, had six listed tasks:

- Advise the cooperating agencies.
- Identify, develop, prioritize and address wildland/urban interface issues facing citizens.
- Develop plans and actions for management of identified issues and make recommendations to appropriate levels of government.
- Promote the development of citizen awareness of interface issues and initiatives.
- Pursue the development of agreements among owners and operators of private land in order to implement plans and actions in a timely manner.
- Provide the cooperating agencies with a quarterly report on Commission activities and progress.

The Commission includes ten members, including representatives from the cooperating agencies plus volunteers. The latter are selected by the existing Commission from key segments of the private sector, such as home-owners, contractors, the chamber of commerce and the academic community.

Much of the advisory and administrative work of the Commission is accomplished through appointed task forces. When a task force is formed, the Commission states a complete description of duties, constraints, available support, and time frames for accomplishment. Four standing task forces and their scopes are:

- *Interagency Fire and Emergency Management Group* (See box on the following page)
Develop and provide information regarding current issues and challenges in the area of fire and emergency prevention, detection, enforcement, and incident response and management.



- *Growth and Planning*
Develop and provide information regarding proposed developments, projects, laws and regulations.
- *Forest Health*
Develop and provide information regarding conditions and proposals which may affect or be affected by the occurrence and processes in natural ecosystems within the wildland/urban interface.
- *Public education*
Identify education needs and opportunities related to living in the wildland/urban interface. Support

Commission efforts and assure broad dissemination of information regarding Commission activities.

Develop public support

An understanding of the need for public support preceded the creation of the Prescott Area Commission and strengthened after its start. A meeting in 1989 of the Prescott National Forest supervisor, the county board of supervisors chairman, and the Prescott mayor and city manager presented the scope of problems facing the interface area. This group recognized that the

Interagency Fire and Emergency Management Group

Representation includes members from the vast majority of agencies and entities responsible for managing emergency incidents in the area. The principal mission is to assume an advisory and support role to the Commission in all matters related to fire and emergency management in the interface. There are three subgroups and their responsibilities:

Executive Group

Focus on the needs and provide liaison to the Commission and direct the activities of the subgroups.
This subgroup is responsible to address prevention, legislation, and for involvement in long-term and master planning efforts, including city and county master plans and forest land management plans.

Public Education Group

Promote public awareness of fire and other emergency management issues
This subgroup is responsible for the education of the local and transient public in related matters.

Operations Group

Develop and address field tactical operations in fire and other emergency management activities. Assure competency through cross-training and emergency action drills.
This subgroup coordinated all fire and emergency management tactical operations, law enforcement and training.

public must drive the process. The group further agreed to sponsor a conference designed to present the issues and opportunities of a coordinated effort to invited members of the community.

The conference, *Living on the Edge: The Challenge of Wildland Development in the Prescott Area*, was developed through the cooperation of all of the affected local, state and federal agencies. Attendees included representatives from home-owner groups, developers, insurance agents and other commercial and special interests.

The issue of fire management was the focus at that

time, but a natural evolution has occurred to address the full range of wildland/urban interface issues. This has increased the quantity and quality of public support for the Commission.

Said one member: "If an agency comes in and says, 'Hey, you've gotta do these things' that are based on these reasons, but without legislation or ordinances to back them up, it's not going to occur. So that is another reason why the effort to create a public-driven process is so important, where the public is not only accepting this, but demanding resolution of it. To me, that is what is leading us to potential success in the Prescott area."

Accomplishments of the Interagency Fire and Emergency Management Group

- Development of an operating plan for Interagency Incident Management in the Prescott Basin. This plan was developed by and describes the operational roles of fire and emergency managements, law enforcement, and the private sector in all-risk incident management, including evacuation.
- Providing the I-220 Incident Command System training course to area law enforcement officials and personnel.
- Identification of an Overlay District, within which the development of common building codes and ordinances between agency and governmental jurisdictions is performed.
- Participation in a task force appointed by the Governor of Arizona to develop a statewide wildland/urban interface initiative.
- Development and implementation of strategic and tactical operations drills in the Prescott area.
- Development and implementation of cross-training for urban and wildland fire fighters, law enforcement and other emergency services personnel.
- Development and implementation of a single multiagency incident information center (MIIC), and a single multiagency incident support center.
- Giving informative talks to local service, special interest and home-owner groups regarding the wildland/urban interface challenge.



A Citizen's Guide to Basic Evacuation Procedures



Presented by the Prescott Area
Wildland/Urban Interface Commission

ESSENTIALS TO TAKE FOR IMMEDIATE EVACUATION

- Important papers (if readily available)
- Medications
- Prescription glasses/dentures
- Personal toilet articles/sanitary needs
- Sleeping bags or blankets
- Baby food/diapers
- Checkbook/credit cards/cash
- Drivers license

ADDITIONAL ITEMS TO TAKE IF TIME PERMITS

- Flashlight/extra batteries
- Change of clothing for each person
- Food — nonperishable, ready to eat
- Recreational items — games, cards, sewing, reading material

ACTIONS TO TAKE FOR IMMEDIATE EVACUATION

- Disconnect all appliances except refrigerator and freezer
- Set heat thermostat to lowest setting during winter
- Lock doors and windows
- Leave the exterior light on
- Be sure to leave the orange EVACUATION sign on your front door knob. This advises rescuers of your evacuation.

ADDITIONAL ACTIONS IF TIME PERMITS

- Secure outdoor possessions (lawn furniture, garbage cans)
- Secure or hide valuables
- Turn off gas, before leaving home

EVACUATION / PETS / LIVESTOCK

- Your animals should be left with friends or placed in an animal shelter but **NOT** taken to the evacuation shelter. The final alternative is to leave animals at home. Provide them with food, water and shelter.

Note: If you are not involved in the actual evacuation and you wish to care for pets, a request of services may be made to the local radio stations.

HANDICAPPED/SPECIAL NEEDS RESIDENTS

Those individuals who may need special aid in the event of an evacuation, are encouraged to plan ahead with neighbors or friends for assistance. If help is not readily available, residents may call 771-3260 or 445-1221 for assistance.

ESSENTIALS TO TAKE FOR IMMEDIATE EVACUATION

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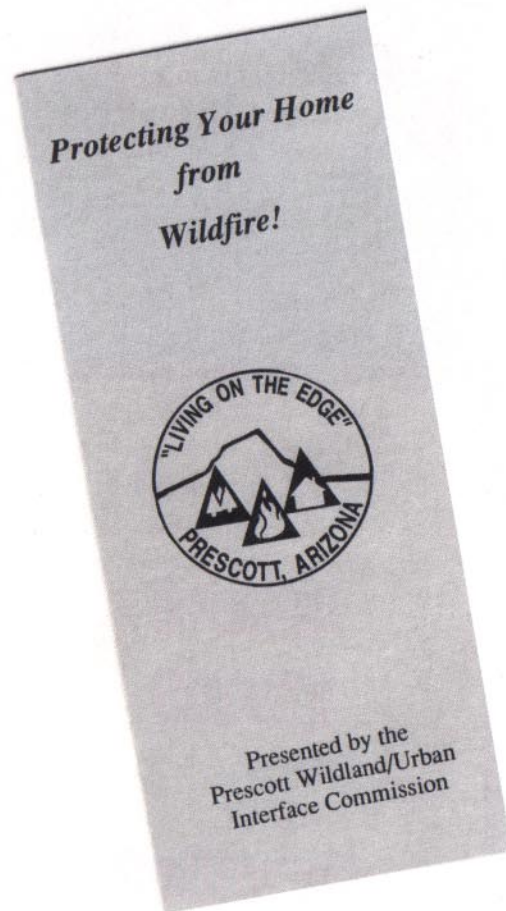
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**ALL
OCCUPANTS
HAVE
EVACUATED**

Preventing chaos. When the next major wildfire sweeps through the Prescott area, a plan is now in place for an orderly evacuation. Residents have this brochure that includes a door banger with a detachable panel to notify the emergency services that the structure has been evacuated.



Implement, coordinate and evaluate programs

Between 1990 and 1992 the emphasis of the Commission was on fire management issues. The following accomplishments were produced:

- Encouraged joint resolution that chartered the Commission, developed the memorandum of understanding and put the Commission in place.
- Defined the role of the Commission as one of issuing policy statements.
- Set processes in place for budgets and funding.
- Established good working relationships between Commissioners and represented agencies.
- Achieved better understanding between agencies of each others' needs, responsibilities and issues, and agencies see the Commission as important in managing interface issues.
- Developed an evacuation plan for the Prescott area, with a brochure describing the plan.
- Changed the rural addressing system to assist with evacuation.
- Encouraged a change in roofing materials requirements within the City of Prescott.
- Have had an influence in statewide activities related to the state commission on wildland/urban interface issues.
- Improved cooperation in emergency services, and improved public involvement in and awareness of emergency services.
- Improved public awareness of wildland/urban interface issues.
- Secured assistance of the school board with duplication of materials and in getting interface issues into the educational system.

Since 1992 the following accomplishments have been reported concerning broader wildland/urban interface issues:

- Identified criteria for prioritizing interface issues.
- Clarified the role of the Commission regarding the staff and task forces.
- Implemented plan for creating additional task forces.
- Clarified the geographic scope of the Commission.
- Planned the transition of new commissioners into the Commission to ensure continuity of mission.
- Validated and updated the operating policies and procedures.
- Integrated existing workload into the strategic actions.
- Compiled and distributed the strategic plan.
- Prepared a symposium presentation on the Commission.

Keys to future success

The Prescott Area Wildland/Urban Interface Initiative is still in its infancy, but because the design and basic tenets of the Prescott effort were developed after review of successful and unsuccessful efforts nationwide, the probability of achievement is positive.

"The research and the experience we have gained over the last several years," writes Commission member Ed Hollingshead, "has lead us to believe there are several identifiable keys to successful wildland/urban interface effort:

"We must understand that the challenge is multifaceted, including not only the increased risk of catastrophic wildfire, but other impacts on the quality of life brought about by the movement of people into the wildlands.

"We must understand and accept that agencies and

government entities cannot resolve the wildland/urban interface challenge alone. Only 'We, the people...' can do it. The effort must rely on the wealth of expertise and energy in the community.

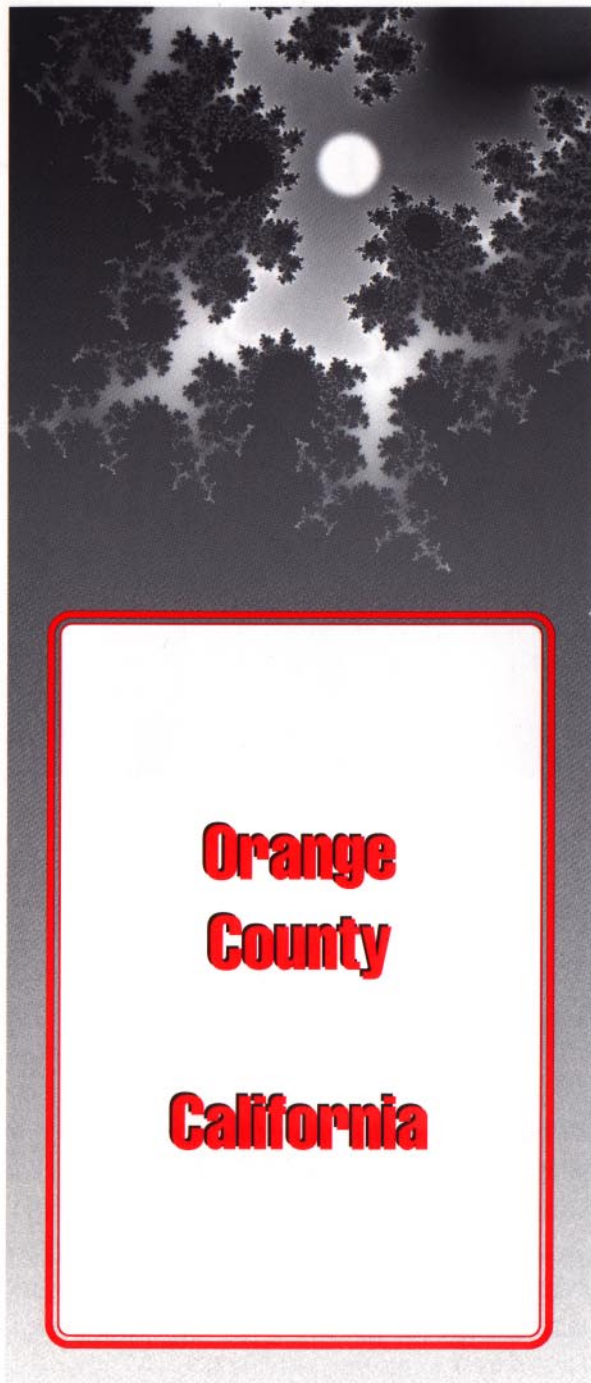
"We must facilitate community understanding and agreement that we are at a crucial decision point and must move forward to meet these challenges. The success of the wildland/urban interface effort ultimately relies on citizens understanding the issues and demanding their resolution.

"A successful effort will provide continuity and leadership to address the wildland/urban challenge. This can only be accomplished through the establishment of a recognized and authorized group of citizens and agencies that, in partnership, assumes that role. This group must provide a forum for public identification of wildland/urban interface issues affecting quality of life,

have the responsibility and authority to recommend alternatives and to advise government and the private sector in management of these issues, and provide continuity in the cooperative community effort toward their resolution.

"Just as no agency alone can solve the problem, neither can a single group. We must rely on the people of the community. We must organize them into task forces and allow them to develop alternative solutions for those issues most important to them.

"We, as agencies working in partnership toward a common goal, must be prepared to act upon and assist in the resolution of identified issues. We must realize that it may require stepping outside our traditional roles and taking a few risks. We must respond to the people of the community in a manner that meets their needs, not our own."



Orange County lies between Los Angeles and San Diego Counties and includes numerous beach towns, such as Huntington Beach, Newport Beach, Mission Viejo and San Clemente. At the opposite end of the county is Anaheim Hills and the Cleveland National Forest.

During the recent California firestorms of October and November 1993, in which more than 1,000 structures were destroyed or damaged, three major fires occurred in Orange County:

- The Stagecoach fire, starting on October 26, burned 750 acres and eight structures.
- The Laguna Canyon fire, starting on October 27, burned more than 16,500 acres and 366 structures. Another 17 structures were damaged.
- The El Toro fire began on November 2 and also burned structures.

The county has intense urban development in its central area, and it has suburban tract development as you get away from the urban core. Along the periphery you have large-lot subdivisions that are quasi-rural and broadly interspersed with native vegetation.

Identify fire problems

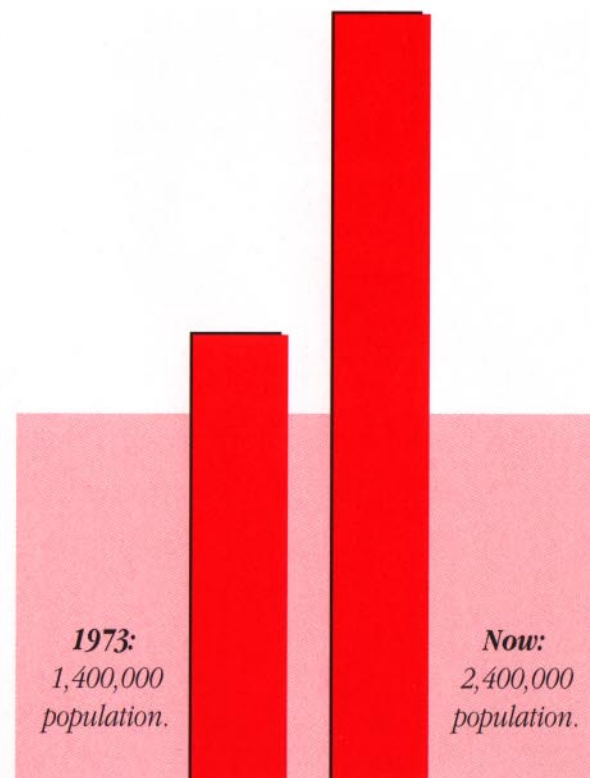
The county has undergone tremendous growth in the last 20 years. During that time the population has increased from 1.4 million to 2.4 million, a 71% increase. As housing nearly doubled, wildland acreage decreased from 210,000 acres to 160,000 acres. At the same time, however, the line between the urban core and the rural areas that comprised the wildland/urban interface grew to 200 miles.

County leaders recognized the ever-increasing potential for disaster...and the possible solution. "Back in the late 60s we had what at the time was our most catastrophic wildland fire, called the Paseo-Grande Fire. In

it a number of structures burned, and the whole question of the wildland/urban interface and the potential dangers and liabilities that are associated with it became a topic of *immediate* discussion. A task force was established, consisting of fire personnel, people from our planning and engineering departments, and a developer representative, because no one wanted to recreate that calamity."

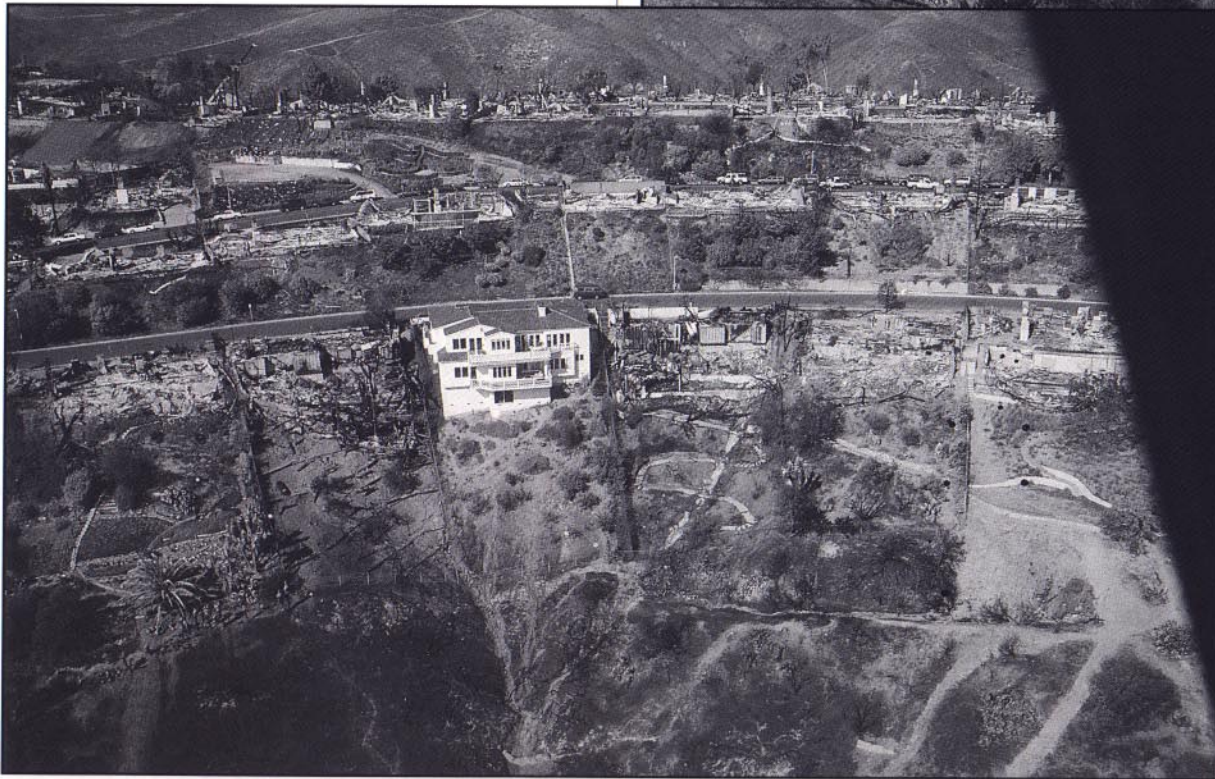
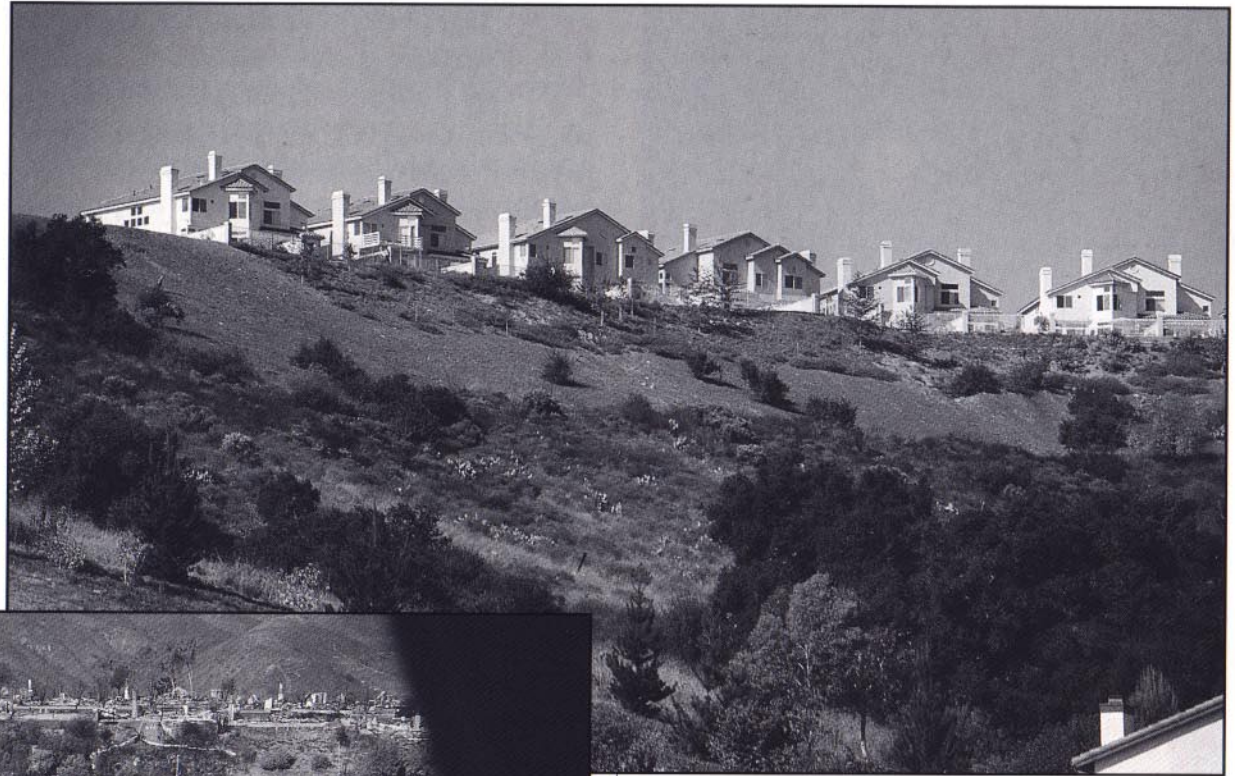
The task force began to examine ways to develop standards and an approach that could consistently be used to prevent major fires in developments in the interface and provide for the safety of residents if a fire did occur.

A systematic review of conditions and fire experience showed that much of Orange County is covered



22

With fuel modification: Lower fire risk. Homes on this scenic California slope have a much better chance of surviving a major wildfire below the crest, as a result of the removal of the heavy fuels from the slope.



Without fuel modification: One survivor. A single home stands alone after a wildland fire raced up this formerly scenic California slope. That home and its owner gained national prominence as a dramatic example of how an individual took responsibility for making his home as firesafe as possible, even when located on a scenic California slope.

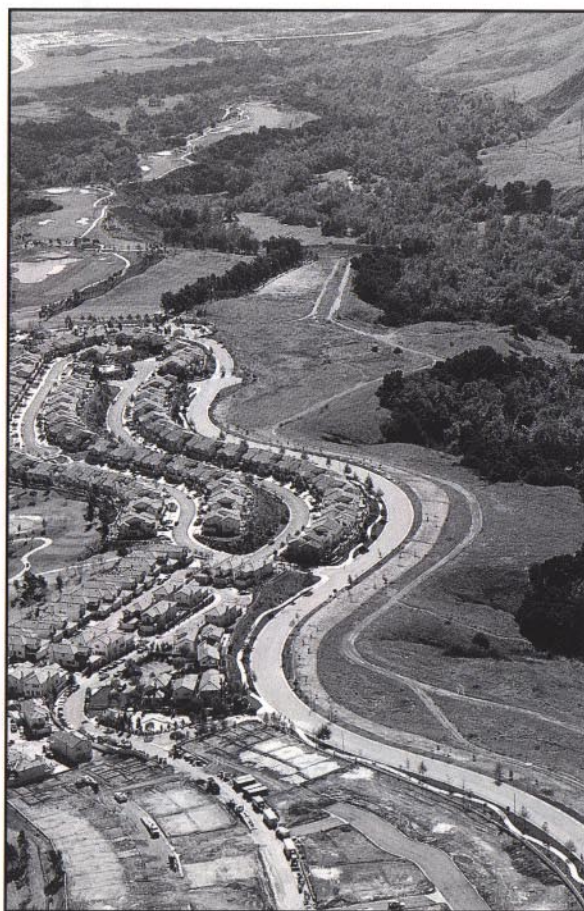
“A fuel modification is a wide strip of land where flammable vegetation has been removed or modified or both and partially or totally replaced with drought-tolerant, fire-resistant plants. It provides an acceptable level of risk from wildland fires. Fuel modification also provides a reduction of radiant and convective heat, thereby providing fire suppression forces a safer area in which to take action.”

Thinning zone. Homes in this dense residential area are separated from heavily forested areas by a zone where dense vegetation is removed, leaving an open view of the adjacent scenic wildlands.

with brush and grass. During periods of little rainfall, this natural vegetation becomes dry and highly flammable. The predictable result of any drought is an increase in the number and intensity of brushfires that threaten homes and countless acres of watershed.

Implement programs

One of the major accomplishments of the task force was the development of the Fuel Modification Plan Guidelines. These guidelines were established by the Orange County Fire Department and are administered



by its Wildland Fire Defense Section. The plan guidelines established fire hazard severity zones for county unincorporated areas. Because of the brush, grass and predominate winds, the county defined two hazard zones for special control: High and Very High.

Any development within these zones, which includes nearly all foothill, mountain and non-irrigated former farming areas, requires fuel modification of the natural vegetation at the urban interface. The nature of the fuel modification may vary in complexity and is dependent on these factors:

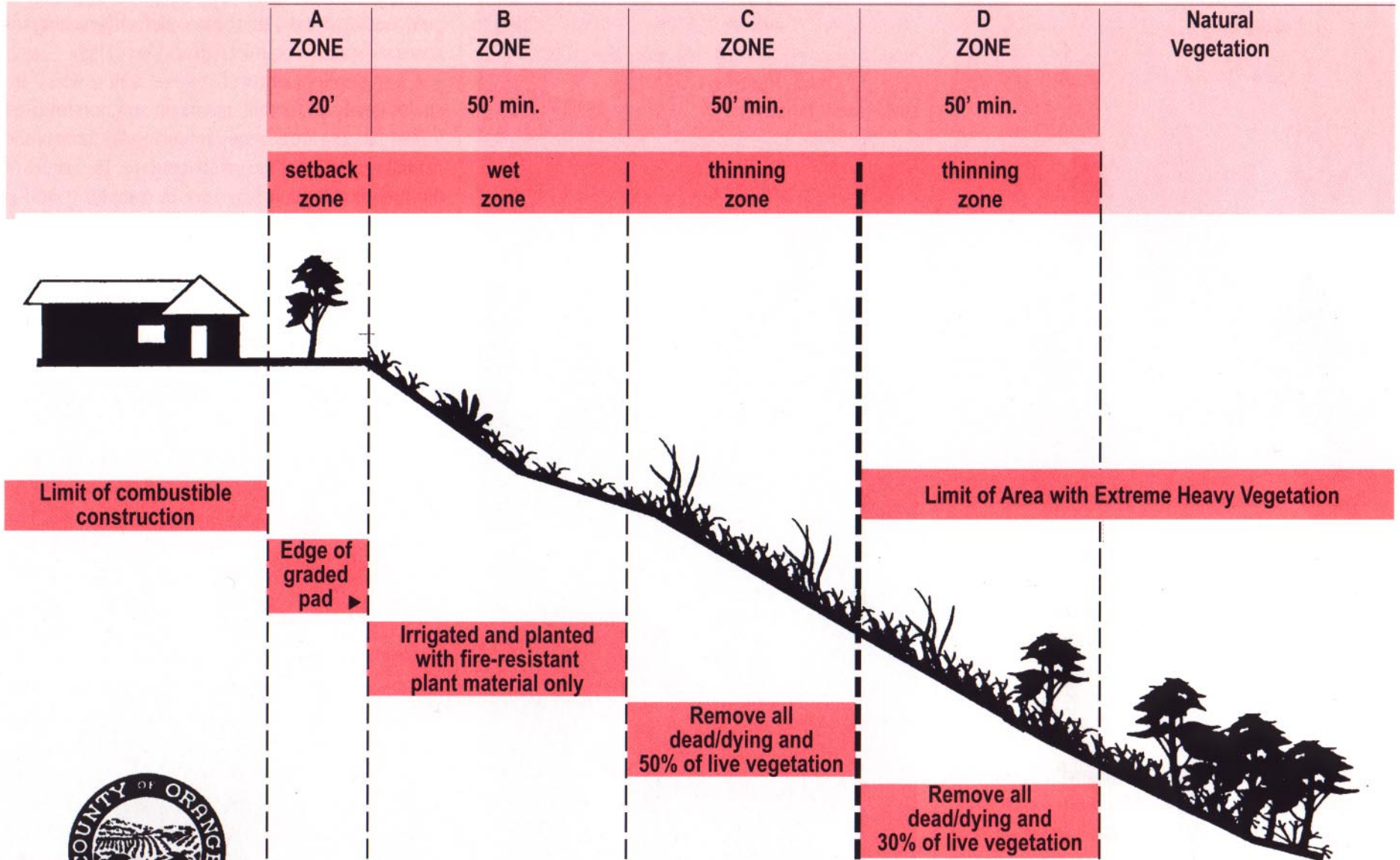
- Amount of vegetation
- Arrangement of vegetation
- Topography
- Degree of exposure
- Local weather conditions
- Construction and design of structures

The many variables involved with fuel modification make precise regulations infeasible for general application. Therefore, each project must be reviewed for its distinctive needs. The Wildland Fire Defense Section will make suggestions for fuel modification programs to meet specific safety requirements.

Other mitigation measures that may be required include class A noncombustible roofs, protected attic and crawl space vents, reduction or elimination of exterior combustible construction, residential interior fire sprinkler systems, and double-glazed windows.

Most fuel modifications will have a cost impact on large projects. The fire department urges developers to consider fuel modification requirements for a project in the first stages of design and planning, when changes are less expensive. Fuel modification requirements may be reduced through the practical use of streets, parks, golf courses or other noncombustible uses as part of

Fuel Modification Diagram



fuel modification.

Fuel modification considerations include:

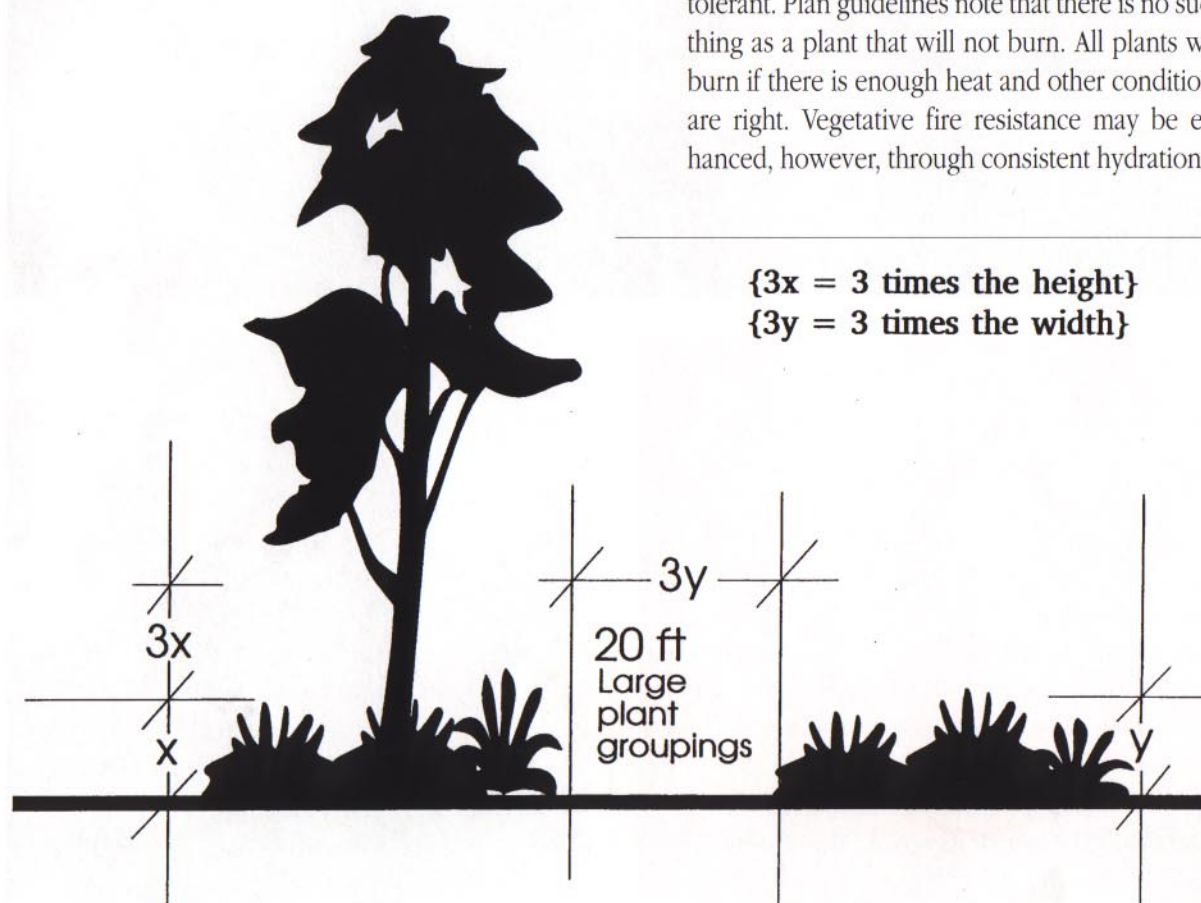
- Setback, commonly 20 feet measured from the top or toe of a graded slope.
- Wet zone, an irrigated perimeter of 50 feet beyond the setback.
- Thinning zone, another band of at least 50 feet where thinning or removal of heavy perennial brush is required. (The minimum total width of a fuel modification plan is 150 feet in most cases.)
- Plant list, allowed only from the approved list of plants that are relatively fire resistant and drought tolerant. Plan guidelines note that there is no such thing as a plant that will not burn. All plants will burn if there is enough heat and other conditions are right. Vegetative fire resistance may be enhanced, however, through consistent hydration.

- Maintenance, which must be ongoing and can be expensive. Written evidence of responsibility must be submitted with the preliminary fuel modification plan.

A fuel modification must be approved before any grading or building permits can be issued. After the fuel modification plan has been accomplished under the supervision of the fire marshal, the final inspection procedure may include a landscape architect and must include the Orange County Fire Department. The final approval must be obtained prior to the use and occupancy of any affected structure.

Develop public support

The frequent wildfires in California give the public a constant reminder of the dangers faced in interface



Trees and large tree-form shrubs (Oaks, Sumac, Toyon), which are being retained must be pruned to provide a clearance of three times the height of the understory plant material or 10 feet, whichever is higher.

Dead and excessively twiggy growth must also be removed.

All plants or plant groupings except cacti, succulents, trees and tree-form shrubs must be at least 20 feet apart.

Reviewing fuel modification plans. Each project must be reviewed by the Wildland Fire Defense Section for the particular needs of the area.



areas. Public support was enhanced, therefore, when the fuel modification program contributed to improved fire safety.

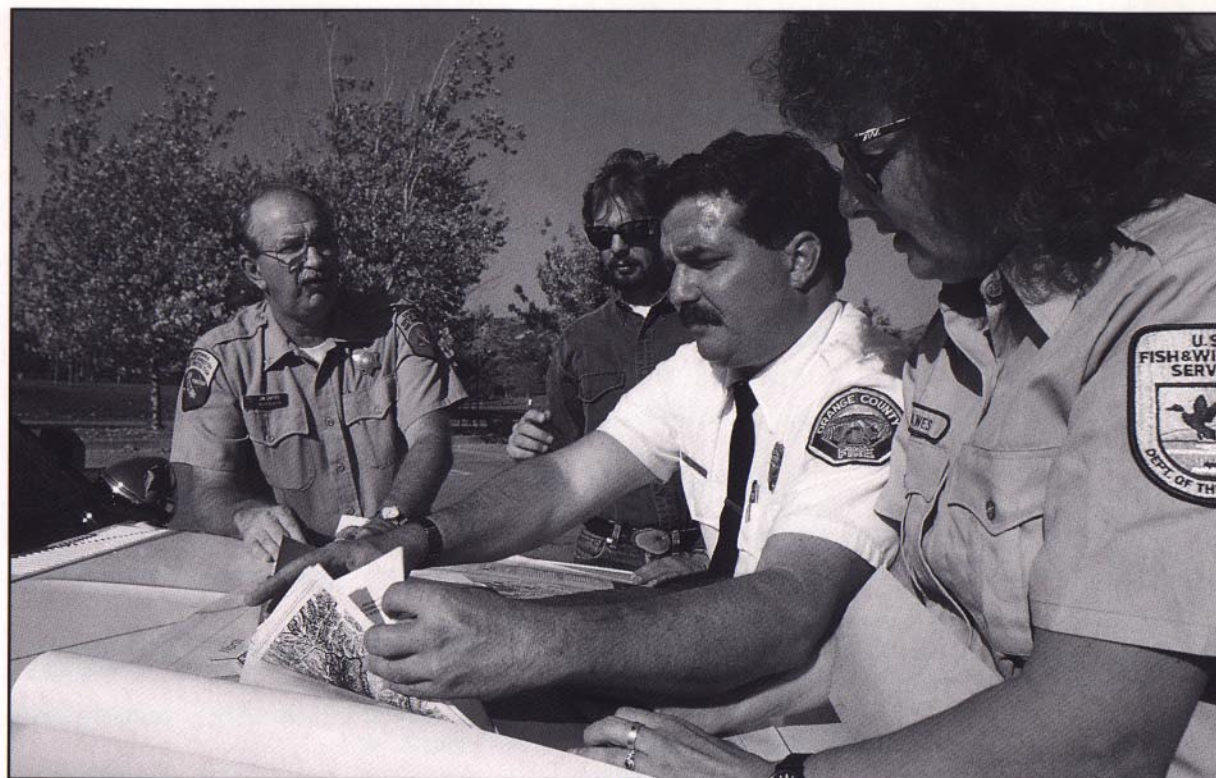
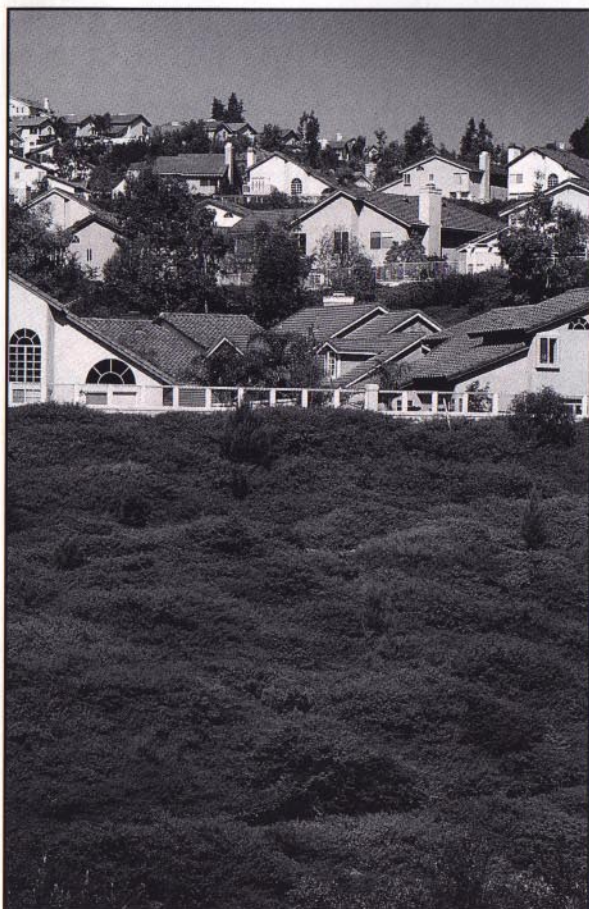
Notes one official: "Look at the area here where the vegetation fire met the fuel modification plants and burned into them. As soon as fire met the moist, irrigated plants, considering the type of fire-resistant plants that were here, the plants did not continue to burn."

Although the October and November 1993 fires in California were catastrophic, and Orange County suffered major damage, the losses could have been worse without the fuel modification plan. The greatest Orange County losses were in older areas that were developed

before introduction of the plan. An example was the Laguna Canyon fire, where almost 400 structures were destroyed or damaged. Existing developments did not fall under the new plan. In the fire that rolled into Anaheim Hills, where a fuel modification program was in effect, only a few homes were lost.

Burning unabated for miles, the October and November fires burned to the ocean, jumped wide highways, and consumed thousands of acres of wildland and developed area. In view of the potential destruction of a fire of this magnitude, the performance of installed fuel modification plans was a major victory that the public could understand and appreciate.

Interagency cooperation. It's important to the success of any wildland-urban interface program.



Some undesirable domestic species

- | | | | |
|-------------------------------|----------------------|----------------------------|------------------|
| Adenostoma Fasciculatum | Chamise | Eriogonum Fasciculatum ... | Common Buckwheat |
| Adenostoma Sparsifolium | Red Shanks | Juniperus species | Juniper |
| Artemisia Californica | California Sagebrush | Myrtaceae | Eucalyptus |
| Cedrus species | Cedar | Pennisetum | Fountain Grass |
| Cortaderia Selloana | Pampas Grass | Pinus species | Pine |
| Cupressus species | Cypress | Salvia Mellifera | Black Sage |
| Dodonea Viscosa | Hopseed Bush | | |

GUIDELINES FOR PLANTING IN FIRE-RISK AREAS

Planting of vegetation adjacent to structures in close proximity to native vegetation is considered part of the Fuel Modification Program and is subject to annual inspections by inspectors from the Orange County Fire Department. The following guidelines are in effect when planting near fire risk areas in Orange County:

- Limit use of plants known to be especially flammable.
- Limit planting in large unbroken masses, especially trees and large shrubs.
- Limit use of plants which develop large volumes of foliage and branches.
- Limit use of plants which have dry or deciduous foliage during part of the year.
- Limit use of plants which develop deciduous or shaggy bark.
- Limit use of plants which develop dry or dead undergrowth.
- Limit massing of vegetation adjacent to structures, especially under eaves, overhangs, decks, etc.
- Limit massing of shrubs at bases of trees or larger shrubs.
- Conduct yearly maintenance to reduce fuel volumes, eliminate weeds, remove dead vegetation, etc.
- Provide reliable automatic irrigation systems to maintain vegetation in healthy, turgid state.
- Topping of trees is discouraged. This creates excessive branching and can increase the fire danger.

Appendix

List of Products:

National Wildland/Urban Interface Fire Protection Program

Wildfire '90, Wildfire Strikes Home		
Video	NFES 2136	\$2.43
Wildfire Strikes Home, Second Edition		
Booklet	NFES 2177	\$0.50 (est.)
Protecting Your Home from Wildfire		
Booklet	NFES 2076	\$0.32
Video	NFES 2104	\$2.17
Case Study: Black Tiger Fire		
Booklet	NFES 2130	\$0.90
Video	NFES 1247	\$3.06
Case Study: The Stephan Bridge Road Fire		
Booklet	NFES 2176	\$0.50 (est.)
Case Study: The Oakland/Berkeley Hills Fire		
Booklet	NFES 2298	\$0.50 (est.)
Case Study: Fire in the Hills		
Video	NFES 2299	\$1.93
Case Study: Firestorm '91, Spokane, Washington		
Booklet	NFES 2238	\$0.50 (est.)
Video	NFES 2247	\$2.11
The Meeting		
Video	NFES 2186	\$2.72
Wildfire Control		
Video	NFES 2182	\$2.54

Operation Water

Booklet	NFES 2295	\$0.50 (est.)
Video	NFES 2296	\$1.93

Fire Behavior in the Wildland/Urban Interface

Booklet	NFES 2273	\$0.50 (est.)
Video	NFES 2132	\$2.56

Fire Fighter Safety in the Wildland/Urban Interface

Booklet	NFES 2102	\$0.34
Video	NFES 2103	\$1.94

Firewise Landscaping, Part I: Overview

Video	NFES 2411	\$3.00 (est.)
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Firewise Landscaping, Part II: Design and Installation

Video	NFES 2412	\$3.00 (est.)
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Firewise Landscaping, Part III: Maintenance

Video	NFES 2413	\$3.00 (est.)
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Building Interagency Cooperation

Video	NFES 2135	\$3.00 (est.)
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Creating Fire-Resistant Environments

Video	NFES 2128	\$2.91
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Fire Protection in the Wildland/Urban Interface: Everyone's Responsibility

Video	NFES 1900	\$5.00 (est.)
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How to Order Products

The National Wildfire Coordinating Group (NWCG) has sponsored the publication of these Appendix items produced by the National Wildland/Urban Interface Fire Protection Program. Copies of each of these items may be ordered from the National Interagency Fire Center at Boise (NIFC). To order: mail or fax a purchase order or requisition to:

National Interagency Fire Center
Branch of Supply
3833 S. Development Avenue
Boise, ID 83705-5354

FAX: 208-387-5573

Orders must be from agencies or organizations, not private individuals. Use the "NFES" number for the items you are ordering. **Phone orders are not accepted.** The cost listed for each item is the actual cost of reproduction and processing. You will be billed the cost of the items after they are sent. Orders from other than federal wildland fire agencies or state land protection agencies will receive an 18% surcharge on the bill. Transportation charges, other than mail, will also appear on the bill.

Questions regarding **ordering** procedures can be addressed to the NIFC Supply Office, 208-387-5542.

Questions regarding **billing** procedures can be addressed to the NIFC Supply Office, 208-387-5533.