

**A  
REPORT  
TO THE  
COUNCIL OF WESTERN STATE FORESTERS**

# **FIRE IN THE WEST**

## **THE WILDLAND/URBAN INTERFACE FIRE PROBLEM**

**Alaska  
Arizona  
California  
Colorado  
Guam  
Hawaii  
Idaho  
Kansas  
Montana  
Nebraska  
Nevada  
New Mexico  
North Dakota  
Oregon  
South Dakota  
Utah  
Washington  
Wyoming**

**Wildland/Urban Interface**

**A  
Report  
for the  
Western State Fire Managers  
by**

**William C. Teie  
Brian F. Weatherford**



September 18, 2000

TO: Council of Western State Foresters  
FROM: Western State Fire Managers

**Structures Lost!** is the headline on the morning news more and more these days. It has been thought that this was a problem only in California. It isn't! It is a growing problem throughout the West.

This report was developed in an effort to paint a true picture of the extent of the wildland/urban interface fire problem in the West, and present an action plan on how the states should proceed in an effort to deal with this growing problem. The two most salient points in the report are:

- This problem is going to get a lot worse before it gets better!
- We know what has to be done! We don't have to invent anything! We just have to implement "FireSafe" construction and streamline how we operate.

The Western State Fire Managers want to thank William C. Teie and Brian F. Weatherford for this outstanding report.

Sincerely,

  
David Behrens, Chair

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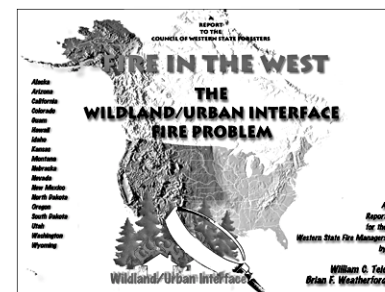
We would like to thank all those who provided us their expertise on the subject of the wildland/urban interface fire problem. In particular, we would like to thank each of the state fire managers for their input and support. Those questionnaires were not easy to complete.

Specifically, we would like to thank Dave Behrens, Arizona State Land Department; Rich Homann, Colorado State Forest Service; Brian Shiplett, Idaho Department of State Lands, and Tim Murphy, Montana Department of Natural Resources and Conservation; for their support and review of the draft. In addition, we would like to thank Ronny J. Coleman, President FETN and the retired California State Fire Marshal and Chief Deputy Director for the California Department of Forestry and Fire Protection; Ken Blonski, University of California Forest Products Laboratory; Steve Frady, Nevada Division of Forestry; Chris White, Boulder County Land Use Department; Ross Hesseltine, FireSafe Spokane; Gary Marshall, Bend (OR) Fire Department; Jim Graue, Spokane County Fire District 9; and Bob Leaverton, Santa Fe National Forest; for their time and efforts in providing valuable information.

Without the help of these experts, this report would not have been possible.

## ***Additional Copies***

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## *Executive Summary*

- Every year wildfires destroy hundreds of structures throughout the West. The wildland/urban interface fire problem exists in every state, and is getting worse. It will continue to get worse before it gets better.
- We already know why houses burn. Quite simply it is because they are not built with fire safe materials and methods, or do not have sufficient clearance from flammable wildland fuels. Building codes, fire codes, and the Urban-Wildland Interface Code have been developed to address the problem. What is lacking is the public and political will to implement the known solutions.
- An increasing amount of attention is being paid to the wildland/urban interface fire problem, both by the media, some state forestry organizations and by the federal government. Attention and funding should be focused on initial attack, mobilization and fuels reduction.
- The disastrous Cerro Grande Fire in Los Alamos provides us a “peek” into the future, and illustrates the “ills” in the wildland fire protection system and how it can fail. It represents an unprecedented learning opportunity for all the players.
- Each state is unique in the authorities and responsibilities given its wildland fire protection agency. Unfortunately, most state forestry departments are not adequately empowered to address the wildland/urban interface fire problem. Codes, regulations, and building standards that would provide for fire safe development in wildland areas exist, but few states or communities have summoned the public and political will to implement them. The most important issues are **ignition-resistant construction** and **defensible space**.
- We need to develop programs that will educate our target public audience (homeowners, legislators, planners, and developers) to the potential for personal disaster in a wildland/urban interface fire. We must change public perceptions and attitudes, and generate a concern for fire safety that will overcome existing public apathy and political inertia.
- States need to map and assess the extent of the wildland/urban interface problem, and share this data with the fire community, planners, developers and legislators.



- The states need to improve their support to local fire forces that can add tremendous capability to initial fire attack operations and structure protection mobilization during major fires. State agencies need to assess and improve their ability to respond to the wildland/urban interface fire problem and to effectively mobilize and manage available local government fire resources.
- States need to take the initiative in transforming their relationship with the federal wildland agencies to one of true cooperation, framed in cooperative fire protection agreements and operating plans.
- States need to apply pressure to the federal government to focus more attention on the problem in the West, and to pressure FEMA to move from funding rebuilding of burned structures to funding mitigation measures before the fire.
- An opportunity exists to combine wildland/urban fire problem mitigation efforts with forthcoming forest health initiatives. Both will require careful planning and execution to be successful. Increased use of prescribed fire can serve both purposes simultaneously, but may require some loosening of Clean Air Act regulations. States need to enact tort claim protections for use of prescribed fire.
- With a proposal to provide an additional \$1.6 billion to the budgets of the USDA Forest Service and the Department of Interior for 2000 fire season related issues, and in particular the wildland/urban interface fire problem, it is imperative that the states have a plan.
- The states need to increase the involvement of the private sector in the solutions to the problem. Small landowners, timber companies, insurance companies, developers and builders, and the banking community all have a vested interest in solving the wildland/urban interface fire problem and need to be brought into active partnerships with the total fire community.
- The states should develop plans to move beyond federal excess property. This equipment has served the states and rural fire departments well, but there is a need to develop plans to replace this equipment.



- Critical solutions that need to be implemented include: assessment and mapping of problem areas; public education; adoption of the Urban-Wildland Interface Code; clarification and revision of the Federal Fire Policy; increased use of prescribed fire (both for hazard reduction and forest health); construction of fuelbreaks; improving the training, equipment, and mobilization of local fire forces; establishment of state interagency fire management teams; and clarification of relationships through written cooperative fire agreements and operating plans.

- If nothing else is possible, states should at least focus their limited resources on achieving compliance with **ignition-resistant roofing standards** and providing **defensible space** around all structures in the wildland/urban interface.



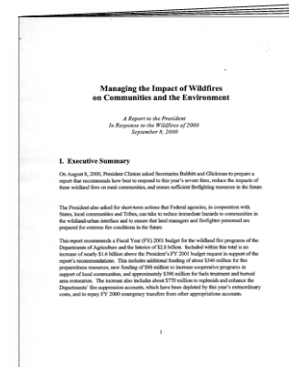
## Preface

The wildland/urban interface fire problem has been studied and discussed for years. In the “old days” it was a rural problem. Then in 1961 the Bel Air Fire destroyed over 400 homes in the hills above Los Angeles and a new phrase was born – wildland/urban interface. We as a society want quick fixes to our problems, but there will be no quick fixes to this one. Developing an immediate and politically acceptable solution is unachievable!

The solutions are well understood. It is the implementation of these solutions that is lacking. This report will attempt to put the problem in prospective and present an action plan that is practical and achievable, IF there is a will to do it.

On September 8, 2000, the *Managing the Impact of Wildfires on Communities and the Environment, A Report to the President*, was published. This report recommends the addition of \$1.6 billion to be added to the 2001 budgets of the USDA Forest Service and the Department of Interior. The proper implementation of the recommendations contained in this very important report can go a long ways toward lessening the impacts of the forest fuel buildup and the wildland/urban interface problem.

The Council of Western State Foresters asked the Western State Fire Managers to develop a wildland/urban interface strategy for the West. Toward this end, the fire managers commissioned William C. Teie and Brian F. Weatherford to develop a report analyzing the situation, making recommendations on the best strategies and tactics to implement, and providing a list of some of the initiatives being used in various locations in the West.

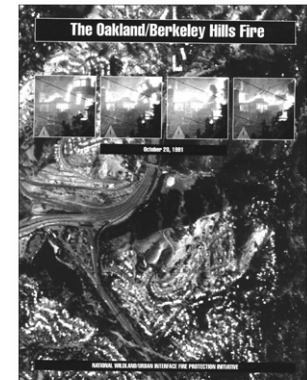


## Introduction

Each summer the headlines in the newspapers of the West read, “**Structures Lost!**” as a reminder that a wildfire has again destroyed someone’s home or business. The wildland/urban interface fire problem is one that will get a lot worse before it gets better—and it will never completely go away.

### ***It is no longer just a California problem!***

As far back as you want to remember, the wildland/urban interface fire problem was one that most felt was a California problem. With a large population, highly flammable fuels, steep terrain, hot dry summers and the infamous Santa Ana winds, it seemed that each summer and fall homes were burning in the Golden State. The statistics bear this out, with California having had 203 interface fires between 1955 and 1999. These fires burned over 3.2 million acres, destroyed over 11,000 structures and caused the deaths of 62 firefighters or civilians. But the picture has changed in the last decade.



Since the beginning of the ‘90s, the rest of the West has experienced a growing number of wildland/urban interface fires. Nearly all of the Western States have experienced wildfires that have destroyed homes or businesses. Most of the Western States have now joined California as states that have experienced serious wildland/urban interface fires that have destroyed scores of homes. (See the Appendix for detailed information).

### ***We already know how to make homes FireSafe!***

After each devastating fire, people asked, “how can we prevent such fires in the future?” We know the answer...it’s ***ignition-resistant construction, defensible space***, enclosed eaves and decks, adequate water, etc. It is not that we don’t know the answer, it is that we cannot get the general public, politicians, or private industries interested in implementing the solutions.

The “Code of the West” comes into play...whether it is the homeowner who says: “I didn’t move into the woods to cut it down...leave my





trees and brush alone,” or the politician saying, “you moved into the country, so don’t expect the same level of service you had in the urban area.”

Both sides of the issue think it is a problem that will happen to someone else in some other place. That is, until it visits them! Any person who lives in a wildland area is potentially a target for a wildland fire, although some areas are more prone to serious fires than others.

### ***Mitigate growth, existing problems and respond as needed!***

Any plan to move toward solving the problem must not only address the growth in the West, it must address the problem of millions of existing structures at risk. It must also address the existing level of fire protection and its ability to cope with this ever-increasing problem.

In a nutshell, the public, planners, and politicians need to be convinced it is in their best interest to address the issue of growth in the wildland as it develops and to implement actions that will bring both new and existing structures into compliance with fire safe guidelines. Incentives such as strict laws and regulations, low-interest loans, or reduced insurance premiums must be developed to insure the full participation of all homeowners in the wildland/urban interface.

### ***The West is different!***

There are several factors that make the West unique when compared to the rest of the Nation. These distinctions must be fully understood and appreciated before we can focus on appropriate funding allocations. Some of those factors are:

***Its Size***—The West is large. There are 2,119,441 million square miles in the seventeen western states. This is just over 57 percent of the total acres in the Nation.

***Its Topography***—The West has mountains; “you can lean against most of it.” This has a direct impact on fire behavior, resistance to control, access and local weather.

***Its Weather***—The weather in most of the West features long dry summers, hot dry winds, and extremely low relative humidity; all of which have a direct impact on fire behavior. The regional weather patterns annually spawn dry lightning storms that start thousands of fires. The fall brings strong winds.



***Its Forest Conditions***—The nature of the wildland vegetation and the many “fire regimes”, in combination with topography and weather, create large areas with very high to extreme fire hazard. The forest health is suffering and the buildup of residual fuels is at dangerous levels. This is further complicated by federal land management ownership and policies.

***Its Federally Owned Lands***—Over 58 percent of the West is in federal ownership. This makes the various federal land management agencies major players in how the forests of the West are managed and protected (Figure 1).

***Its Federal Partners***—There are six federal wildland fire “fighting” agencies in the West: USDA Forest Service, USDI Bureau of Land Management, USDI National Park Service, USDI Bureau of Indian Affairs, USDI Fish and Wildlife Service, and the Department of Defense. Each of the agencies has different “charters” and land management policies.

	<i>Areas, in acres.</i>							
	<i>Forest Service</i>	<i>Bur of Land Management</i>	<i>Bur of Indian Affairs</i>	<i>Fish and Wildlife Service</i>	<i>National Park Service</i>	<i>Dept of Defense</i>	<i>Other Federal</i>	<i>TOTAL</i>
Alaska	22,004,745	86,908,060	1,140,410	76,321,037	52,891,681	1,677,718	22,851	240,966,502
Arizona	11,250,693	14,252,778	20,718,207	1,716,858	2,629,633	1,219,717	2,751	51,790,637
California	20,627,691	14,556,074	191,020	323,642	4,615,013	1,753,493	434,695	42,501,628
Colorado	14,501,592	8,296,512	32,835	81,574	574,689	415,473	358,175	24,260,850
Hawaii	1	0	0	288,511	220,410	127,734	1,627	638,283
Idaho	20,442,651	11,847,328	55,700	76,068	86,866	14,402	1,067,840	33,590,855
Kansas	108,175	0	40,234	58,332	698	143,447	97,088	447,974
Montana	16,872,610	8,060,382	1,074,907	1,153,013	1,221,314	2,540	316,204	28,700,970
Nebraska	352,133	6,580	66,469	172,360	5,863	18,703	119,139	741,247
Nevada	5,815,856	47,844,391	1,233,000	2,318,069	165,500	484,965	1,699,739	59,561,520
New Mexico	9,326,599	12,770,569	8,349,148	384,251	371,827	3,180,226	453,865	34,836,485
North Dakota	1,105,779	59,717	866,896	487,654	71,640	2,112	1,273,320	3,867,118
Oregon	15,664,078	16,223,739	796,588	557,479	194,859	31,072	133,625	33,601,440
South Dakota	2,013,628	279,869	5,002,056	198,086	263,629	890	60,455	7,818,613
Utah	8,112,462	22,877,713	2,331,094	419,169	2,015,426	939,973	660,613	37,356,450
Washington	9,174,956	370,110	2,602,254	186,369	1,932,401	433,251	752,979	15,452,320
Wyoming	9,258,281	18,383,926	1,889,532	86,486	2,393,198	9,512	815,841	32,836,776
TOTAL	166,631,930	262,737,748	46,390,350	84,828,958	69,654,647	10,455,228	8,270,807	648,969,668



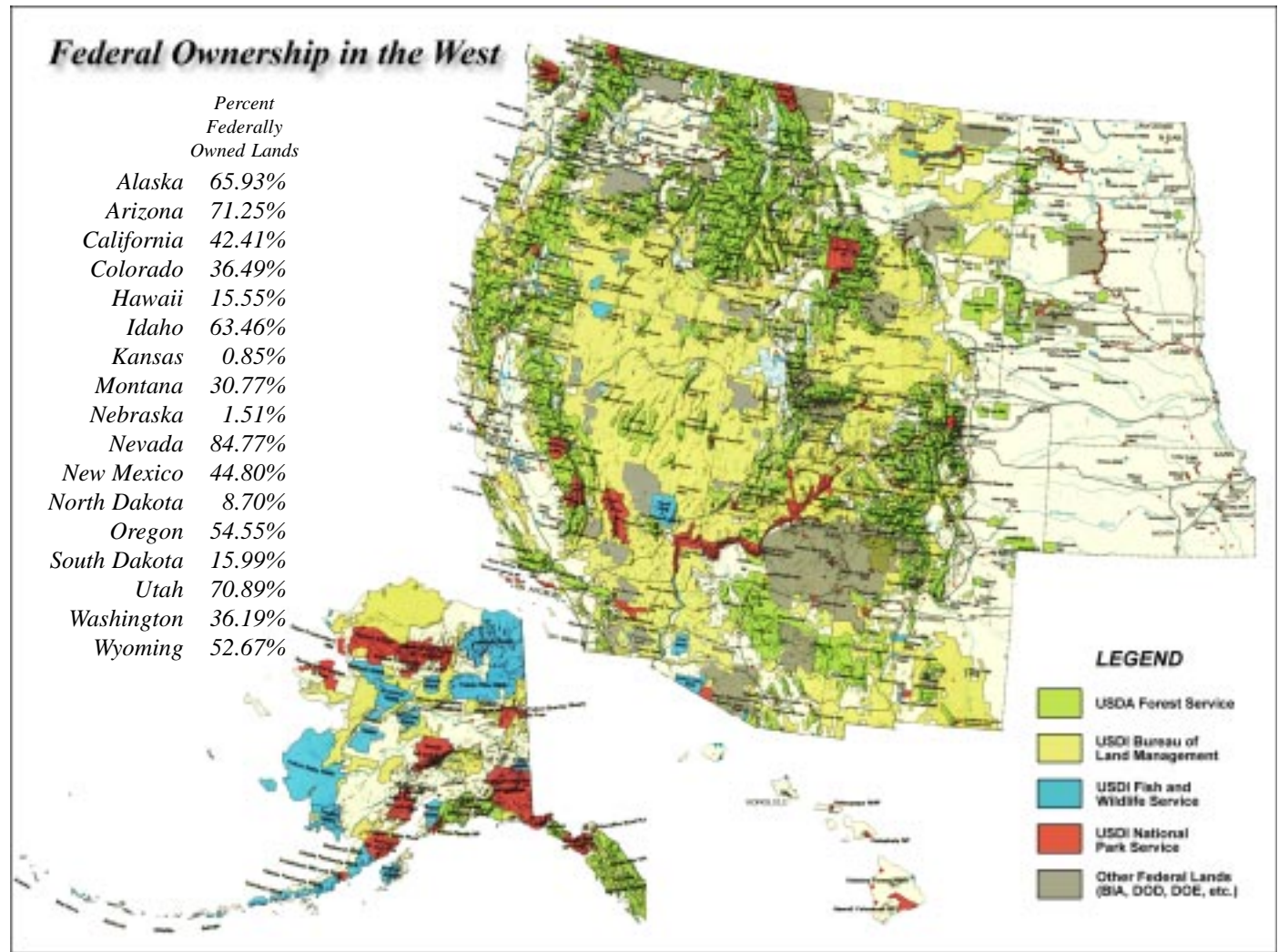
Figure 1. Over 58 percent of the land in the West is owned by the Federal government.

***Its Sovereign Nations***—The vast majority of Tribal Lands in the Nation are in the West. This is further complicated by the evolving relationship between the USDI Bureau of Indian Affairs and the various Tribal Governments.

***Its Forest Service Organization***—The Forest Service has seven regional foresters in the West. This complicates the development of a single strategy for how federal dollars will be spent in the West.

***The Wildland/Urban Interface Fire Problem***—The extent of the Wildland/Urban Interface fire problem in the West cannot be understated. The urban sprawl will continue to grow, placing more homes in danger each year. The West as a whole is now experiencing more and more wildland/urban interface fires. The 2000 fire season dramatically supports this contention.

***Its Wilderness and Roadless Areas***—The vast majority of federal wilderness and roadless areas are in the West. Both have a significant impact on wildland firefighting operations.



## Gathering the Data

The initial phase of data collection for this report was a questionnaire developed by the consultants and sent to the fire managers of each of the seventeen western states and the Pacific island territories. Each of the states completed and returned the questionnaire, along with supporting documents and data relative to their specific issues.



### Fire Managers Responses

*Within this report, the responses of the state fire managers to the questionnaire are summarized in text boxes like this one.*

The questionnaire consisted of 24 questions relating to the nature of the wildland/urban interface problem in the state, the state agency's authorities and responsibilities to mitigate the problem, what state fire managers are doing and what they think they should be doing, mutual aid, training, federal agency involvement, and what ideas for problem solutions may be lurking out there.

## Guam

Of the U.S Pacific trust territories, only Guam replied to our wildland/urban interface fire problem questionnaire, and "Yes, Virginia, there is a" wildland/urban interface fire problem in Guam. Because Guam's fire protection system and interface problem are so different, it deserves its own section in this report.

Located some 3,700 miles west of Hawaii, Guam is on the other side of the International Date Line, and thus "where America's day begins." While most of us would consider Guam's climate to be tropical (70-90" of rain per year), it has a definite dry season and large areas of grass and brush. El Nino weather patterns bring drought and high fire danger. Much of Guam is set aside in natural reserves (mini-wilderness areas) that complicate the wildland fire problem. Many villages are experiencing rapid growth due to land and housing initiatives for native peoples, and homes are spreading into the wildland. Despite its differences, Guam, like many western states, has lost structures to wildland fires large enough to qualify for FEMA funding. For a more complete description of the wildland/urban interface problems in Guam, refer to the Appendix.



## ***Background***

You cannot really understand the complexities of the wildland/urban interface fire problem in the West until you understand something about the fire protection systems in this Nation.

Benjamin Franklin started the first organized fire department in the United States in Philadelphia on December 7, 1736. For over a hundred years fire protection focused on urban areas...rural and forested areas of the Nation went unprotected. The rural areas of this Nation could not afford the level of protection found in most cities. The rural residents provided their own fire protection, using old equipment and staffing the engines with citizen volunteer firefighters. It wasn't until the Forest Service was formed early in the 20<sup>th</sup> Century that fire protection was provided to wildland areas.



### ***Fire Protection Jurisdictions and Responsibilities***

In the United States, there are three basic levels of government: local, state and federal. Each level of government has different authorities and responsibilities, but each has an important role to play in mitigating the wildland/urban interface fire problem.

Local government is defined as incorporated cities, counties, boroughs, or special districts. Volunteer fire companies will be listed under local government. There are thousands of fire departments in the West, most of which have their own fire authority or agency (Figure 2). The protection of life and property is the primary function of a local fire department.

The number of rural and municipal fire departments varies greatly in the West. Hawaii has only seven to deal with, where California has over 900 fire departments in the state. At last count, there are 6,394 rural or municipal fire departments in the West.

Local fire departments often play a major role in protecting structures that are being threatened by a wildland/urban interface fire. None of the western States can adequately deal with a major wildland/urban fire situation without the assistance of local fire departments and the cooperation of the Federal land management agencies. In some parts of the West, rural fire departments are not supported by any taxing authority. In fact, large areas may have no organized fire protection at all.





Even where they do exist, local fire departments provide greatly differing levels of fire protection services. Depending on local conditions, some may have grass or brush fire trucks to deal with small grass or grain fires, but very few have the resources (engines, water tenders, handcrews, aircraft, etc.) to tackle a major wildland fire without state and/or federal assistance.

A typical local government fire department involved in the wildland/urban interface fire problem would be a rural fire district centered on an unincorporated small town with maybe two fire stations, each with a structural fire engine, a grass rig, a water tender, and probably a rescue squad staffed by a small, but dedicated, group of volunteer fire fighters.

While training and equipment standards vary greatly, these local government fire departments wind up being the key players in protecting structures from encroaching wildfires in the wildland/urban interface.

***Rural Fire Protection*** – The most basic of fire protection is provided by thousands of dedicated volunteer firefighters. They provide basic fire protection services to their communities for no pay...just the satisfaction of serving their community. In a lot of cases, taxing authorities do not support these fire departments. They have to raise the money for the gas, oil and insurance by selling baked goods or sponsoring raffles. These types of fire departments usually respond to structure fires, medical aids, traffic accidents and wildland fires. Each year they make the first attack on thousands of wildland fires in the West. They provide this protection with little or no training and frequently are poorly equipped.

***Number of Local Fire  
Departments***

<i>Alaska</i>	<i>288</i>
<i>Arizona</i>	<i>252</i>
<i>California</i>	<i>927</i>
<i>Colorado</i>	<i>398</i>
<i>Hawaii</i>	<i>7</i>
<i>Idaho</i>	<i>209</i>
<i>Kansas</i>	<i>673</i>
<i>Montana</i>	<i>420</i>
<i>Nebraska</i>	<i>490</i>
<i>Nevada</i>	<i>211</i>
<i>New Mexico</i>	<i>359</i>
<i>North Dakota</i>	<i>396</i>
<i>Oregon</i>	<i>438</i>
<i>South Dakota</i>	<i>364</i>
<i>Utah</i>	<i>230</i>
<i>Washington</i>	<i>560</i>
<i>Wyoming</i>	<i>172</i>

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***6,394***

*Figure 2. Local fire departments play a vital role in the protection of each state's wildland resources. They especially come into play for structure protection during a wildland/urban fire.*



***Municipal Fire Protection*** – As the population of an area increases and the community can afford it, a city or fire protection district may hire some full-time firefighters, operate aerial truck companies, and evolve to a municipal fire department. Municipal fire departments respond to the same type of emergencies as those in the rural areas, but the structures may be taller and the fire protection operations more technical and specialized. Most municipal firefighters, be they volunteer or full-time, are not adequately trained or equipped to fight wildland fires.

### **State Level Fire Protection**

State government in the West addresses fire protection issues in varying ways. In most states, there may be more than one state agency that has some role to play in wildland fire protection. There are the State Forester, the State Emergency Management agency, the National Guard, and the State Fire Marshal, to name a few.

***State Forestry Agencies*** – The state forestry agencies in the West vary greatly in their authorities and responsibilities. Several states have adopted laws that direct the State Forester to provide wildland fire protection and provide funding, personnel, and equipment to deliver services. Other states give the responsibility of providing wildland fire protection to the State Forester, but do not provide funding for such protection. Only Nevada has given its State Forester the responsibility to provide fire protection at the same level as traditional local governmental entities.

#### **Authorities and Responsibilities**

*Surprisingly, not every state forestry agency has the legal authority to fight wildfires, let alone initiate programs aimed at the wildland/urban interface fire problem. Only four of the state wildfire agencies (CA, KS, NV, WY) have the authority to fight structure fires in the wildland/urban interface. Eight states share responsibility for actions in the interface with some other entity, usually a local government fire agency. Thirteen of the seventeen states said that they thought most of the “players” in the interface understood their individual roles and responsibilities.*

### **Federal Level Fire Protection**

Federal Government agencies own or control 648,969,668 acres or 58 percent of the land in the West. The Federal land management agencies provide differing levels of wildland fire protection depending on their authorities and responsibilities. The levels of wildland fire protection provided by the USDA Forest Service and the USDI Bureau of Land Management differ from that provided by the USDI National Park Service, simply because their missions are different.

In some cases, the various authorities and responsibilities between federal, state and local agencies may be overlapping and in conflict. This can lead to confusion and frustration. The wildland fire



protection problem is further compounded by the fact that wildland fires know or respect no political boundaries.

### ***Jurisdiction vs. Responsibility***

There is a lot of the West that has no form of fire protection, but where there is protection, there are four basic types: Rural; Municipal; State Forestry; and Federal. Each jurisdiction or agency has different authorities and responsibilities. This section of the report will attempt to describe these differences.

On each piece of ground, only one level of government, and one government agency has *jurisdiction* for wildland fire protection. On federally owned wildland that is one of the federal land management agencies. On private lands, perhaps the state, or a county, city, or district may have jurisdiction. Jurisdiction means having both the legal authority and the financial obligation for fire protection. The area of jurisdiction for a city or special district is easily defined; it is the area within the city limits or district boundary. The area of responsibility for a federal agency is the land it owns. The area of jurisdiction for a state is usually most complex.

This area, called *state responsibility area*, is defined in a piece of legislation that places “qualifiers” on the land. It may be land owned by the state, or all forested lands within the state that are not within an incorporated city or owned by the federal government, or all privately owned forested lands (Figure 3).

There is a difference between jurisdiction and protection responsibility. A jurisdiction may contract the protection of its land to another agency (e.g. in a “balancing of acres” co-operative fire protection agreement, or formal contract).

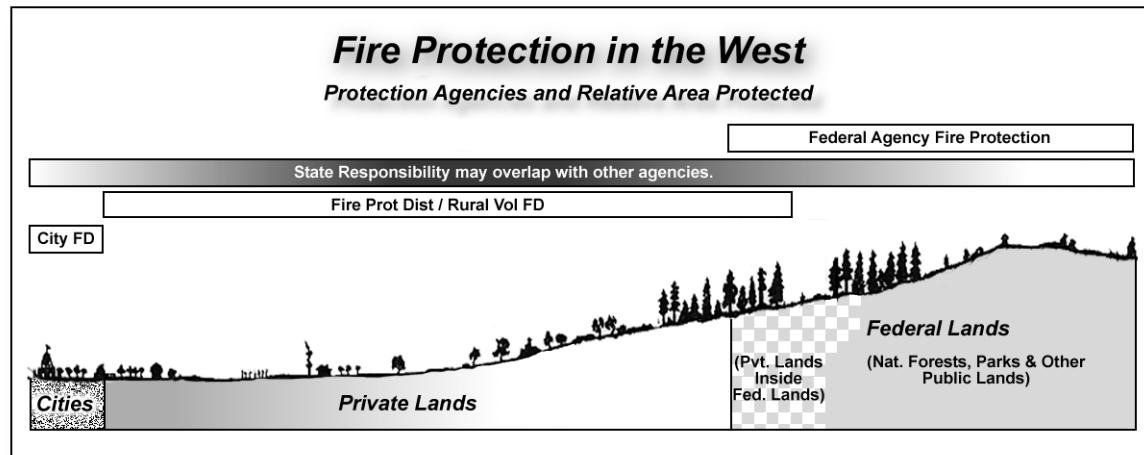


Figure 3. Wildland fire protection can be very complicated. There may be areas where the protection responsibilities overlap and may even be in conflict. Local authority is usually the simplest. State responsibilities differ with each State and usually overlay local government. Federal protection responsibilities differ between the agencies, and the federal government provides some funding to the States and volunteer fire organizations in the West.

A *state direct protection area* is that area of the state where state forces provide direct fire protection. The direct protection area usually includes state responsibility area, but it may also include lands of another agency that it protects under the authority of a contract or cooperative agreement. The best example of this type of protection is when a state protects federal lands that are adjacent to state protected lands, or when the Forest Service protects private lands within a national forest.

A *local protection area* is an area where the state has not declared it has a direct responsibility. This may be non-forested area within a city or fire district. The primary fire protection responsibility in these areas lies with the local governmental entity, or there may be no fire protection at all.

### Levels of Protection

To fully understand the extent of the wildland fire protection in the West, there has to be a discussion of the various levels of protection provided by the states. As mentioned, there is a vast difference in the authorities, responsibilities, and the levels of protection provided (Figure 4). There are three general levels of wildland fire protection provided by the western states:

- **Direct Protection** – A state is providing direct protection when it provides funding for personnel and equipment to protect its state responsibility area. There is a command authority and direct employment of firefighting personnel designated to provide protection. Examples: Alaska, California, Idaho, Montana, Oregon, and Washington.

	<i>Area Protected (in acres)</i>			
	<i>Direct</i>	<i>Cooperative</i>	<i>Coordination</i>	<i>Total</i>
<i>Alaska</i>	151,695,898			151,695,898
<i>Arizona</i>		22,200,000		22,200,000
<i>California</i>	27,740,608	11,000,000		38,740,608
<i>Colorado</i>	41,432,979			41,432,979
<i>Hawaii</i>	850,000		3,306,300	4,156,300
<i>Idaho</i>	6,025,690			6,025,690
<i>Kansas</i>			46,400,000	46,400,000
<i>Montana</i>	5,192,118	45,300,000		50,492,118
<i>Nebraska</i>			49,083,520	49,083,520
<i>Nevada</i>	11,999,791		20,919,540	32,919,331
<i>New Mexico</i>		42,500,000		42,500,000
<i>North Dakota</i>			31,878,661	31,878,661
<i>Oregon</i>	11,300,000	2,300,000		13,600,000
<i>South Dakota</i>	949,117		47,000,000	47,949,117
<i>Utah</i>		15,000,000		15,000,000
<i>Washington</i>	12,708,567			12,708,567
<i>Wyoming</i>	4,237,000		24,863,000	29,100,000
	274,131,768	138,300,000	223,451,021	635,882,789

Figure 4. Each State defines its responsibilities differently. If the State establishes a direct protection area and provides funding and resources to protect it, this is direct protection. Other States may take the responsibility to assist in protection, but use forces from other agencies to protect the area...this is considered cooperative protection. The third type of protection is coordinated protection. This is when the State has given the State Forester broad responsibilities, but limited funding to provide the protection.

- ***Cooperative Protection*** – A state is providing cooperative protection when it provides funding for the protection of its state responsibility area, but provides the protection using other agencies' forces under a cooperative agreement. There is a command authority and limited firefighting forces, but the primary firefighting forces are another agency's employees. Examples: Arizona, New Mexico and Utah.
- ***Coordinated Protection*** – A state is providing coordinated protection when it does not have funding to provide suppression activities, but provides coordination of wildland fire prevention activities and suppression efforts throughout the state. Fire protection of privately owned lands is the responsibility of local agencies. Examples: North Dakota, Kansas, and Nebraska.

There may be hybrids of these three levels of protection. An example is Montana. The state Department of Natural Resources Conservation provides direct protection to 5 million acres of privately or state owned timberlands, but they also provide cooperative protection on 45 million acres of non-forested private lands in the eastern part of the state.

### ***Fire Protection Types***

There are three primary types or levels of fire protection services:

- ***Life and Property Fire Protection*** – a service with the primary responsibility to protect structures AND the people who occupy these structures from injury or death. This fire protection service is normally provided by rural and/or local government fire departments, with specially trained and equipped personnel. After life safety, the priority is to keep the fire from leaving the area of origin. It also includes protecting the structure from an advancing wildland fire. Local taxpayers fund this service through a variety of taxing authorities. (The equipment and training required to conduct life and property protection is not normally provided to the wildland firefighter.)
- ***Wildland Fire Protection*** – a service with the primary responsibility of protecting natural resources and watersheds from damage by wildfires. State and federal forestry or land management agencies normally provide wildland fire protection with specially trained and equipped personnel. Various taxing authorities and fees fund this service. Some wildland fire protection agencies have the responsibility for intermingled life and property protection when a





wildland fire threatens structures...and some do not. It is nearly impossible for an incident commander to separate these responsibilities (and the associated costs) during a wildland fire. (The equipment and training required to conduct wildland fire protection is not normally provided to the local government fire department firefighter. If a fire protection agency is routinely called upon to fight wildland fires, they are usually trained and equipped to do so. A significant safety problem arises when personnel from any agency are called upon to fight fires for which they are NOT properly equipped or trained.)

- **Wildland fire management**– allowing a fire to burn in specific areas, under specified weather conditions, to achieve specific resource management and/or protection objectives. The fire may be an unwanted or a prescribed fire from a natural or planned ignition source. Requires ownership or management authority over the land by the fire protection entity.

### **Wildland/Urban Interface Conditions**

The wildland/urban interface exists where humans and their development meet or intermix with wildland fuels. There are four different wildland/urban conditions:

- **Interface Condition** – is a situation where structures abut wildland fuels. There is a **clear line of demarcation** between the structures and the wildland fuels along roads or back fences (Figure 5). Wildland fuels do not continue into the developed area. The development density for an interface condition is usually 3+ structures per acre. Fire protection is normally provided by a local government fire department with the responsibility to protect the structure from both an interior fire and an advancing wildland fire (unless the line of demarcation is also a jurisdictional boundary).
- **Intermix Condition** – is a condition where structures are **scattered throughout** a wildland area (Figure 6). There is no clear line of demarcation; the



Figure 5. Interface Condition, where there is a clear line between the structures and the wildland fuels.



wildland fuels are continuous outside of and within the developed area. The development density in the intermix ranges from structures very close together to one structure per 40 acres. Fire protection districts funded by various taxing authorities normally provide life and property fire protection, and may also have wildland fire protection responsibilities.

- **Occluded Condition** – is a situation, normally within a city, where structures abut an **island** of wildland fuels (park or open space). There is a clear line of demarcation between the structures and the wildland fuels along roads or fences. The development density for an occluded condition is usually similar to those found in the interface condition and the occluded area is usually less than 1,000 acres in size. Fire protection is normally provided by a local government fire department. The trend is for local government to require developers to include open space in their plans, but not include a long-term mechanism for their maintenance; thus the hazardous fire condition increases over time.

- **Rural Condition** – is a situation where **scattered** small clusters of structures (ranches, farms, resorts, or summer cabins) are exposed to wildland fuels (Figure 7). There may be miles between these clusters. Structural fire protection service may not be available. These types of developments often exceed the capabilities of both the structural and wildland fire protection systems. Wildland fire protection agencies have little or no control over such development and may be unable to provide protection due to statutory barriers.



Figure 6. Intermix Condition, where the structures are scattered throughout the wildland fuels.



Figure 7. Rural Condition, where the structures or clusters of structures are situated in wildland fuels. These structures or clusters are often miles apart.



## *The Status of the Problem in the West*

This section of this report will outline the various aspects of this complicated issue. Most of the information that is presented was gathered from the extensive questionnaire and interviews with experts in the field.

### ***History of Wildland/Urban Interface Fires in the West***

The list of wildland/urban interface fires in the West is impressive. There is no question this is a Western problem. Yes, Florida and several other states in the other parts of the Nation experience wildland/urban interface fires, but it is spotty, and usually only during prolonged drought conditions. The West has the dubious distinction of having “the mostest” every year. Not every year will be a bad fire year in every western state, but every year wildland/urban interface fires will threaten and destroy structures somewhere.

As part of the data collection process for this report, each state submitted its wildland/urban interface fire statistics. For purposes of this report, a wildland/urban interface fire is one that burned more than 25 acres of wildland and destroyed at least three structures. (See Appendix for detailed fire history data). The data support some of our preconceptions, but also reveal some new truths about fire in the interface.

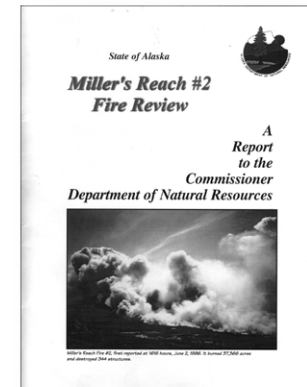
As we would expect, the fire data list from California is by far the most extensive. Since the 1960’s, hardly a year goes by in the Golden State without significant structure loss to wildfire. Some years, single large fires (e.g. Bel Air-1961-484 structures) are to blame, and other years a series of large fires (e.g. 1970 Series –722 structures) was responsible for the destruction. A single fire, the Tunnel Fire in Oakland in 1991 created both a lesson for fire managers and a statistical anomaly when it destroyed more than 2900 structures and killed 25 people while burning just 1,600 acres in a densely urban area.

#### **Problem Analysis**

*Every state reported that it had a wildland/urban interface problem, ranging from a small problem in the plains, to an extreme problem in South Dakota, Colorado, Utah, Washington, and California. All states agreed that the problem was increasing. The states reported that the problem was destined to get worse due to high population growth (e.g. +825,000 people by 2010 in Colorado; 30,000 acres per year lost to development in Washington, etc.), lack of local control over development, leapfrog development (i.e. “urban sprawl”), checkerboard ownership patterns, and public ignorance and apathy.*



But wildfires with major structure loss do not occur only in California. One of the biggest structure loss wildfires is the Miller's Reach #2 fire in Alaska (our least densely populated state), which destroyed 454 structures in 1996. This year's Cerro Grande fire in New Mexico burned 47,650 acres and destroyed 350 structures, most in the City of Los Alamos. Each year in the 1990's, Montana's list of wildfires destroying structures has been getting longer, and in 2000 apparently will set new records. Of all the western states, only Kansas could not produce data showing structures lost to wildland fire.



Unfortunately, not all states regularly collect comprehensive data on wildfires, including structure loss. Some states had to be reminded by old timers of fires that destroyed numerous structures, but which are not captured in a database. Lack of a nationwide, standardized statistical forest fire reporting system and database hinders broader understanding of the wildland/urban interface fire problem.

During the late 80s and 90s, all of the other states (except Kansas) experienced a significant increase in fire activity. Some of the fires of significance were:

	<i>Fire Name</i>	<i>Year</i>	<i>Acres</i>	<i>No. Structures lost</i>
<b>Alaska</b>	Miller's Reach #2	1996	37,336	454
<b>Colorado</b>	Bobcat and High Meadows	2000	21,527	73
<b>Idaho</b>	Lightning Fire Series	2000	1,283,998	100+
<b>Montana</b>	Lightning Fire Series	2000	922,124	322
<b>New Mexico</b>	Cerro Grande	2000	47,650	350
<b>Oregon</b>	Hull Mountain	1994	7,990	44
<b>South Dakota</b>	Westberry Trails	1988	3,840	57
<b>Utah</b>	Wasatch	1990		43
<b>Washington</b>	Fire Storm 91	1991	350,000	191



## ***The 2000 Fire Season***

One would hope that the 2000 fire season is an anomaly; but don't bet on it. It is felt that it is just a peek at what can be expected in the future. In 1910, the worst year for fires in the Northern Rockies, the fires burned in forests that had been logged. Ninety years later we say that the fires are burning in



fuels as a result of effective fire suppression efforts. But, let us not forget, it is the weather that starts these fires, and the weather that allows these fires to burn the way they do.

Just look at the acres burned in the Nation since 1990 (Figure 8). The trend predicts a steady increase. If you only look at the last several years the trend line really shows an increase in annual acres burned.

### **Cerro Grande Fire**

Early in the 2000 fire season, there was a fire that brings into focus most every thing that is wrong with the system. The Cerro Grande Fire provides a peek into the future...we must learn from this disastrous fire and work toward correcting some of the problems.

The Cerro Grande Fire started on the National Park Service, Bandelier National Monument as a prescribed fire on May 4, 2000. On May 5, 2000 it escaped and was declared a wildfire. On May 10<sup>th</sup> the fire entered Los Alamos, New Mexico, destroying 450 structures (235 residential structures that housed 410 dwelling units, 195 outbuildings and 20 structures on the National Laboratory). This fire was unique in several ways, and it provides a “peek” into the future. The following are some of the issues raised by this fire:

- **Prescribed Fire** – It doesn’t take nuclear scientists to figure out that our land management agencies must conduct more prescribed fires to reduce the buildup of fuels. Planning and conducting a prescribed fire is not an “exact science.” Even if all the rules are followed, escapes will happen and homes may be threatened or destroyed. There is a real need to conduct more prescribed fires throughout the West and for everyone to understand that a small percentage of these will escape control. If agency policy and procedures are not followed in planning and conducting prescribed fires, the number of escapes will increase dramatically.
- **Environmental Impact Requirements** – In 1996, the Santa Fe National Forest leadership initiated a report on the wildland/urban interface fire problem in Los Alamos. They developed a plan of action to deal with it. It took four years to complete the environmental review documents so that the work could begin. The fire hit before the work could be completed.

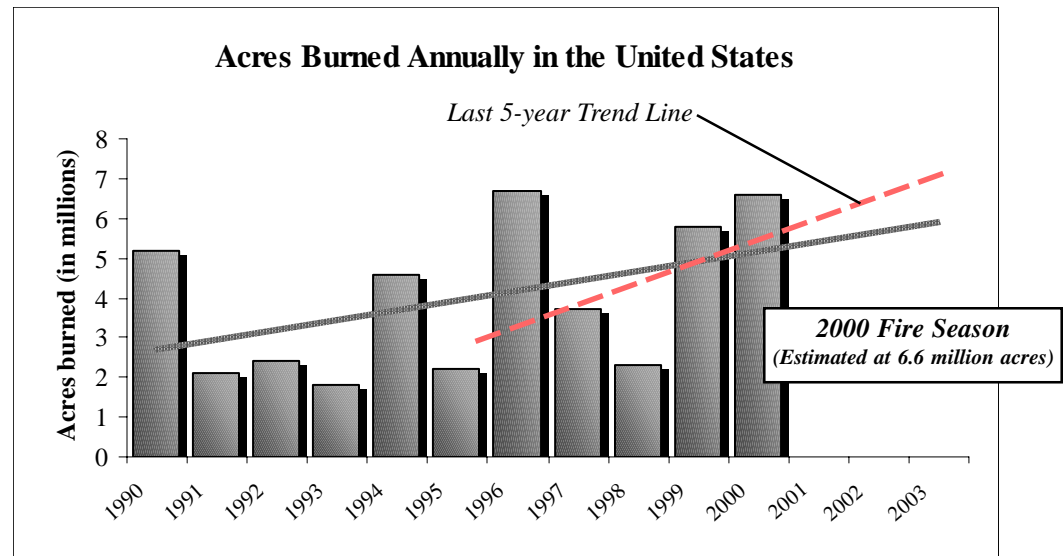


Figure 8. The number of acres burned each year in the United States is on the rise.





- **Firefighting Forces** – The execution of a prescribed fire taps firefighting forces and these suppression forces are not available to fight wildland fires.

- **Human Development** – Urban development in or adjacent to the wildlands complicates the use of fire to remove the accumulation of fuels.

- **Smoke** – Some of the more useful prescriptions use low intensity fire, but generate more smoke. Increased burning restrictions from EPA are an obstacle to fuel reduction efforts.

- **Wildland/Urban Interface Planning** – The Santa Fe National Forest had identified the Los Alamos area as a wildland/urban interface area at high-risk for a disastrous fire. They had developed a plan to mitigate this problem, but this plan was shelved until the Environmental Impact Assessment could be completed. Some work had been started, and this was effective.

- **Suppression Operations** – The Incident Organization showed a Structure Protection Group. This group was never fully supported. This was probably a result of the federal fire policy.

- **Clearances** – There were no local ordinances requiring defensible space. There are not any ordinances because the people don't want any. Even after the fire, there are people who do not want to clear the vegetation back from their homes.

- **Building Codes** – There were no extraordinary code requirements developed to attempt to mitigate the hazard that existed.

- **Mobilization** – There was no authority or plan to mobilize local government fire suppression forces available in the State.

- **BAER** – Burned Area Emergency Rehabilitation is a new term in our vocabulary. This is where some of the firefighters have gone! Fire

## Cerro Grande Fire



suppression forces are now used to accomplish this new task. Over \$20 million was spent rehabilitating the Cerro Grande fire scar. The actions taken by the Department of Energy, USDA Forest Service and the USDI National Park Service have raised the level of expectation of public related to extent of burned-area rehabilitation that will be taken. Those impacted by wildland fires in the future will expect the government to do more to rehabilitate the burned area.

- **Fire Assignment Rotations** – The federal land management agency fire assignment policy has reduced the maximum days for fire assignments from 21 to 14 days for the 2000 fire season. This will increase the number of firefighters needed to accomplish the same task by at least one-third, and greatly increase travel costs to deliver fresh troops.
- **Area Command** – With the reduction in the level of fire expertise in the various federal agency administrations, some areas have had to establish Area Command Authorities to fill the role of MACS.
- **Incident Management Teams** – The use of these teams has grown tremendously; while the number of teams and level of expertise are declining.
- **Specialization** – The use of more specialists within the federal agencies has depleted the firefighting “militia.”
- **Timber Cut** – With the federal land management agencies reducing their annual cut, revenue is lost, the workforce available to fight fire is reduced, and the number of private companies needed to reforest the cut areas is reduced...these people planted in the winter and fought fire in the summer.
- **Budgets** – Fire budgets are static, but the use of these funds is changing. (Example...the timber budgets in some areas were used to purchase engines...for use in slash burning. Now the fire budget has to purchase the engine.)

## ***Roles of State Agencies***

Each state government is organized differently, with some fielding strong state forestry agencies with extensive authorities and responsibilities for wildfire prevention and suppression. In other states, the state forester merely provides technical advice, and fire protection is left to local government forces. Funding for wildland/urban interface fire protection is very limited.

If they had the opportunity, the majority of the state agencies would like to be able to sponsor prevention initiatives, provide coordination of mutual aid, provide operational support to local fire agencies, sponsor hazard reduction initiatives, provide more financial support, and have a greater role in direct fire suppression in the wildland/urban interface.

Several states mentioned the need to perform an assessment and mapping of the problem, and to provide more/better wildland fire training to local firefighters.

#### **Legislation**

*Several states reported that significant wildfire events had resulted in some kind of fire safety legislation. After the 1993 fire storms in southern California, the legislature passed the first statewide Class A roofing requirement for high fire hazard areas; after the Tunnel Fire in Oakland, the legislature directed CDF to expand its wildland fire hazard classification system to areas of local responsibility. In Montana, following the disastrous 1988 fire season, the legislature directed the DNRC and State Fire Marshal to develop fire safe guidelines. In Nevada, roofing regulations were developed as the result of bad fires with structure losses. Colorado received a budget augmentation for fire equipment following the 1994 fire season. Unfortunately, most states reported little legislative support for the wildland/urban interface problem.*

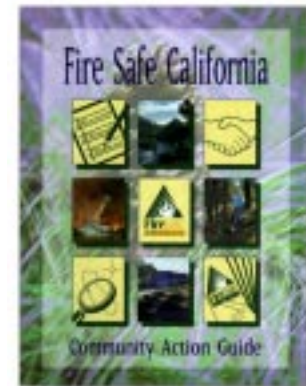
*Twelve of the western states have no state regulations or building standards governing development in the wildland/urban interface. Only seven states have building or fire regulations that can be used to address the interface problem, usually the Uniform Fire Code. In Washington, despite an extreme interface problem and a history of large, damaging fires, the DNRC may only recommend fire safety features for new development.*

### **Codes, Regulations and Building Standards**

We know the technical measures needed to mitigate the wildland/urban interface fire problem in the West. Unfortunately, we can only implement actions as fast as society allows. Hopefully we are still a system of government that responds to the needs and will of its citizens. Solutions will be implemented only when there is a clear need and strong public support for action. Codes, regulations and ordinances are available if the public can be made sufficiently aware of the problem to generate support for their adoption.

#### **FireSafe California**

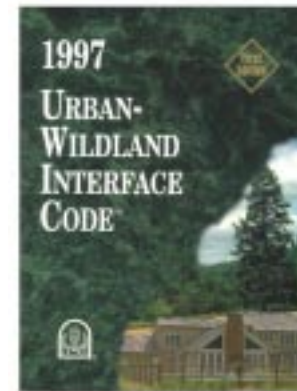
A variety of FireSafe regulation packages exist in the West. They range from the comprehensive package of statutes adopted by California, to a less-intimidating set of rules adopted by the County of Spokane, and include the new Urban-Wildland Interface Code and NFPA 299. In order to successfully mitigate the wildland/urban interface fire problem in the West, each state legislature must adopt a comprehensive package of FireSafe statutes that apply to the whole state. The problem is too severe and the costs too high to both state and federal taxpayers to leave the implementation of appropriate FireSafe statutes to the multitude of local governments.



#### **Urban-Wildland Interface Code**

The 1997 Urban-Wildland Interface Code, published by the International Fire Code Institute, is the first code package developed especially to address mitigation of fire hazards in the wildland/urban interface. The

regulations address both land use and the built environment. Construction requirements are based on the exposure hazards to which the structure may be subjected. Bridging the gap between building codes and fire codes, this code is intended to be enforced by designated local officials of the jurisdictional agency. If adopted by a state, local fire officials could also be delegated enforcement authority. The code is correlated with model building and fire code regulations to avoid conflicting provisions. It offers an opportunity for states or local government entities to adopt a comprehensive package of regulations that can effectively reduce the propagation of the wildland/urban interface fire problem to new developments, and begin the formidable task of applying effective solutions to existing properties.



### **Roof Coverings and Clearances**

The two most important factors in mitigating the wildland/urban interface fire problem in the West are converting to ***ignition-resistant roofing materials*** and achieving ***adequate defensible space***. States need to concentrate their initial efforts on obtaining full compliance with a fire-resistive roofing standard and clearance of flammable vegetation and other materials from around structures in the identified high fire hazard areas. If unable to take any other actions, whether due to political inertia or lack of funds, these two items will contribute to a significant reduction in the number of structures lost to wildfire each year.

An effective fire-resistive roofing standard is not difficult to obtain. A variety of roofing materials are available on the market today that can prevent flying embers from taking hold while still achieving architectural attractiveness. Restrictive CC&R conditions must be eliminated in subdivisions in high fire hazard areas, by state legislation if necessary, in order to allow retrofitting of flammable shake/shingle roofs with ignition-resistant products. Insurance companies could offer premium reductions and lending institutions could offer low-interest loans to encourage residents to switch to nonflammable roofs.

Defensible space is an absolute necessity if firefighters are to be successful in defending structures from encroaching wildland fires. Placing firefighters' lives in jeopardy to try to save a structure where the owner has not provided appropriate defensible space is no longer an acceptable risk. Defensible space (30-100 feet, depending on slope and cover type) can be achieved without decimating the



### **Interface Firefighting**

*The majority of the state agencies are actively involved in the firefight in the interface, with 14 providing direct suppression, 15 providing operational support to other fire agencies, 14 coordinating fire fighting efforts, 11 providing financial support, and 5 providing other aid such as logistical support, contractual assistance, and Incident Command/Management Teams. Only three states thought that their roles might change significantly in the future, due primarily to changes in federal fire policy and reduced funding for federal fire forces.*

landscape. Specimen trees, appropriately spaced and pruned, can provide adequate shade and beauty. Fire-resistant shrubs and ground covers can be used in landscaping to achieve desired decoration without adding to the fire hazard. Decks and eaves can be enclosed so as not to trap embers, firewood can be moved away from the structure, and appropriate areas can be sprinklered to maintain high fuel moistures. All that is needed is for residents to understand and appreciate both the severity of the fire hazard and the value of these measures in protecting their homes.

Even if nothing else can be accomplished, converting to **ignition-resistant roofing** and providing adequate **defensible space** in the high fire hazard areas could significantly reduce the loss of structures to wildfire each year.

### **Public Education**

You cannot legislate a change in attitude! What are needed are incentives that eventually change of habits and attitudes of an educated public. The desired attitude with reference to the wildland/urban interface fire problem is that the residents living in a wildland/interface area must plan, construct and maintain a home that is resistant to ignition. Appropriate goals for educational efforts are:

- The education of individual homeowners to what constitutes a FireSafe home; that it is ultimately their responsibility and they may lose what can never be replaced.
- The education of residents to FireSafe practices so that the community polices itself.
- The enactment of realistic building codes and other regulations that will move toward a more FireSafe community.
- The issuance by lending institutions of low interest home improvement loans for FireSafe projects.
- The adoption by the insurance industry of premium cost reductions for FireSafe structures.





## **It isn't just your home you will lose!**

Homes and other buildings are not the only victims of wildfire in the wildland/urban interface. There are all the regular victims of forest fires: air quality, water quality, fish and wildlife habitat, recreational opportunities, viewsheds, etc. There are the losses to the community infrastructure (power and phone lines and poles, bridges, fences, roads, etc.) Then there are the ripple economic effects in the community from time lost from work, lower productivity due to stress, displaced businesses, etc. If the damages from the fire are significant, there will be further damage potential from subsequent floods and mudslides. The destruction of the natural environment may cause people to move out of the community or stagnate growth. Any way you measure it, wildfire in the wildland/urban interface is usually a losing proposition for everybody.

## **Developing Peer Pressure**

One of the biggest needs is to achieve broad scale understanding of the wildland/urban interface fire problem among the whole population so that they might generate enough political interest to overcome inertia. As each state completes its assessment project, it then needs to initiate one of the available fire prevention models (FireWise, FireSafe, etc.), and especially the public education component of the model, in its identified target hazard areas. Only when the public truly understands the nature of the wildland/urban interface fire problem will the community-based coalitions needed to effectively mitigate the problem be successful.

## **Protection in Place**

We need to rethink our current attitudes and policies about evacuation. Most fire managers are so afraid of the potential repercussions from a civilian death in a wildfire, that they have trouble seeing the advantages of limiting evacuations and protecting people in place, let alone encouraging able-bodied property owners to stay and assist in protecting their property. The Australian Model not only encourages property owners to stay, it provides them with detailed information on preparing their property and

### **Public Perceptions**

*Ideas advanced for correcting the public perception that "their fire department" will save their house in the event of a big wildland fire included public education campaigns, a multimedia advertising campaign, statistical comparisons of structure losses with and without clearance, show me trips after big fires, and putting the public on notice that protecting their home is their responsibility. While the majority of the states agreed that the ultimate solution lies with the homeowner, a significant minority (and one of the authors) believes that the only practical solution is a cooperative effort between homeowners, landowners, and government. Some foresters argued that the land has to be managed on a watershed scale across property lines to achieve forest health, which would presumably lower fire danger.*



### **Evacuation**

*Half of the states have an evacuation policy, although some confused authority to evacuate with a policy on evacuation. Some policies are not written, and a couple are in the draft stage. Some places have adopted the “Missoula County Evacuation Plan (McMeekin Plan). In most cases, local law enforcement (especially the sheriff) has the authority to initiate evacuations, but in some states the authority resides with the county commissioners. It appears that little preplanning has gone in to the evacuation issue in the wildland/urban interface.*

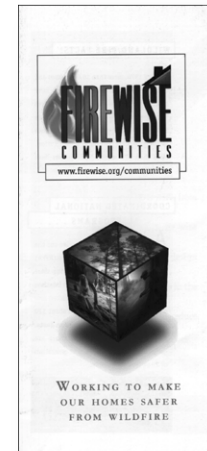
themselves to withstand the onslaught of wildfire. Reducing the amount of people being evacuated reduces traffic congestion, which improves ingress for fire apparatus. It also reduces the likelihood of injuries from traffic accidents. In many mountain communities, the risk to civilians would be less if they were protected in place in a place of refuge (safety island) within the community than left to try to drive themselves out of the area over inadequate roads. Firefighters need to understand the authorities and policies of the agency with evacuation jurisdiction in order to make well-informed decisions about the merits of evacuation.

### **Australian Evacuation Model**

Opposition to the concept that homeowners should be responsible for protecting their homes and not be evacuated was nearly unanimous. Many said “it can’t be done”, that it conflicted with the goal of maximizing property protection while minimizing risk to the public and firefighters, and that they “can’t even conceive of this happening”. While a small majority supported homeowners purchasing firefighting equipment, many commented that the private fire protection should be built-in, not requiring people to operate it during the fire. Some said that no policy was the best policy, and that the decision to evacuate should be left to common sense. A few commented that some people could be useful to supplement the efforts of beleaguered local volunteer firefighters.

### **FireWise**

FireWise is a public education model program developed by a consortium of the federal wildland fire agencies, the National Association of State Foresters, the National Fire Protection Association, and Federal Emergency Management Agency as part of the National Wildland/Urban Interface Fire Protection Program. It provides a video, brochures, pamphlets, checklists, etc. directed at fire safety in the wildland/urban interface which state and local agencies can modify with local photographs and statistics to make the program more tailored to local needs. It is a valuable tool readily available to any fire agency to begin making its residents more aware of the wildland/urban interface fire problem and what they can do to make their properties safer from encroaching wildfire.



A series of 2-day seminars is being held in major cities nationwide to acquaint local and state fire officials, as well as interested private citizens and civic groups, with the FireWise program. (Also see: [www.firesafe.org](http://www.firesafe.org))

At least two states, Alaska and Colorado have adopted FireWise as their primary wildland/urban interface fire prevention program statewide.

The package for Alaska is sponsored by the Alaska Wildfire Coordinating Group and follows closely the FireWise model, providing information on the six standard elements of landscaping, access & signs, emergency water supply, FireWise construction, home planning, and when wildfire threatens. The glossy color pamphlets feature photographs of local places, people, and fire situations, which add to the appeal of the product. In addition to the FireWise video, the packet includes numerous fire prevention pamphlets, and a Fire Risk Rating For Homes score sheet.

The Colorado State Forest Service has taken components of the FireWise model and modified them to fit local conditions. They have published a detailed instruction booklet on “*FireWise Construction – Design and Materials*” to help educate developers and builders. In Larimer County in the Rocky Mountain front country, where several significant wildland/urban interface fires have occurred in the past, the Project has produced a very polished and colorful package of educational materials, including the FireWise video, for homeowners associations, community civic organizations, etc. that tailors the standard generic fire safety recommendations to the local conditions in the county. The package starts off with a hard-hitting introduction that asserts, “You are at risk!” and details the wildfire threat in Larimer County. It then covers the gamut of fire safety guidelines for access, water supply, defensible space, fuel management, building construction, and interior fire safety. It concludes with a “What to do when...” checklist to help people prepare themselves to survive a threat from wildfire.



#### **Existing Initiatives**

*The most popular local wildland/urban interface fire prevention programs were FireWise (AK, CO, HI, WY), FireSafe Councils (CA, NV, HI, WA), and “Living with Fire” in Utah. See the Appendix for discussions of these programs.*

#### **FireSafe Spokane**

Following a series of major fires in the Spokane (WA) area during a windstorm in October of 1991, several class-action lawsuits against local electric utility companies were combined. The settlement of this suit provided \$300,000 to develop a method to improve defensible space around vulnerable homes in this forested community in dry eastern Washington. Thus, “*FireSafe Spokane*” was born.

The mission of this nonprofit corporation, with a five-member board of directors representing the electric utilities, the fire community, and Washington DNR, is to educate, facilitate, and coordinate local community efforts to improve defensible space around homes in the wildland/urban interface to the extent that both fire damages and suppression costs are reduced.

Projects of FireSafe Spokane include demonstration FireSafe houses, educational materials, free home inspections, a spring clean-up week, FireSafe film short, and special teams to emphasize the wildland/urban interface fire problem to the media.

Active since 1998, FireSafe Spokane now has an executive director who has completed a problem assessment and action plan. The group is currently seeking long term funding to extend the project beyond its current three-year funding window. For more information, see Appendix.

#### **FireFree Bend**

After the Skeleton Fire in 1996 destroyed 19 structures outside of Bend (OR), the SAFECO insurance company approached the Bend Fire Department with the offer of a donation to buy fire equipment to improve fire protection in the area. The Bend Fire Marshal made a pitch for a prevention program that would get residents to change their attitudes and behaviors about fire. This project was agreed to, with SAFECO providing initial funding of \$75,000. A steering committee contracted with a public relations and marketing firm, the RalstonGroup, which has developed an effective and very professional multimedia campaign using a FireFree! logo and a “get in the zone” (i.e. *defensible space*) motto.



The objectives of FireFree Bend are to mitigate the loss of life and property caused by wildfires through public education; develop a program to foster and promote public education for fire safety; to change attitudes and behaviors toward wildfire safety and survival; and to establish a review and measurement process to assess the effectiveness of the program, and assist the insurance community and fire service in evaluating high fire hazard interface area.

The project has had considerable success and garnered many additional corporate sponsors and significant additional funding. They have produced a professional quality video using “locals” as stars, and sponsored cleanup weekends that have removed more than 10,000 cubic yards of combustible yard waste in one weekend. FireFree Bend now has a self-sustaining hazard reduction program supported by an aware local populace. They have starter kits available for communities interested in starting their own programs. For more information, see Appendix.

### **Project Impact - Deschutes County**

Deschutes County (OR) became one of the first communities in the nation to receive a FEMA Project Impact grant for wildland fire hazard reduction as the result of a grant application put together by the Bend Fire Department.

Project Impact is a federally funded grant program that provides funds to one community in each state each year for projects to better prepare it to survive a large-scale disaster. Located on the dry east side of the Cascade Mountains in east-central Oregon, Bend is a growing resort community in the piney woods with a significant wildland/urban interface fire problem.

With \$300,000 in federal and \$100,000 in local grant funds, the Deschutes County Project Impact team has established the goals of supporting the FireFree Bend project and expanding it countywide, developing additional means of ingress/egress in targeted high-risk subdivisions, completing a standardized rural addressing project, and completing a GIS map database for the county. For more information see Appendix.

#### **Mapping**

*Thirteen of the states have mapped or begun mapping the extent of their wildland/urban interface problem, most using GIS programs, with ArcView the most common software. Only a few of the states were making these maps available to outside agencies (e.g. other fire agencies, planning departments, etc.). Nine states reported that they were seeking funding sources (usually federal grants) to be able to complete their assessment and mapping projects. Few of the states felt that the current USDA Forest Service project to map the wildland/urban areas in the nation would be useful, as the scale would be too broad, not enough detailed information would be available, and the results would be subject to misinterpretation by the uninformed. Most felt that the project should start at the local level with the data rolled up into a national database.*



## ***Mapping of the Wildland/Urban Interface Areas***

Before you can intelligently discuss the wildland/urban interface fire problem, you must map the areas of concern. Most fire managers can point to the areas within their jurisdiction that pose a problem. The key is to delineate these areas on a map so that they can be defined in detail.

These maps should be of a scale that you can determine whether an individual parcel is in or out of the area of concern. It is best that these maps be developed using geographic information system software (GIS). In this way, the information can be stored, manipulated and shared with cooperating agencies and the insurance industry.



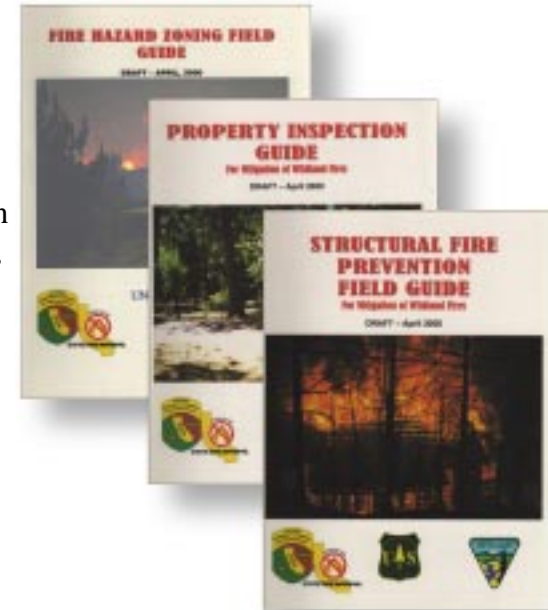
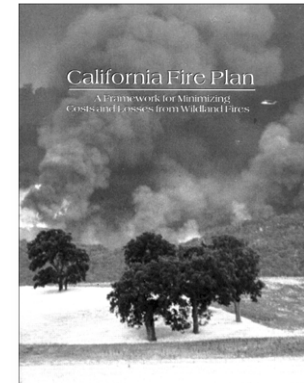
[www.ucfpl.ucop.edu](http://www.ucfpl.ucop.edu)

### **California Fire Plan**

One of the most complete programs of wildland/urban interface mapping has been conducted in California. Under policy direction from the Legislature and the Board of Forestry, the Department of Forestry and Fire Protection has mapped the entire state, categorizing areas as to their level of hazard. This mapping is then tied to the *California Fire Plan, A Framework for Minimizing Costs and Losses from Wildland Fire*, and an outstanding example of a fire plan.

As part of the implementation strategies, the University of California Forest Products Laboratory has produced three guides directed at the wildland/urban interface fire problem. They are the:

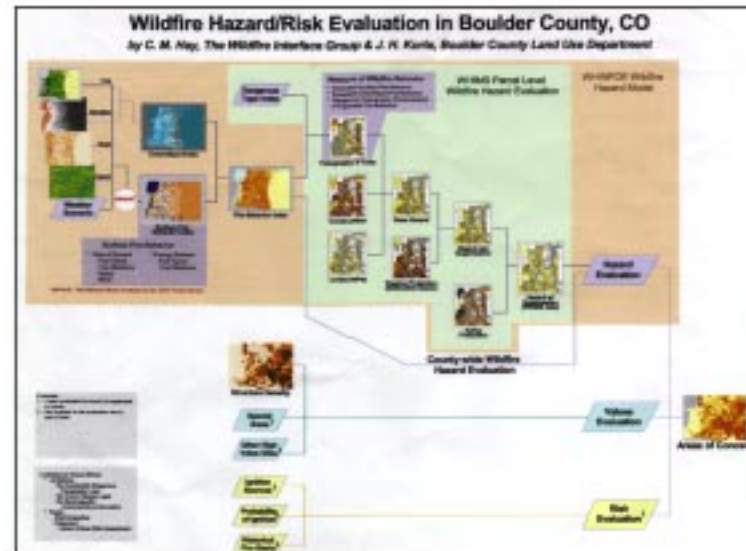
- *Fire Hazard Zoning Field Guide*
- *Property Inspection Guide*
- *Structural Fire Prevention Field Guide*



The material developed in California is outstanding. It includes plans and actions that can be taken on a statewide basis, as well as tools for planners and firefighters alike. If any agency is planning on moving their programs forward, time would best be served by reviewing this work.

### **Boulder County Wildfire Hazard/Risk Assessment**

As a result of disastrous fires in the area, the Boulder County (CO) Land Use Department has developed one of the most comprehensive hazard/risk mapping and assessment programs in the nation. This award-winning program is a model that needs to be emulated.



The evaluation program ties all the elements (fuel, elevation, slope and aspect) with weather and predicts fire behavior. This then provides three evaluations: Hazard Evaluation; Values Evaluation; and Risk Evaluation. From all of these various “layers” an Area of Concerns map is produced. See the Appendix for more information.

### **Mobilization Initiatives**

The mobilization of large forces to combat major fires will always be necessary. The states need to address several of the following factors as a means of streamlining emergency operations.

#### **It Isn't Just Mapping**

States need also to do an analysis of their capability to respond to the wildland/urban interface fire problem, both before and after the fire. Mitigation of fire hazard and exposure through effective fire prevention programs and effective initial attack suppression actions can significantly reduce the anticipated losses from a major fire.

#### **Federal Funding**

*If given funding, with which to address with wildland/urban interface fire problem, the state agencies identified mapping/preplanning, supporting local initiatives, adopting FireWise or similar programs, hazard reduction projects, fuelbreaks, demonstration projects, home inspection programs, and tax incentives to homeowners as their priorities. Several states indicated that if “matching funds” were required for grants, they would have little hope of obtaining such funds, let alone the staff to administer such grant programs.*

### Do you have the Facts?

One of the problems with identifying and assessing the wildland/urban interface fire problem is that in order to make good decisions, you need all of the facts. Many of the states do not at this time have access to the facts (data) necessary to do an effective assessment. Each state needs to make sure that it builds the appropriate foundation for planning and developing solutions by acquiring and maintaining the following types of data:

- Fire weather data
- Fuels data
- Fire occurrence and causal statistics
- GIS data base (interactive with other sources)
- Maps for everybody
- Road/street and addressing database
- Water systems configurations and capabilities
- Telecommunications systems data
- Suppression resource inventories
- Hired equipment vendor database
- Cooperative agreements and operating plans
- Model assessment guide
- Model statutes, codes, and ordinances

Gathering of basic facts and information is the critical first step towards developing a meaningful analysis and understanding of the wildland/urban interface fire problem in any area. If you don't know what's really happening out there, you are probably not prepared to offer meaningful solutions.

### Fire Prevention

Fire prevention programs designed to reduce risk need to be targeted at the real causes of large, damaging fires in the high hazard areas. This requires on-going collection and analysis of data on fire causes from all jurisdictions. The need is to be able to target the sources of risk that cause major fires, not just lots of small fires (e.g. power lines vs. kids and matches). Each state needs a comprehensive, standardized fire statistics database collecting information from (and accessible to) all fire agencies. Fire prevention programs such as FireSafe and FireWise are targeted at reducing exposure of existing structures to loss from wildfire. This type of program needs to emphasize to two most important factors in structure survivability: *ignition-resistant roof coverings* and *defensible space*.



## Pre-fire Planning

The capability of the suppression system response to the wildland/urban fire problem needs to be analyzed to determine its effectiveness. Are *all* of the fire agencies in the high hazard areas actively involved in joint response planning, training, and drills? Do they have the most effective types of apparatus and equipment, and adequate numbers of trained personnel to operate it? Are there auto aid and mutual aid pre-plans in effect that assure the immediate response of the closest available types of correct resources? Can the players communicate on common radio frequencies when they arrive on the fire ground? Do the initial attack fire agencies have immediate access to specialized types of equipment (e.g. air tankers, helicopters, bulldozers, etc.)? Has the concept of Unified Command been accepted and practiced? If so, the capabilities of the suppression force can mitigate a lot of damage in the wildland/urban interface. Just remember that no suppression force is invincible in the face of the worst possible wildfire conditions.

## Training, Communications, Equipment

The most critical components of an effective suppression system in the wildland/urban interface are training, communications, and equipment.

Training means that the players from all agencies (especially the local municipal fire departments and districts) receive regular training in wildland fire fighting techniques. Such training needs to focus on basic wildland fireline evolutions and firefighter safety, not just ICS position training. Regular interagency wildland drills are necessary to keep the players ready. Live fire training is invaluable, if it can be conducted safely.

Communications means primarily radio communications, with two important factors. A dispatch system that can interface with all fire agencies to provide timely dispatch of automatic and mutual aid resources, as well as serve as an efficient collection point for fire intelligence data is critical to effective response in the high hazard areas. Mobile (and portable) radio communications is the second factor. The personnel arriving at the fire scene need to be able to effectively communicate with each other to be able to work safely and efficiently. Common radio frequencies with pre-planned shared use agreements are critical. Adequate numbers of command and tactical nets must be provided.

### Training

*In the training arena, all of the states provide instructors for wildland firefighting training courses, and the majority also provide training materials to local government firefighters. Several of the states also train/credential local instructors, and/or maintain a certification/qualification system for wildland firefighters. If given more money for training, most states responded that they would expand their existing programs with more instructors, more/better materials, standardized curricula, credentialed instructors, etc.*



Mountain top repeaters (or mobile relays, or remote bases, etc.) are important to maintaining effective communications over wide areas of difficult terrain.

Equipment means the tools of the trade appropriate for the job at hand. If the job is initial attack on a wildfire in the wildland/urban interface, this means engines of a size that can negotiate narrow country roads, light bridges, steep grades, and preferably operate off-road as needed (Type III engines), as opposed to structural engines (Type I engines) that might suffice for structure protection, but won't contribute much to perimeter control. Equipment means having lightweight wildland fire hose, lightweight personal protective equipment, portable pumps, Class A foam systems, etc. Many city fathers in the West would be well advised to acquire a few Type III, four-wheel-drive, pump and roll, foam-equipped engines before "the big one" happens in their backyard.

Only when training, communications, and equipment of all the fire agencies that can reasonably be expected to operate on the fire in the wildland/urban interface in a high fire hazard area have been maximized, can response somewhat mitigate hazard, risk, and exposure.

### **Master Mutual Aid Agreements**

Historically, when fire agencies want to share resources, they enter into local mutual or automatic aid agreements. This system works well when the number of agencies involved are small. As numbers grow, there comes a time when there is a need for state-level legislation that allows the various jurisdictions within a state to move across jurisdictional lines and assist others in need.

#### **Mutual Aid**

*While thirteen of the 17 states have a statute-based mutual aid system, several mentioned the need for improved planning, coordination, and communications in order to make the system functionally effective. Again, additional training was identified as a need in the mutual aid system. Washington for example, had recently overhauled its state mobilization plan, creating regional coordinating groups staffed by local/state fire officials to improve mutual aid coordination.*

As the wildland/urban interface fire problem has grown, the use of local forces to protect threatened structures has increased. Many of the states still do not have adequate authority to properly mobilize the existing forces.

Such agreements are referred to as Master Mutual Aid Agreements. Some of the best systems are found in California, Montana, Oregon and Washington. The system in each state is different in its operations, but similar in that it allows for the movement of firefighting resources statewide.



## **Compacts**

The States have authority to enter into interstate compacts for the movement of firefighting resources and other assets. Compacts are not simple to establish. Since the Civil War, the Congress requires their stamp of approval before they are ratified. There are two compact agreements in the West.

**Interstate Civil Defense and Disaster Compact** – In 1977 the states of California, Oregon, Washington, Nevada and Idaho entered into a compact to share “forest fire” fighting resources. Since that date, the states of Utah (1987) and Wyoming (1989) have been added. This compact is used when two states want to provide assistance to each other. It can also be used when the national system through the National Interagency Fire Center (Boise) is not responsive.

**Northwest Forest Firefighting Compact** – Congress just recently ratified an agreement between the states of Alaska, Washington, Oregon, Idaho and Montana, and the Canadian Provinces of British Columbia, Alberta and Yukon. It provides for the movement of resources between the various states and the three provinces of Canada.

Compacts should only be used when there is a special need to move forces between the states, or when the national system is not able to respond in a timely fashion. There is a need for those states not presently “signed on” to do so.

## ***Cooperative Relationships***

Fighting fire in the wildland/urban interface is a cooperative venture. No one agency can do it alone. For close to a century, the federal land management agencies and the state forestry organizations have had some level of cooperative relationships. The level of these relationships has varied, but the need is greater now. As more large, damaging fires threaten more structures, there is greater need for effective cooperative relationships between wildland fire agencies.

The area that needs the most work is between the state forestry organizations and the various forms of local government fire protection, be it municipal, rural or volunteer. There are many examples of great relationships, but, there more of poor or nonexistent working relationships.



## Use of Local Firefighting Forces

Each state needs to assess its needs for both initial attack forces and structure protection engines from local fire agencies, and preplan the mobilization of these resources. Developing cooperative agreements and operating plans that clearly define the responsibilities and roles of the cooperating agencies should be high on the agenda of each state wildland fire agency. States must also establish mutual aid authorities and mobilization plans that allow the effective mobilization and deployment of local government fire resources on a preplanned basis to any major wildfire in the state.

The effective use of local government fire forces, both for initial attack and for structure protection on wildland fires, will require additional training and specialized equipment, especially wildland personal protective equipment. States need to consider the minimal cost of wildland Nomex for local firefighters against the savings in fires held to a small size and structures saved.

Some of the elements of a good mobilization system are:

- **Enabling Legislation** – The State Legislature needs to develop legislation that allows state and local government forces to assist each other.
- **Workers Compensation** – A system must be in place that provides for firefighters responding to a call for mutual aid to be protected in the event of injury.
- **Dispatch Coordination** – The system to mobilize the local forces must use an existing organizational structure, AND involve the local government fire leadership. The system will only work if the locals have a buy-in and are involved in the process.
- **More than just fire engines** – The system has to include a way to mobilize more than just fire engines and their crews. Leadership is mandatory if a firefight is to be organized, efficient and effective. Incident management teams are a method of organizing overhead to support large fires.
- **Payment** – Mutual aid, by definition is without cost. Mutual aid works when the commitment of the assisting forces is not for an extensive period of time. Since wildland fires can take days before they are controlled, a mechanism has to be established that allows the assisting forces to move from no-cost mutual aid to assistance for hire.
- **Training** – Firefighters are only as good as their training. There has to be a way to train all firefighters to effectively and efficiently fight wildland/urban interface fires. There also has to be training on how to manage these types of incidents.



- ***Tactical Communications*** – Day-to-day tactical communications systems do not work well under the workloads placed on them by a fast moving wildland fire. Statewide communications plans need to be developed and implemented to make any major firefight effective.

## **Equipment**

The Federal Excess Personal Property (FEPP) program was a good start. It allowed states to acquire surplus equipment that could be rehabbed and retrofitted and assigned to local volunteer fire departments to give them a wildland initial attack capability they might not otherwise have. The complexity of the wildland/urban interface problem and the increased fuel loading, fire intensities, and values at risk make it now time to move beyond the used equipment concept. Congress (and the states?) needs to provide funding to equip local volunteer fire departments with new, safe, reliable and effective fire apparatus, firefighting equipment, personal protective equipment and the training to properly utilize it. Better equipment and training improves the effectiveness of local volunteer firefighters on initial attack on wildland fires and increases their ability to respond to major disasters. With more frequent large, damaging fires, and declining federal wildfire resources, we need to increase our pool of available resources.

## **Federal Agencies**

The USDA Forest Service is the largest of the federal land management agencies. Congress has provided funding for state and volunteer fire protection through the Forest Service budget for many years.

## **Federal Fire Policy**

You cannot discuss the Federal Fire Policy and its impact on the wildland/urban interface fire problem in the West, unless you first understand the evolution of the USDA Forest Service. For the better part of the 20<sup>th</sup> Century, the USDA Forest Service operations focused on the “multiple use” of the national forest system lands. They managed the forests for water, recreation, wildlife and sustained forestry. Many of the forests were used for the harvesting of timber, and substantial portions of their budgets were devoted to timber management and protection.



### **Federal Fire Policy**

*Most states said that the implementation of the Federal Fire Policy has impacted their state, expressing concerns about reduced federal fire forces, withdrawal of federal fire forces from the interface, less federal agency support for major fires, and reduced cooperation. Only five states indicated they are changing their protection system to compensate for changes in the Federal Fire Policy, most by redeploying or adding state forces to make up for reductions in federal forces. Some were increasing their oversight of federal operations and anticipating more “reasoning*

Starting in the 70’s, several events occurred that would have an everlasting impact on the agency:

- The environmental movement pushed to change the mission of the agency from that of “multiple use” to that of preservation.
- Increased cooperative relationships between the USDA Forest Service and its many state and local government cooperators resulted in wildland firefighters working side by side with structure firefighters.
- The need for more specialists resulted in the decimation of the “militia” of generalist employees who were used to staff fires.

In the 90’s the Forest Service leadership became concerned with the dramatic increase in their cost as it related to the wildland/urban interface. They found themselves protecting developed areas as a result of “balancing of acres.” They were being pressured by “on the ground firefighters” for training and equipment (such as self-contained breathing apparatus) so that they could properly protect structures.

All of this dictated that the Forest Service and other federal land management agencies develop a policy and plan to deal with this growing concern. The result was the Federal Wildland Fire Policy; a long overdue document, but one that is not well understood. The USDA Forest Service is concerned about the level of understanding within it’s employee ranks. They are presently surveying their employees as to their understanding of this very important policy (See Appendix for a Summary of the Policy).

### **We don’t fight structure fires!**

The issue of federal firefighters being involved in the protection of structures was festering, but it came to a head in the late 80’s when the press aired a sound-bite by a federal firefighter on a fire near Woodfords, California, who said, “we don’t fight structure fires!” What he meant was that they don’t fight structure fires in the way municipal fire departments do. To become structural firefighters would greatly increase training and equipment costs for the federal agencies (Figure 9).



At the same time, federal agency auditors began questioning the propriety of federal agencies cost-sharing the increasingly large bills for local government forces amassed to protect structures located outside federal jurisdiction, especially when the fire didn't start on federal land.

These cost concerns, coupled with increasing pressure to allow fire to resume its natural ecological role and other factors, lead to a major revision of Federal Wildland Fire Policy.

Current federal fire policy then calls for increasing reintroduction of wildfire into the ecosystem, consistent with both resource management and fire plans. It calls for property and resource protection needs to be assessed based on values at risk. It redefines the federal role in the wildland/urban interface to include wildland firefighting, hazard reduction, cooperative prevention and education, and technical assistance. It properly defines the ultimate responsibility for property protection in the interface to belong to state and local governments.

Thus, from the federal agencies' perspectives, all fires are certainly not to be immediately extinguished regardless of cost, and federal firefighters are not to be used in place of local government forces to fight structures fires (at least from the inside out). The policy does however, recommit the federal agencies to continued cooperative fire protection efforts with all partner agencies.

The problems encountered so far with the new federal fire policy have not been so much with the policy itself, but with its interpretation and implementation by local federal line officers. There are examples where USDA Forest Service line officers have informed cooperating agencies that federal forces will be withdrawn from a fire if structures are to be protected. Using the Federal Wildland Fire Policy as the authority for such an action is clearly outside the intent of the policy. While federal agency fire forces can and should be used as necessary to protect structures from encroaching wildfire (but not fighting interior structure



*Figure 9. There is a difference between fighting structure fires and protecting a structure from a wildland fire. The firefighter entering the structure is properly trained and equipped. The firefighter protecting the structure is also trained and properly equipped. Each is in the right place--their roles are correct!*





fires), the federal agencies will continue to resist having to absorb the costs (and certainly the full responsibility) of structure protection.

The primary problem with the Federal Fire Policy is it is open for any interpretation. It can justify federal involvement in the protection of structures, or it can justify the withdrawal of any federal forces on a fire where structures are threatened. What is needed is clarification from the Washington, D.C. level, clearly stating, in operational terms, what can and cannot be done under it. The policy is so important to so many entities, that the ambiguity that allows so many interpretations must be removed.

### ***Federal Emergency Management Agency***

#### **FEMA**

*Several of the states have been involved with fires significant enough to generate FEMA reimbursement funding for suppression costs exceeding the floor costs.*

*Only five states said that they would change their approach to the wildland/urban interface fire problem if given FEMA dollars for initiatives. They cited initiating hazard reduction projects and adopting fire prevention programs such as FireWise, but were concerned about “the strings” that would be attached. The two primary recommendations the states had for proactive use of FEMA funds were mapping/preplanning and hazard reduction.*

Are the bailouts helping? Probably not! Applying federal funds to help people rebuild their homes lost to a wildland fire, without strong fire safe regulations to provide **ignition-resistant roofing** and **defensible space**, is merely perpetuating the problem.

The use of federal funds to “pay back” state and local government costs for fighting major fires tends to become a political excuse not to invest state and local funds in solutions to the fire problem.

Perhaps the FEMA funds would be more effective if applied *before* the fire, to build fuelbreaks, improve water supplies, train and equip local firefighters, and promote **ignition-resistant roofs** and **defensible space** around homes in the wildlands.



## Forest Health

One of the areas of increasing concern in the West is forest health, meaning the overall well being of the forest as an ecosystem. Partially as a result of the exclusion of fire in the last half of the 20<sup>th</sup> Century, the forests of the west are very different than the ancient forests. The woods today contain many more trees per acre and much more brush undergrowth and slash (deadwood) than the forest primeval. Insects and disease have gained the upper hand, creating large stands of dead timber. On many privately owned forest lands in the west, a succession of profit-oriented ownerships has over logged and over grazed the land, resulting in weak stands of immature timber. In general, the woods of the west are not as healthy as they could or should be, given our knowledge of natural systems. Unfortunately, the free enterprise economic model of the U.S. encourages extensive, rather than *intensive* management of our forest resources.

A significant new term has crept into the wildland lexicon in the last few years:” *forest health*. ” This new term is an attempt to focus perspectives on the forest as an ecosystem made up of a multitude of components, each of which has a role in determining the overall vitality of the ecosystem.

While climate, water and soil are obvious factors in determining the type of vegetative cover, the presence and influence of a great variety of other factors can significantly influence the overall vigor or health of the ecosystem. For example, a lack of water during a period of drought may place the trees in a forest stand under stress, which could make them more susceptible to attacks from insects and diseases. Should an insect epidemic kill a large stand of trees, that forest is less healthy than it was (both biologically and financially). It also now is at great risk for a catastrophic wildfire, which could not only destroy the dead trees, but also carry on into the healthier portions of the forest, or into homes at the interface.

Fire is one factor in determining the overall health of a wildland ecosystem. Many native plant species are fire adapted, and thrive when occasional, low intensity fires move through their habitat, reducing competing plant species and destroying insect populations and disease vectors. Fire replaces mature brush with new growth that is more nutritious for browsing animals such as deer. Fire eliminates accumulations of dead and down materials, converting their components to essential nutrients that boost soil fertility.

### Grant Funding

*The most popular solutions to the wildland/urban interface fire problem if federal grant funding was to be made available were public education, mapping/preplanning, supporting local initiatives, training volunteer firefighters, hazard reduction projects, demonstration projects, fuelbreaks, and home inspections, in that order. There was little support for tax incentives for homeowners, and a plea to eliminate federal agency pass-through costs (“skimming”).*

During the past 80-90 years, we have evolved to a position of suppressing most forest (and other wildland) fires as a threat to our forest resources and associated private property values. This trend of excluding fire from the wildlands has been exaggerated by increasing development of wildland areas and the need to protect man's improvements from fire. One result of the successful fire suppression

policy has been a tremendous increase in the available fuel volume (measured in tons/acre). Some estimates show that fuel volumes in our national forests are now 3-5 times greater than the historical average and that continuous blocks of heavy fuels cover 3-5 times as much area as before fire was excluded. This means that now wildfires are likely to be 3-5 times as difficult to put out and apt to become 3-5 times larger than in "the good old days."

#### **Fuel Modification**

*While few of the state wildfire agencies have the authority to manage fire for resource benefit on private lands, several do so on state lands. Only five states (CA, CO, NM, NV, and UT) have protection from liability lawsuits, but eleven of the states have active prescribed fire programs. The most common prescribed fire objectives are slash disposal, hazard reduction, range improvement, timber stand improvement, pest control, and wildlife habitat improvement, in that order. About half of the states have the authority to establish fuelbreaks and/or firebreaks, but only with the permission of private landowners. Eleven states have the authority to initiate hazard reduction programs, frequently focused on slash disposal, and generally requiring cooperative agreements. Most of the states provide technical advice to private landowners who wish to undertake hazard reduction projects, but only half can provide operational support to such projects.*

A chorus of voices is now calling for the reintroduction of fire into the ecosystem at levels that would improve forest health. We can anticipate a couple of problems with this concept: first, the fuel volumes will have to be reduced to keep fires controllable; second, the fuel accumulations will have to be broken into manageable blocks; and third, fire is *not* necessarily beneficial to all species. Careful planning of the timing, location, intensity, and duration of fire will be required to achieve maximum contributions to forest health without endangering threatened plant and animal species, and inter-mixed private property interests.

There is a role that fire management can play in improving forest health that will concurrently reduce the potential for major wildfires. State forestry agencies need to work with federal and private forest landowners in support of forest health initiatives, including selective logging, thinning, fuel reduction by prescribed fire, fuelbreaks, etc., especially in high fire hazard areas at the wildland/urban interface. One example of such a program is the Grand Canyon Forests Partnership, working to improve forest health and reduce fire danger in the wildland/urban interface around Flagstaff (AZ). For more information see [www.gcfp.org](http://www.gcfp.org).

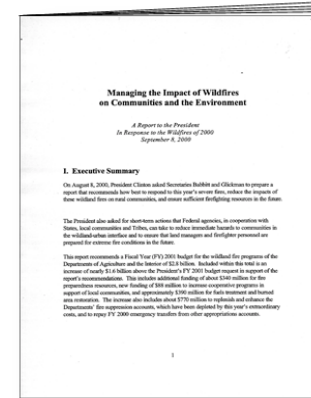


To the extent that wise use of fire to remove hazardous fuel accumulations and contribute to forest health can be properly planned, funded, and executed, fire managers should get on the forest health bandwagon.

## Managing the Impact of Wildfires on Communities and the Environment

On September 8, 2000, the White House published a report to the President, outlining a major Federal initiative on dealing with the buildup of fuels and the wildland/urban interface fire problem.

This report recommends a \$1.6 billion budget increase in the USDA Forest Service and US Department of Interior budgets. Most of these funds are earmarked to cover costs incurred fighting fires this summer and to increase the Federal firefighting force. But, just over \$73 millions is designated for State, Volunteer and Rural Fire Assistance programs.



[www.whitehouse.gov/CEQ/Firereport.pdf](http://www.whitehouse.gov/CEQ/Firereport.pdf)

**Table 1**  
**FY 2001 Funding Summary, USDA Forest Service and the US Department of the Interior**

USDA Forest Service and the US DOI	FY 2000 Final	FY 2001 President's Budget	FY 2001 Additional Needs	FY 2001 Total Needs	FY 2001 House Action	FY 2001 Senate Action
...Dollars in thousands...						
Fire Preparedness	\$584,618	\$586,433	\$336,381	\$922,814	\$586,433	\$586,683
Fire Operations	323,995	331,136	677,711	1,008,847	320,107	579,394
Emergency Fire Contingency	290,000	150,000	476,000	626,000	200,000	150,000
State Fire Assistance	23,929	30,006	42,994	73,000	25,000	28,042
Volunteer Fire Assistance	3,240	2,510	10,790	13,300	5,000	5,000
Rural Fire Assistance	0	0	10,000	10,000	0	0
Forest Health Management	62,075	62,842	12,000	74,842	63,794	63,989
Economic Action Programs	20,198	17,267	12,500	29,767	14,246	23,486
<b>TOTAL</b>	<b>\$1,308,055</b>	<b>\$1,180,194</b>	<b>\$1,578,376</b>	<b>\$2,758,570</b>	<b>\$1,214,580</b>	<b>\$1,435,988</b>

**Rural Fire Assistance** - This is a new program within the US Department of Interior directed at volunteer fire departments in small, rural communities.

**State Fire Assistance** - This \$43 million increase includes \$20 million for fuel reduction and \$4 million for FireWise implementation. The actual unspecified increase to the States is about \$25 million.

**Volunteer Fire Assistance** - This is an increase of over 500%.

Figure 10. This is Table 1 from the Presidential Report titled "Managing the Impact of Wildfires on Communities and the Environment", dated September 8, 2000. It outlines a \$1.6 billion program to cover the extraordinary costs associated with the 2000 Fire Season and an increase in several programs that involve the States.

This requires the State Foresters to have plans on how this money should be distributed and used (Figure 10). On September 20th, Congress passed a \$1.8 billion plan.

The three programs that directly effect the States are State Fire Assistance, Volunteer Fire Assistance and a new program within the US Department of Interior, Rural Fire Assistance. The States have been involved with the first two programs for years. The proposed State Fire Assistance budget has a general across-the-board increase of just over \$24 million (about 100 percent over FY 2000), \$20 million for “high priority forest management practices on lands to reduce fire risk and fuel loads,” and \$4 million for “fire education,” presumably the FireWise program.

The Rural Fire Assistance program is new. The report says, “Rural fire district assistance in the Department of the Interior is a new program to provide technical and financial support to volunteer fire departments that protect communities with populations of less than 10,000. Emphasis is on areas intermingled with lands managed by the Interior Department (especially the Bureau of Land Management). For US Department of the Interior \$10 million.”

It will be interesting to see if the Department allocates these funds to the various State Foresters for distribution to the rural “fire districts” or develop a Federal to Rural program. After the Point Fire, where two volunteer firefighters were killed on a Bureau of Land Management fire, the Bureau proposed a program where they would use the money to have a direct relationship between rural volunteer fire organizations, excluding the States. This program was opposed at that time and should be now! The State Foresters should make it very clear that funding to the rural communities of this Nation should continue to go through the states -- just like the Volunteer Fire Assistance program managed by the USDA Forest Service.

### ***Private Landowners and Industry***

Any plan to help correct the problems of fuel loading buildup and the wildland/urban interface growth should include private landowners and the forest products industry.

#### **Small Landowners**

Since much of the wildland acreage in the west is in federal ownership, the federal land management agencies will probably assume a leadership role in forest health issues. Much of the wildland/urban interface area however, is in small private ownerships where forest health and hazard reduction





issues are much more complicated. Using prescribed fire to reduce fuel loading in a small drainage in a national forest is relatively easy to accomplish compared to trying to put together a hazard reduction burn in a rural subdivision with thirty owners of ten-acre parcels. The hodgepodge ownership patterns of much of the wildland/urban interface areas will require extensive preplanning and marketing to a variety of audiences to make prescribed fire an effective tool in restoring forest health.

### **Timber Companies**

In much of the West, private timber companies own significant tracts of timberland. While fire exclusion has created forest health concerns in these areas also, management of these lands is based almost exclusively on an economic model, as opposed to the ecological model the Forest Service plans envision. Fuel accumulation and fire hazard on these lands vary proportionately with the economic success of the timber company. That is, timber companies with good profit margins can afford to invest more in hazard reduction. A trend in recent years is for these private timberlands to be consolidated under fewer larger companies than in the past, but bigger may not necessarily mean better financial or forest management. Many timber companies need economic incentives not currently available in the free market in order to invest significantly in hazard reduction, let alone be able to significantly improve overall forest health.

#### **Partnerships**

*The laundry list of potential partnerships for cooperation in solving the wildland/urban interface problem included insurance companies, local fire departments, local government, planners, builders, developers, homeowner's associations. Nobody mentioned corporations other than insurance companies or local civic clubs, both potential sources of project dollars.*

### **Prescribed Fire**

The West has such large expanses of open wildlands with high and increasing fuel volumes that hazard reduction measures must take place on a large scale to be effective. Prescribed fire is a necessary management tool if fuel loading is ever to be significantly reduced in the western woods. Prescribed fire is cheaper per acre (at least at this time) than other available fuel reduction methods (mechanical clearing, chipping, etc.). Cheap is important, especially to private landowners who may not have the level of funding to address the fuels problem that Congress can make available to the federal land management agencies.

The two most significant roadblocks to successful use of prescribed fire for hazard reduction projects in the West are environmental regulations and litigation. In many instances, each separate project may require a full environmental impact report/assessment, which is time-consuming and



expensive (California has had success using a “program EIR” to cover all projects generically). Increasingly strict air pollution regulations, including protecting the “viewshed” of National Parks, place further restrictions on when and how much burning can be conducted in any region. Prescribed burning can usually be done safely only in short intervals of the spring or fall (depending on fuel type), and usually requires light winds, which are not conducive to dispersing the smoke. Further complications arise if there is any chance that the area to be burned may contain any “threatened or endangered” species of flora or fauna. Finally, lawyers spring to the aid of landowners whose “valuable” property may suffer any damages from an escape, dramatically increasing agency costs. These factors have combined to reduce the amount of prescribed fire use in the West significantly. Certainly, the escape of a federal prescribed fire operation in New Mexico this year will be another stumbling block.

In order to utilize prescribed fire to its full potential in hazard reduction in the West, states are going to have to seek reasonable exemptions from overly strict environmental regulations, and provide protection from tort claim liability to those agencies that must manage prescribed fire. There are several pieces of legislation that the State Foresters may want to analyze and support. They are:

- **H.R. 236** by Representative James Rogan titled: *To exempt prescribed burning on National Forest System lands from regulation under the Clean Air Act.*
- **H.R. 1522** by Representative Helen Chenoweth-Hage, titled: *To safeguard communities, lives, and property from catastrophic wildfire by authorizing contracts to reduce hazardous fuels buildups on forested Federal lands in wildland/urban interface areas while also using such contracts to undertake forest management projects to protect non-commodity resources, and for other purposes.*
- **H.R. 1530** by Representative Mark Roley, titled: *To make forestry insurance plans available to owners and operators of private forest land, to encourage the use of prescribed burning on private forest land, and for other purposes.*



Other hazard reduction measures can be effective, but only on a smaller scale. Fuelbreaks and firebreaks can protect high hazard subdivisions and even small communities, but their maintenance requires use of herbicides, which may not be politically popular. Mechanical thinning and clearing can be effective in small areas, but are very expensive without financial incentives. Greenbelts can be built in to new developments to serve multiple duties as wildlife habitat, recreation space, and fuelbreaks.

## National Fire Protection Association

The National Fire Protection Association (NFPA) is an international organization that develops fire protection standards. It has only been in the last several years that they moved from the “structure” firefighting arena to the wildland firefighting arena. The two NFPA standards that have direct impact on the wildland/urban interface fire problem are:

- Protection of Life and Property from Wildfire (NFPA 299). This standard outlines an analysis system, fuel modification planning, street and road standards, water supply, structural design and fire prevention measures.
- Standard for Wildland Fire Fighter Professional Qualifications (NFPA 1051). This standard outlines the basic qualifications for a wildland firefighter and officer. The new standard that will be issued in 2001 will include the qualifications for a wildland/urban fire specialist.



## Insurance Industry Initiative

It is easy to say “what we need is the insurance industry to give the homeowner a break on insurance rates if they have a FireSafe home.” This may be one of the incentives, but not all that has to be done. “Fire” is not the main concern the insurance industry has. Wind (hurricanes), water (floods) and earthquakes are at the top of their list. Fire is sixth on their list...and, except for “Oakland” sized fires, they have the losses covered by the premiums.

States need to work with representatives from the insurance industry to develop an understanding of this issue. If states can show insurance companies that they have correctly (and scientifically) diagnosed the extent of the wildland/urban interface problem, and can share maps and data that are useful to them, perhaps the insurance companies can be encouraged to develop premium reductions for FireSafe homes and to support local initiatives such as FireWise, FireSafe, etc.



Again, the two most important elements to structure survival are *ignition-resistant construction* and *defensible space*. These are the elements we need to try to convince insurance companies to give credit for first.

### **Building Industry**

Currently, there are no incentives for developers and/or builders to spend the extra money for the materials needed to make homes fire safe. Most homebuyers are ignorant of the factors that make homes fire safe.

Until homeowners are educated to the point that they begin to demand built-in fire safe features, or fire safe codes are adopted to require such features, builders will continue to follow the cheap path.

Local government planning and building officials still are not well educated in fire safe building and development standards.

### **Banking Industry Initiative**

We need to be able to convince the banking industry that it is in the best financial interest of the lending community to provide low-interest loans to homeowners who wish to retrofit their homes with FireSafe roofing materials. The concept is simple, the smaller the chance of the house burning down, the greater the chance that the full mortgage will get paid off. While this is not a large chunk of the bank's business, it could be important to the long term financial health of the community to keep lots of houses from burning down. State and local fire agency officials need to meet with representatives of the lending community to begin dialog on this issue.



## *Recommendations*

Whenever you take on a major task, it is best to have a plan and to do it in small steps. The hurdles involved in the wildland/urban interface fire problem did not arise over night, and will not be overcome quickly. And, the problem will never be solved if steps are not taken in a planned and organized manner.

The following recommendations are presented as a plan to address the problem in relatively small steps. Some of the recommendations are directed to the Council of Western State Foresters and the National Association of State Foresters. Some are directed toward individual states and communities. The goal is not to attempt too much, but to start down a path that facilitates change.

### **Public Education**

One of the biggest needs is to achieve broad scale understanding of the wildland/urban interface fire problem among the whole population so that they might generate enough political interest to overcome inertia. Public attitude drives what they will do to prepare for a fire, as well as drives any political action at all levels of government.

Any message must be in language they understand. Experts in any field tend to speak in technical terms, not terms understood by the average citizen.

■ **Recommendation** – That each state move as quickly as possible to implement the FireWise public education model. Funding should be targeted for development, distribution and training.

### **Federal Initiative**

The potential for federal funding of various wildland/urban interface initiatives is high. There is the legislation following the Cerro Grande Fire, designating \$120 million to the Departments of Agriculture and Interior for fuel modification on federal lands near the wildland/urban interface.

#### **Initiatives and Solutions**

*The laundry list of incentives for homeowners to make their homes fire safe included insurance premium rebates, property tax rebates, development of the biomass industry, more stringent fines for violations, public recognition for compliance, operational support for projects, community block grants, roof retrofit cost-share programs, subsidized home improvement loan rates, and cost-sharing for hazard reduction or reroofing. Among statutory and regulatory solutions suggested were fire safe building construction, UBC and UFC, defensible space, require insurance premium rebates, mandatory water supply, adequate ingress and egress, and fuelbreaks around subdivisions. Surprisingly, three states recommended no new laws/regulations.*





The \$1.6 billion initiative developed by the President needs immediate attention. The State Foresters should develop proposals on how this expected funding would be used. The funding should NOT be simply divided by 50, it should be directed toward specific projects.

■ **Recommendation** – That a plan be developed to allocate any federal funding to specific projects in this order of priority. This plan should follow the recommendations of the States, but include items that increase the efficiency of initial attack and mobilization of fire forces. Some specific areas are:

- **Public Education** – To fund FireWise or other public education fire prevention projects.
- **Fuels Treatment** – Focus on fuel treatment projects that have a wildland/urban interface component and complement cooperative programs between federal/state/private entities.
- **Initial Attack** – Improve the level of initial attack through the use of rural volunteer fire departments by providing them more and better funding, training, and equipment.
- **Extended Attack** – Improve the capabilities of the states to assist local forces during this crucial time in the fire attack. A preplanned and organized transition from initial attack to extended attack will facilitate earlier control of major fires and reduce damages and suppression costs.
- **Major Incident Management** – Improve the capabilities of the State and Local fire authorities to manage major incidents without reliance on the federal teams.
- **Mobilization** – States need to establish authorities and procedures for effective mobilization of available local government resources to respond to major wildfires.

#### **Recommended Priorities**

*The States were asked what would be their priorities for programs. These percentages were developed from their responses:*

Public Educations	20%
Training Rural Firefighters	20%
Local Initiatives	15%
Mapping and Planning	15%
Hazard Reduction	10%
Fuel Breaks	10%
Demonstration Projects	5%
Home Inspections	5%



■ **Recommendation** -- That the Department of Interior funds for the new Rural Fire Assistance program be channeled through the States, in the same way the Forest Service allocates their Volunteer Fire Assistance funds.

### ***Mapping the Wildland/Urban Interface Areas***

Before you can begin to educate the public and planners and governmental leadership, you must define and delineate the wildland/urban interface areas within each state. The goal should be that the maps be of such detail that they would designate whether an individual parcel is in a hazardous zone or not. The maps should also be developed using ArcView or a compatible Geographic Information System database.

■ **Recommendation** – That each state map and assess the wildland/urban interface areas in the state and share this information with local planning agencies and the insurance industry.

### ***Federal Fire Policy Clarification***

The Federal Fire Policy is a necessary document, but it needs clarification so that its interpretation is limited to its intent.

■ **Recommendation** – That a list of specific questions and/or concerns be developed and sent to the appropriate federal agencies for clarification and interpretation. That the clarifications and interpretations then be distributed to all appropriate levels within the states and federal agencies.

### ***Forest Health***

Forest health is a technical term that means something to foresters and wildland fire managers. It means nothing to the general public. It is important that when attempting to remedy a hundred years of fire policy, that the thinking go beyond 30-feet of clearance, and include incentives for the small landowner, timber company and federal land management agency. Defensible space is vital, but the term implies that a firefighter will be necessary and present during the fire. The plan must include the reintroduction of fire to the forests and use other fuel-modification methods when appropriate.

■ **Recommendation** – That some simple explanations be developed that describe what forest health means for the layman.



■ **Recommendation** – That public education programs move beyond “defensible space” to include forest health issues.

■ **Recommendation** – That Congressional action be enlisted to support some exemptions from the Clean Air Act for prescribed fire.

### ***Mobilization Checklist***

Most of the states in the West do not have authorizing legislation to move local government firefighting forces statewide as needed. Even with proper authorization, there is also a need for a established system to:

1. Activate and mobilize the needed forces.
2. Provide Worker’s Compensation and other liability insurance.
3. Provide logistical support to the responding forces.
4. Reimburse agencies for assistance that goes beyond mutual aid.

■ **Recommendation** — Each of the states should conduct a “self-evaluation” survey of their authorities, responsibilities, and capabilities to ensure that they are ready to move the necessary forces when needed.

### ***Adoption of Urban-Wildland Interface Code***

We know what makes a home FireSafe! There are several ways that codes, regulations and building standards can be developed and implemented. Each state or local entity will have to develop standards that are appropriate to their community. The Urban-Wildland Interface Code is the most comprehensive available. It can be adopted as a regulative code or as a model code.

■ **Recommendation** – That the Urban-Wildland Interface Code be used as the model code recommended by the state forestry agencies in the West.

### ***Interstate Compact***

Only seven of the seventeen states in the West are signatories to the Interstate Civil Defense and Disaster Compact.



■ **Recommendation** – That the ten states not signatories to the interstate compact take the appropriate actions to join the compact.

■ **Recommendation** – That an operations plan be developed for the movement of state personnel and equipment as authorized by the interstate compact. That each spring, this operating plan be updated and refined as necessary.

### ***Major Incident Management Teams***

The use of major incident management teams is becoming more and more important. The complexities of managing fires or other disasters is so complicated that a team approach is appropriate. The use of the federal teams has been the only option for some states. The federal teams are excellent at what they do, but sometimes do not adjust to the needs and wants of state or local officials. Establishing state teams is not a move away from cooperative programs with the various federal agencies, it is an augmentation of cooperation. There is enough work for all the qualified teams.

■ **Recommendation** – That each state develop their own major incident management teams, utilizing state, local and federal personnel.

### ***Delegation Authority***

All too often, when a federal team is requested to manage a state emergency, the team brings with it the policies and procedures of their “home agency.” A letter of delegation is issued that allows the team to function on the incident. But, in most cases, the letter of delegation does not adequately spell out the expectations of the entity being served.

With the issuance of the Federal Fire Policy, structure protection issues have become more complicated. If a team is not specifically given the responsibility to protect structures they may not do so. All too often, the incident management team assumes they are to apply their agency’s policies and procedures to the operation, rather than use the authorities, responsibilities and policies of the agency giving them authority to fight fire on their behalf. This is especially true on fires burning in multiple jurisdictions when the non-federal agencies are not able to assume their fair share of a true *unified command* operation. Lacking the full input provided in unified command, it is imperative that jurisdictional agencies utilizing the federal or interagency Incident Management Teams specify upfront in their



delegation of authority to the team, the authority, responsibility, and funding mechanism to be used to provide protection of structures from the encroaching wildfire.

■ **Recommendation** – Develop a standard letter of delegation to be used by the states with federal incident management teams. Insure that the delegation authority includes a statement that the team is to concern itself with structure protection or any other specific areas of local concern.

### ***Use of Local Firefighting Forces***

Each year, the forces of rural county fire departments, fire protection districts, and local volunteer fire companies make initial attack on thousands of wildland fires in the West. During major wildland fires, these same forces are called upon to protect the structures threatened when wildfires encroach into the wildland/urban interface. The majority of the local government firefighting forces lack the training, equipment, and communications to operate safely and effectively on major wildland fires.

■ **Recommendation** – That states assume a leadership role in improving the safety and effectiveness of local government firefighting forces on wildland fires, especially in the wildland/urban interface. States should provide more and better training, equipment, and communications capabilities to local fire forces.

■ **Recommendation** – The states must also begin to develop plans that will begin to phase-out the federal-excess property equipment and replace it with more up-to-date apparatus.





## Appendix

### Definitions

Before you can fully understand the wildland/urban interface fire problem, you must know the language and the terms. The following are some of the unique definitions associated with the problem:

**Areas of Safe Refuge** – an area of safe refuge is like a safety zone, a place where a person is safe from a fire. Structures can be constructed in such a way to provide a place of refuge during a wildland fire.

**Dwelling Unit** – is a house, home, apartment, etc. where humans reside. A motel or hotel room is not a dwelling unit, because the length of stay is usually short-term.

**Hazard** – the degree of flammability of the fuels once a fire starts. This includes the **fuel** (type, arrangement, volume, condition, etc.), **topography** and **weather**.

**Home or House** – is usually a privately owned structure in which people live. It does not house more than one family.

**Ignition-Resistant Construction** – incorporates the use of materials and design that enables a structure to withstand ignition from radiant heat, fire brands or direct flame impingement.

**Risk** – the chance of a fire starting from any cause.

**Structural Fire Protection** – is defined as interior and exterior actions taken to suppress and extinguish a burning structure or improvement utilizing standard building fire protection methods, equipment and training (Figure 10). Structural fire suppression is generally the responsibility of a



Figure 10. Structure fire protection usually involve the interior attack of a structure.



local government entity, although there are some locations in the West where there is currently no structural fire agency in place.

**Structure** – is a building, home, business, barn, etc., that is built within one foundation/ frame-work. An apartment building is a structure.

**Structure Protection** – to protect structures from the threat of damage from an advancing wildland fire (Figure 11). This normally does not include an attack on fire that is inside the structure. It involves the use of fire control lines (constructed or natural) and the extinguishment of spot fires near or on the structure. This protection can be provided by the rural and/or local government fire department firefighter and the wildland fire protection firefighter.

**Structures saved** – a structure is considered saved if it is within the exterior boundaries of the fire or directly adjacent to the fireline, and did not burn down or suffer serious damage as a result of the wildfire.

**Structures threatened** – a structure is considered threatened if it is within the exterior boundaries of the fire, or within ¼-mile of the exterior boundary of the fire and within the fire behavior projection for the next 24-hours.

**Suppression** – taking specific actions to control and extinguish an unwanted wildland fire.

**Wildfire Causes** – there are three general causes of wildland fires, **natural** (lightning), **accidental** (debris burning, children with matches, etc.) and **intentional** (arson).

**Wildland/urban interface fire** – is a fire that **burning primarily in wildland fuels** that destroys or threatens several structures.



Figure 11. Structure protection is the protection of a structure from an advancing wildland fire. It normally does NOT include an interior attack.



## Wildland/Urban Interface Fire History

(A wildland/urban interface fire is defined as one that destroyed at least three structures and burned over 25 acres of wildland.)

State	Year	Fire Name	Acres Burned	Structures Lost	Deaths
<b>Alaska</b>					
	1996	Prator Lake	120	3	
		Miller's Reach #2	37,336	454	
<b>Arizona</b>					
	1983	Pretzer	200	3	
	1990	Dude	25,000	30	6
	1995	Oldt	100	14	
		Bagdad	200	4	
	1996	Points	26	3	
	1997	Kuyhendall	410	6	
<b>California</b>					
	1955	Humboldt/Siskiyou	152,245	13	
		Refugio	84,770	20	
	1956	East Highlands	15,330	5	1
		Sherwood	9,428	8	
		Newton	26,169	50	
		Hume	1,940	9	
	1960	Homstake	10,948	10	
	1961	Harlow	41,200	106	2
		Bel Air	6,090	484	
	1964	Hanley/Series	71,601	174	
		Weldon/Series	11,650	20	
		Coyote	67,000	94	1
	1965	Northern Cal Series	113,766	41	
		Suncrest	1,260	7	
	1967	Sence Ranch	17,431	5	
		Santa Susanna	25,000	10	
		Paseo Grande	48,639	61	
		Baliff	23,929	8	1
		Woodson	17,560	30	

State	Year	Fire Name	Acres Burned	Structures Lost	Deaths
	1968	Louis	1,327	5	
	1969	Walker	17,000	8	
	1970	Statewide Series	567,508	722	19
		Reche	4,168	3	
		Bear	53,100	54	
	1972	Swasey	1,933	8	
		Bradford	1,760	4	
	1973	Boulder	8,478	17	
	1975	Grundy	1,710	3	
		Pendleton	2,400	10	
	1976	Quarry	38,346	8	
		Jacksonville	5,307	3	
		Honey	1,482	3	
	1977	Sycamore	804	234	
	1978	Creighton Ridge	11,405	64	
		Mandeville Canyon	5,500	18	
	1979	Hesperia	1,525	25	1
		Northern Cal Series	3,200	7	
		Laurel Canyon	150	24	
		Bernardo	9,000	10	
	1980	Tower House	2,349	3	
		Riverside	500	5	
		Dry Flat	28,655	6	
		Turner	28,000	7	
		Indian	28,200	7	
		Lakeland	8,400	4	
		Stable	5,482	65	
		Summit/Series	41,472	355	
		Panorama	23,600	7	
		Kiowa	2,440	11	
	1981	Thunder	11,500	29	
		Atlas Peak	22,000	69	
		Flat	1,500	3	
		Rieche/Series	29,704	6	

Note: Fire History Data as of August 31, 2000. The daily NIFC report was the source for the 2000 data.

State	Year	Fire Name	Acres Burned	Structures Lost	Deaths	State	Year	Fire Name	Acres Burned	Structures Lost	Deaths
		Swall	1,900	3				Lake	10	4	
		Oat Mountain	17,500	9				Miller	38,600	7	
		Cow Mountain	25,534	4				49er	33,700	312	
	<b>1982</b>	Gypsum	16,800	14				State 1807	4,738	5	
		Daydon Haul	57,000	65				Stagecoach		15	
		Dulzura	5,019	7				Rosa		4	
	<b>1983</b>	Porta Costa Series	325	10				Yucca	931	3	
	<b>1985</b>	Hidden Valley	1,250	20				Fern	7,790	58	
		Eight-Mile	462	13				Preston	1,000	7	
		Seco	1,954	3				Geysers	352	7	
		Gorda Rat	55,889	8				PG E #19	8,648	3	
		Cherry	40,231	17				Miller	10,000	18	
		Las Pilitas	74,640	41		<b>1989</b>		Kelly Ridge		4	
		Pala	325	3				Highway 26	400	9	
		Wheeler	120,000	26				Calaveras	425	4	
		Miller	8,000	3				Powerhouse	11,680	22	
		Deer	520	8				Olivas	813	3	
		Delta	1,620	3				Eagle	4,600	3	
		Lafayette	100	3				Poppet	1,328	3	
		Lehr	200	64				Ortega	6,100	13	
		Page Mill	100	13				San Benito	52	7	
	<b>1987</b>	Dog Bar	362	9				Joshua	690	6	
		Stanislaus Complex	144,762	28				San Martin	375	17	
		Clark	37,530	4				Two Rock	161	7	
		Gulch	6,800	6				Greenwood Series		159	
		Yellow Complex	47,770	3				Tuttletown	740	8	
		Glasgow	13,370	3		<b>1990</b>		Monterey	18	8	
		Salmon/St. Clair	8,600	35	1			Paint	4,900	641	1
		Post	546	3				Carbon Canyon	6,640	14	
		Baldwin Hills	500	21	2			Bedford	490	20	
		Morse (Pebble Beach)	160	37				Glendale	75	50	
	<b>1988</b>	Amador	600	3				Cottonwood		5	
		Railroad	10,750	15				A Rock	12,136	66	
		Mason	4,072	5				Pine	125,892	27	
		Orinda	15	7				Long Gulch	2,100	3	

State	Year	Fire Name	Acres Burned	Structures Lost	Deaths	State	Year	Fire Name	Acres Burned	Structures Lost	Deaths
		Knoll	300	7				Sycamore	10,000	3	
	<b>1991</b>	Fiddle	20	3				Warners	2,400	20	
		Tunnel	1,600	2900	25			Riverside	5,000	6	
	<b>1992</b>	Borax	1,920	15				Bluff	2,624	3	
		Jay	550	3				Vision	12,354	45	
		Maidu	675	10				Lopez	1,985	4	
		Villa	6,700	19		<b>1996</b>		Ellis	43	6	
		Fawn	350	13				State 837	653	5	
		Fountain	63,960	636				Weber	360	4	
		Cleveland	24,580	26	2			State	165	3	
		Moccasin	8,370	6				Dove	930	3	
		Clear	190	5				Riverside	40	3	
		Idaho	50	4				Pechanga	1,336	3	
	<b>1993</b>	Greenmeadow	40,051	66				Gifford	31	3	
		Kinneloa	5,715	149	1			PGE #8	80	5	
		Stagecoach	546	8				Stumpfield	3,000	43	
		Mill Creek	4,680	6				Lightning #29	7,000	20	
		California	25,100	107				Peachland	25	4	
		Ortega	21,392	15				Highway 58	33,094	13	
		Guejito	20,722	9				Riverside	1,210	6	
		Laguna Canyon	14,808	366				Harmony	8,592	110	
		Topanga	16,885	300	3			Rincon	1,800	6	
		Reppier	5,956	15				Calabasas	13,010	6	
		Old Coach	2,139	36		<b>1997</b>		Riverside	320	3	
	<b>1994</b>	Kelsey	860	33				Grove	1,235	3	
		Raulson	1,000	13				Calimesa	377	9	
		Bailey	7,000	8				Priest	250	10	
		Broens	1,650	4				Wohlford	457	8	
		Creek	442	3				Pamela	25	3	
		Highway 41	48,531	37				Pauba	7,800	10	
		Lakeland	2,400	8				Wildwood	940	6	
		Scout	3,023	9				Poppet	1,500	5	
		Lucas	8,464	40				William	5,810	85	
		Hemet Complex	19,200	14		<b>1998</b>		Juniper	6,000	89	
<b>1995</b>		Jenny	420	6				Edna	28,164	5	1



State	Year	Fire Name	Acres Burned	Structures Lost	Deaths	State	Year	Fire Name	Acres Burned	Structures Lost	Deaths						
Colorado	1999	Taylor	2,160	5	1	2000	Clear Creek	126,000	10								
		Bitterwater Valley	420	5			Burgdorf Junction	64,666	19								
		Lowen	2,000	23			Fisher Springs	22,000	4								
		Dunstone	268	3			Lookout Point	4,000	3								
		Bloomer #3	2,590	9			Trail Creek	34,759	30								
		Musty #3	7				SCF Wilderness	171,560	22								
		Willow	21,900	60			North Fork Wilderness	14,506	5								
		Canyon #4	2,580	230			Indian/Prospect	11,100	3								
		Rumsey	3,015	6			Morse	4,275	3								
		Shockey	3,885	3													
		Oregon	280	5													
	Jones	26,202	264														
	2000	Manter	72,750	16													
		Berryessa	1,731	15													
		Morgan	3,316	3													
		Happy	5,500	3													
Union		350	5														
Kansas																	
Information is not available.																	
Montana																	
Idaho	1989	Black Tiger	2,000	44		1991	Pattee Canyon	1,200	7								
		Old Stage	2,000	10			1983	Baney Coulee	2,500	3							
		Hour Glass	1,275	13				1984	Houghton Creek	12,061	3						
		Wake	3,846	3						Hawk Creek	180,508	44	1				
		Buffalo Creek	10,000	10					1988	Red Bench	14,000	24					
		Monument	100	9							Storm Creek	30,000	12				
		Bobcat	10,600	22							Canyon Creek	120,000	6				
		High Meadow	10,927	51							Whitehall	1,630	3				
		Pony	5,240	4						1991	Holter Lake	125	3	2			
		2000	Puu Kapu	4,500	3							1998	Shepard Mountain	30,000	34		
													1999	NE Corner	3,917	10	
											Fishel Creek			28,155	5		
							Anelope				7,240			20			
							Outlook	6,952			10						
					2000	Canyon Ferry	43,922	50									
							Fort Howes	55800	4								
						Average Bad Day	1,310	11									
						Monture/Spread Ridge	21,800	4									
						Hell Creek	750	3									
						Valley Complex	173,563	227									
						Thursday	750	3									
		</															

State	Year	Fire Name	Acres Burned	Structures Lost	Deaths	State	Year	Fire Name	Acres Burned	Structures Lost	Deaths
<i>Nebraska</i>		Thursday	750	3			<i>1994</i>	Blackwell Road	65	14	
		Blodget Trailhead	10,764	8				Hull Mountain	7,990	44	
		Gilger	640	3			<i>1996</i>	Wheeler Point	14,960	11	
		Maloney Creek	72,000	12				Skeleton	17,736	36	
		Boulder Complex	12,604	9			<i>1998</i>	Lone Pine	5,290	3	
		Skalkaho Complex	64,794	4			<i>2000</i>	East Complex	45,000	3	
<i>Nebraska</i>						<i>South Dakota</i>					
	<i>1999</i>	Thedford	75,000	15	4		<i>1959</i>	Deadwood	2,500	60	
<i>Nevada</i>							<i>1988</i>	Westberry Trails	3,840	57	
	<i>1994</i>	Crystal Peak	7,310	3			<i>2000</i>	Flagpole Mountain	7,800	4	
	<i>1996</i>	Autumn Hills	3,800	4				Jasper	82,600	3	
	<i>1999</i>	Spring Creek	200	2		<i>Utah</i>					
	<i>2000</i>	Coyote	15,000	3			<i>1990</i>	Wasatch		43	2
		South Cricket	65,000	5			<i>2000</i>	Box Canyon	200	3	
<i>New Mexico</i>						<i>Washington</i>					
	<i>1974</i>	Spring	14,500	45			<i>1985</i>	Barker Mountain	60,000	4	
	<i>1993</i>	Burgett	5,350	8			<i>1987</i>	Hangman Hills	1,500	24	
	<i>1996</i>	Hondo	7,651	32			<i>1988</i>	Dinkleman	50,000	3	
	<i>2000</i>	Cree	6,488	3			<i>1991</i>	Firestorm 91	350,000	191	1
		Scott Able	16,034	64			<i>1992</i>	Castle Rock Canyon	5,400	24	
		Manuelitas	1,410	4			<i>1994</i>	Chelan/Leavenworth	58,000	54	1
		Cerro Grande	47,650	350			<i>1996</i>	Bowie Road	3,020	7	
		Viveash	28,283	4			<i>1997</i>	Red Lake	1,151	5	
<i>North Dakota</i>							<i>1998</i>	Cleveland	118,500	14	
	<i>1999</i>	Gap	69,000	16			<i>2000</i>	Rocky Hill	9,404	37	
<i>Oregon</i>								Goodnoe	4,800	3	
	<i>1975</i>	Ten Mile Valley	232	4				Mule Dry	76,800	25	
	<i>1987</i>	Bland Mountain	9,593	35				Eastside Complex	5,924	3	
	<i>1988</i>	Milepost 70	160	4		<i>Wyoming</i>					
	<i>1990</i>	Awbrey Hall	3,353	26			<i>1988</i>	Clover-Mist	319,575	14	
								North Fork	531,182	7	

## **Wildfire Hazard Classification for Boulder County, CO**

By C.M. Hay, The Wildfire Interface Group, cmh\_twig@excite.com  
& J.H. Korte, Boulder County Land Use Department, jhklu@co.boulder.co.us  
June 2000

### **Boulder County, Colorado:**

Boulder County located 40 miles northwest of Denver, CO on the east side of the Colorado Rockies covers approximately 750 square miles. The county lands range from semi-arid grasslands and plains in the east through montane forests and alpine tundras in the west. Steep rugged canyons, strong Chinook and Bora winds, and semi-arid conditions characterize mountainous areas. Public open space, intermix with private landholdings in the western mountainous half of the county where fire protection is provided by 18 local fire protection districts.

### **The Problem:**

The possibility of a wildfire is an ever-present danger in the County. Eighty years of fire suppression preceded by earlier European settler grazing have left the forests with vegetation densities 10 to 100 times their historic levels. This results in fires that are more intense and devastating than the previous historical norm. Combined with increased residential development and high recreation demands in the mountains, the potential for catastrophic wildfire has reached crisis levels.

The intermixing of residential structures with wildland vegetation creates a significant fire management problem. In one case, wildland fuels are partially dependent upon fire as part of their ecology. In the other case, structures are not compatible with a fire environment. This mixture of two different types of fuel with different tolerances for fire is the crux of the wildfire management problem in the urban wildland interface.

In the past few years, Boulder County has experienced several wildfires and the situation reached a crisis point in 1989, when the Black Tiger Fire consumed 44 homes and blackened 2,000 acres of forested land in the western part of the county.

### **The Response:**

In 1990 the Boulder County Wildfire Mitigation Group (BCWMG) was formed consisting of members from public agencies along with private citizens. The group's mission was to determine and coordinate actions that could help minimize loss of life and property from wildfires.

By 1992, a technical team from the BCWMG began designing and developing the Wildfire Hazard Identification and Mitigation System (WHIMS). Using geographic data management and analysis technologies, WHIMS' goal is to identify wildfire hazards, educate homeowners, assist land managers, and assess the risks involved due to wildfires.



## The Approach:

Lot boundaries and ownership information are extracted from the Assessor's parcel database. Topographic information is extracted from USGS digital elevation model data (DEM). Fuel type data were specifically mapped for the county, and parcel-specific hazard data are collected on-site using a specially designed WHIMS questionnaire.

Two levels of spatial focus are a part of the analysis. Broad level analysis occurs countywide and site-specific analysis is focused on individual parcels. The parcel analysis fully nests within the countywide broad analysis and is directly linked through the spatial (GIS) database.

An overall wildfire hazard assessment along with individual factor ratings are produced using a hazard-rating model (**WHINFOE**) that is based upon a standard wildfire behavior model (**BEHAVE**) and the expertise of wildfire behavior specialists. The **WHINFOE** model is a hierarchical model with 3 factor categories (Base Hazard, Passive Protection, and Active Protection categories) that group 7 primary information factors: The **Base Hazard** is the hazard due to the existence and characteristics of the 'burnable stuff'. This category is made up of the Topography and Fuels (County-wide & Parcel Specific) factor, the Building Construction and Design (Parcel Specific) factor, and the Landscaping within 150 feet of a structure (Parcel Specific) factor. **Passive Protection** evaluates Defensible Space, which if present decreases fire intensities allowing a structure to better withstand the passage of the flame front, or so that fire fighters can more easily protect the structure (Parcel Specific). **Active Protection** evaluates Accessibility, Fire Protection Response Time, and Water Availability (Parcel & Subdivision Specific). If present the Protection Categories contribute to a reduction in the Base Hazard.

## The Results:

In districts where the parcel-based hazard questionnaires have been completed and evaluated, the WHIMS information has been valuable in raising homeowner awareness of the wildfire danger to their property. Several mitigation projects have been initiated and/or completed as a result of heightened wildfire hazard awareness within the county due to the efforts of the BCWMG and WHIMS.

## Next Steps:

**Acquire House Pad Locations** so that structure focused proximity analysis can be performed within the GIS as opposed to parcel-aggregated evaluations. Such data would improve the analysis of topographic and fuels data relative to structure location on large parcels. Such data would also solve the multiple structures per parcel problem in the most efficient way.

A **dangerous topography evaluation** is part of the parcel-based evaluations, and is evaluated directly on site for each structure. It is desirable to conduct this evaluation as part of the countywide hazard classification. However, a dangerous topography data layer has not been developed as yet for the entire county. Plans to acquire this information are currently being developed.



The county is currently undertaking a **countywide risk ‘first look’ evaluation** where risk is the probability of an event occurring. That information will be combined with the hazard/values at risk classifications for a follow-on county-wide integrated hazard-risk evaluation to be used to guide planners in the site plan review process for new or remodel building permits.

#### **Author Biographies**

Claire M. Hay is a principal with the Wildfire Interface Group. She is a wildland-urban interface specialist and a remote sensing and GIS specialist. She has been involved in the Boulder County WHIMS project since 1992. She obtained her B.A. in Geography from the University of California, Berkeley, and her M.S. and Ph.D. in Forest Sciences from Colorado State University.

James H. Korte is a GIS Specialist for the Land Use Department at Boulder County, Colorado and has been there since 1989. He has been working with the county’s WHIMS project since it’s inception in 1992 as GIS Specialist. He obtained his B.S. degree in Geography at Pennsylvania State University in 1988.





## ***Federal Wildland Fire Policy – A Summary***

The challenge of managing wildland fire in the United States has dramatically increased in complexity and magnitude over the decades. Large wildfires now threaten millions of both public and private acres, particularly where vegetation patterns have been altered by development, land-use practices, and aggressive fire suppression. Potentially serious ecological deterioration is possible where fuel loads have become extremely high. In these areas, public and private values are at risk. To reduce the threat of these catastrophic fires, federal wildland fire policy was revised in 1995 and engages a proactive approach to managing fire.

Because wildland fire respects no boundaries, uniform policies and programs are essential, as well as strengthening cooperators' relationships. The Departments of the Interior and Agriculture, together with tribal and state governments and other jurisdictions, are responsible for the protection and management of natural resources on public lands. And, as firefighting resources become increasingly scarce, it is more important than ever to strengthen cooperative relationships.

The Federal Wildland Fire Management Policy and Program Review was chartered in 1994 by the Secretaries of the Interior and Agriculture to ensure that federal policies are uniform and programs are cooperative and cohesive. The review was conducted by the Forest Service, the Bureau of Land Management, the National Park Service, the U.S. Fish & Wildlife Service, and the Bureau of Indian Affairs. The National Biological Service, Environmental Protection Agency, National Weather Service, and FEMA also were involved.

The resulting report presents fundamental principles of fire management and recommends a set of federal wildland fire policies. Though the different missions of the agencies sometimes result in differences in operations, a cohesive set of federal fire policies improves the effectiveness and efficiency of fire management - and our ability to meet modern challenges posed by seasonal wildland fire conditions. Some of the key points in the policy include:

- Protection of human life is the first priority in wildland fire management. Once firefighters are committed to an incident, they are the number one priority. Property and resource values are the second priority, with management decisions based on values to be protected.



- Wildland fire, as a critical natural process, must be reintroduced into the ecosystem. Fire will be allowed to function as nearly as possible in its natural role to achieve the long-term goals of ecosystem health. Where wildland fire cannot be safely reintroduced because of hazardous fuel buildups, some form of pretreatment must be considered, particularly in wildland/urban interface areas.
- Wildland fire management decisions and resource management decisions go hand in hand and are based on approved Fire Management and land and resource management plans. Fire managers also have the ability to choose from the full spectrum of fire management options, from prompt suppression to allowing fire to function in its natural ecological role.
- The role of federal agencies in the wildland/urban interface includes wildland firefighting, hazard fuels reduction, cooperative prevention and education, and technical assistance. Primary responsibility rests at the state and local levels. Structural fire protection in the wildland/urban interface is the responsibility of tribal, state, and local governments.
- The Western Governors' Association will serve as a catalyst to involve state and local agencies and private stakeholders in achieving a cooperative approach to fire prevention and protection in the wildland/urban interface. Federal agencies must place more emphasis on educating internal and external audiences about how and why we use and manage wildland fire.

Our success depends upon four things: Every agency administrator must ensure that these policies are incorporated into all actions. Fire professionals must work with agency administrators to make the policies work on the ground. Managers and staffs must actively implement the recommendations and work with their constituents to ensure success. Every employee of every agency must also be committed to follow through on the ground.

Finally, agencies and the public must change their expectation that all wildfires can be controlled or suppressed. No organization, technology, or equipment can provide absolute protection when unusual fuel buildups, extreme weather conditions, multiple ignitions, and extreme fire behavior periodically come together to form catastrophic events.



*Taken from the USDA Forest Service Home Page.*

## **FireSafe SPOKANE**

Prior to 1987, everybody in the Spokane (WA) fire community was “fat, dumb, and happy.” Few people had even considered the possibility that this large, rapidly growing metropolitan area of 360,000 in the piney woods of eastern Washington might have a wildland/urban interface fire problem.

Then came the Hangman’s Valley Fire! This fast-moving, wind-driven wildfire moved through a fuel bed of mostly Ponderosa Pine and annual grass (FBA Fuel Model 2) toward an upscale suburban subdivision that previous pre-fire plans had rated as not threatened, due to its protective ring of wide, green golf course fairways. Unfortunately, long-range spotting conditions laid down a barrage of firebrands on untreated wood shake roofs up to a mile ahead of the fire, and many beautiful homes were lost in one exciting afternoon.

Following this eye-opener, a group of players including area fire chiefs and other interested fire safety advocates began developing a package of proposed legislation that would establish the first statewide FireSafe regulations. This ambitious package included clearance requirements, minimum road standards, street sign and address standards, power line clearances, rated fire resistant roofing standards, and other built-in fire protection features already adopted by several other states or pulled from model fire codes. This first draft package was soundly rejected by the legislature, which clearly indicated it would not consider such sweeping reforms without strong representation on the committee from developers and builders.

Thus, a new larger committee was formed with significant representation from the planning, development, and building constituencies and began reconsidering the complexities of such comprehensive FireSafe regulations. In the meantime, time marched on.

In mid-October, 1991, the Spokane area experienced a wind event that started more than 104 wildland fires in one day. Conditions were already drier than normal, and sustained 60+ m.p.h. winds toppled trees into power lines, starting multiple vegetation fires all around the area. Downed trees and blowing dust and smoke made it difficult for various fire authorities to reach, size-up, and contain many of these wildfires. On the first day, at least 20 fires in the Spokane area reached “project fire” size, and homes were threatened simultaneously on several fronts. Area fire forces were strained beyond their limits, local authorities were slow to realize the scope of the “big picture”, and mutual aid



forces were slow to arrive due to travel problems created by the windstorm. By the time it was over, “Fire Storm ’91 had burned more than 35,000 acres and destroyed 114 homes (see also *Fire Storm ’91 Case Study* by the NFPA).

Following this disaster, several significant actions have been taken to improve the overall level of wildfire protection in the Spokane area:

- Spokane County Commissioners adopted the package of now more “user-friendly” FireSafe regulations the committee had long been working on.
- Area fire agencies consolidated their multiple dispatch centers into four regional interagency dispatch offices with linked communications.
- The radio communications system was reorganized to provide common command and tactical nets, as well as common frequencies for mutual aid forces.
- The state Fire Mobilization Plan was overhauled and mutual aid coordination improved.
- Interagency ICS wildland fire training classes were conducted.
- Interagency Incident Management teams were organized, including an Area Command Authority (ACA) support team to prioritize multiple incidents and allocate scarce resources.
- FireSafe SPOKANE was born.

Most of the wildfires in Fire Storm ’91 were caused when the extremely high winds blew down power lines, or toppled trees across them. The electric utility companies were besieged by lawsuits brought by the many insurance companies who had covered lost homes. Eventually, some twenty fire lawsuits were combined into one class-action lawsuit that was finally settled out-of-court. The settlement provided \$300,000 to develop a method to improve defensible space around vulnerable homes in the Spokane area.



To oversee this new effort, a non-profit corporation was formed with a five-member board of directors representing the electric utilities, the fire community, and the Washington Department of Natural Resources (WADNR), the statewide wildland fire authority. This board established the following mission statement for what has come to be FireSafe SPOKANE:

***To educate, facilitate, and coordinate local community efforts to improve defensible space around homes in the wildland/urban interface to the extent that both fire damages and suppression costs are reduced.***

FireSafe SPOKANE has recently hired its first permanent (part-time) executive director, who has completed a fire problem assessment and developed an action plan. Projects completed and being undertaken by this group include:

- Creating several demonstration FireSafe houses in cooperation with homeowners on a cost-share basis.
- Developing and distributing a *10 FireSafe Steps* educational brochure.
- Providing free voluntary home fire safe inspections upon request.
- Sponsoring a spring cleanup week with subsidized chipping, hauling, and dumping fees so that homeowners can more economically reduce their dooryard fuel beds.
- Working with homeowner/neighborhood associations to initiate and sustain fire safe awareness and FireSafe activities in critical areas.
- Developing a FireSafe film short to be shown in local theaters and in conjunction with the FireSafe-sponsored showing of “Feel the Heat” at the Imax Theater in Spokane.
- Working with WADNR to develop Fire Information Strike Teams (FIST) to emphasize the wildland/urban interface fire prevention message to the media during the “teachable moment” of coverage of a major fire.





- Seeking additional funding from grants and/or corporate sponsorships to continue the program beyond its current three-year funding window.

While FireSafe SPOKANE has made some progress and has a plan in place to further their mission, the going hasn't been easy. Board members have come to realize that public apathy is rampant, cooperation isn't always easy to achieve, and funds are hard to come by. A significant "speed bump" may be a recent court case where a homeowner's association won a lawsuit against a homeowner who converted his wood shake roof to fire-resistant material in violation of the subdivision CC&Rs. Nevertheless, they remain committed to their mission statement and goals and are working hard to help protect the Spokane area from wildland fire.

For more information, contact: Ross Hesseltine, Executive Director, FireSafe SPOKANE, 11418 N. Dakota, Spokane, WA 99208. (509) 464-1086 [www.firesafespokane.com](http://www.firesafespokane.com)



## ***FIREFREE! BEND***

Opportunity knocked twice in Bend, Oregon! Fortunately, sharp people at the Bend Fire Department were there to answer the door.

The first opportunity came in 1998, when representatives of SAFECO Corporation, a Seattle-based Fortune 500 insurance company, offered to donate some money to purchase a new piece of fire equipment to protect their investment in this wildland/urban interface community in central Oregon's high desert. Bend Fire Marshal Gary Marshall argued that instead of another piece of equipment, what the fire community really needed was funding to develop a public education program to create and maintain defensible space around homes in the piney woods.

Marshal Marshall (I couldn't resist that one) is a strong believer in individual responsibility; the opposite of the theory that government exists to do everything for everyone. He wanted to put the responsibility to protect homes from wildfire back on the homeowners and develop a major public education effort to get people to change their attitudes and behaviors about wildfire. His presentation impressed the SAFECO people and they agreed to provide initial funding of \$75,000. A steering committee of interested people from the fire and business communities was formed to establish goals and objectives, and develop a strategy for the campaign.

The steering committee recognized that a professional product would probably produce better results than a homemade one, and put out requests for proposals from professional marketing firms interested in developing the educational program. They selected the RalstonGroup, a nationally known marketing firm that just happened to have relocated to Bend to escape the rat race of the big city. RalstonGroup then developed an extremely effective and professional multi-media campaign using the FireFree! logo and a "get in the zone" (i.e. defensible space) motto.



The objectives of the FireFree! program are to mitigate the loss of life and property caused by wildfires through public education; develop a program to foster and promote public education for wildfire safety; to change attitudes and behaviors toward wildfire safety and survival; and to establish a review and measurement



process to assess the effectiveness of the program, and assist the insurance community and fire service in evaluating high fire hazard interface areas.

The program consists of brochures, multi-media advertising, speakers bureau, team leader training, and other materials focused on educating people of the need to create a minimum 30-foot defensible space around their homes. A professional quality video, starring a variety of local characters, captures people's interest and gets them thinking about the FireFree! message. The video was made available at local fire stations, video rental stores, and libraries.

This educational program culminates each spring in two FireFree! clean-up weekends where residents can recycle their yard trimmings at no charge at the local landfill. In its' first year, the project generated 9,102 cubic yards of combustible yard debris, most of which had to be cut, chipped, and hauled off the streets by employees and equipment from cooperating government agencies (ODF, BLM, FS, Deschutes County, etc.).

The first year results were so impressive that SAFECO increased funding to a total of \$200,000 in addition to the time, materials, and equipment donated by dozens of corporate sponsors. Media outlets contributed matching funds to expand the advertising effort. Homeowner associations created task forces to perform work and raise funds to chip and/or haul their own debris. By the third year of the program, the clean-up weekends generated 10,860 cubic yards of material from 3,949 participating homeowners. The program has become self-sustaining to the point that the cooperating government agencies have been able to reduce their participation significantly, with the majority of the costs transferred back to the homeowners.

The FireFree! program has been a resounding success in Bend and is expanding. The Oregon State Fire Marshal has adopted the program statewide, and the City of Eugene has adopted the program.



## **PROJECT IMPACT**

Opportunity knocked a second time when Fire Captain Peter Ribble of the Bend (OR) Fire Department was exploring the FEMA website looking for new ideas on fire safety programs and found FEMA's Project Impact grant program.

Project Impact is a federally funded grant program that provides funds to one community in each state each year to better prepare it to survive a large-scale disaster. This disaster resistant communities approach is most often focused on floods, earthquakes, tornadoes, hurricanes, etc. But Captain Pribble decided that the biggest threat to his community was a major wildfire. He completed and submitted a grant application that was approved.

Thus was born the Deschutes County Project Impact wildland/urban interface fire safety effort. FEMA provided initial funding of \$300,000, with Deschutes County providing \$100,000 in matching local funds. A 16-person steering committee was formed to oversee the project, and Captain Ribble was hired as the project coordinator.

The objectives of Project Impact in Deschutes County are to improve the efficiency of fire protection and the safety of residents in the wildland/urban interface by:

1. Supporting the FireFree! project and expanding it to countywide;
2. Developing additional means of ingress/egress (new roads) in targeted high-risk subdivisions;
3. Completing the rural addressing project by providing standardized reflective address signs to all residents; and
4. Completing the geo-coding of all addresses in the county to improve the accuracy of the GIS database used by planning and emergency services agencies.

By utilizing the business continuity approach to disaster planning, Project Impact has been able to attract several corporate sponsors. The project has built from an already well-established base of good cooperative relations among the fire agencies, and is working cooperatively with both FireFree! and Keep Oregon Green to spread the fire safety message in Deschutes County.

Other activities that may be included are expansion of an outdoor environmental classroom in Redmond, and a living forest classroom at the High Desert Museum in Bend. For more information, contact: Deschutes County Project Impact, 63333 Highway 20 West, Bend, OR 97701 (541) 312-6008 E-Mail: [peterr@Deschutes.org](mailto:peterr@Deschutes.org)



## **GUAM**

Of the U.S Pacific trust territories, only Guam replied to our wildland/urban interface fire problem questionnaire, and “Yes, Virginia, there is a” problem. We felt that Guam is so different, that it deserved its own section in this report.

Located some 3,700 miles west of Hawaii, Guam is on the other side of the International Date Line, and thus “where America’s day begins.” The island’s 210 square miles consist of a northern limestone plateau rising to a southern chain of volcanic mountains which feature steep coastal cliffs to the east, but more gently sloping terrain to the west. The general elevation averages about 500 feet above sea level (and there is plenty of sea to go around, thank you), with the highest point being 1,334-foot Mt. LamLam.

Since the annual rainfall ranges from 90-100”, and the temperatures run from 70 to 90 degrees, you would expect the vegetation to be tropical and lush, which it is, mostly. There is a distinct dry season from November – June, and some drier areas are covered in what most of us would think of as brushfields and grasslands. When periods of drought occur, there is plenty of fuel loading (30-40 tons per acre), and wildfire can become a serious problem. Much of the island is set aside in conservation reserves (i.e. natural wildland areas).

Guam is a self-governing organized unincorporated U.S. territory actively seeking commonwealth status, but politics being what they are, such legislation has languished in the Congress. In 1994, however some 3,200 acres of land were transferred to private ownership, thus creating the opportunity for “uncontrolled development”. Currently some ten major villages have housing developments encroaching into the wildland, resulting in a moderate, but increasing wildland/urban interface fire problem. The Chamorro Land Trust Act gave each native islander a housing lot, some of which are in the wildland areas, and other affordable housing measures are resulting in a (by small island standards) building boom. The Forestry and Soil Resources Division’s fire program is funded half by the government of Guam and half from State Fire Assistance funds administered by the Forest Service.

The Forestry and Soil Resources Division is authorized to fight wildland fires, providing both direct suppression and operational support to local fire agencies. FSRD also provides command and control, as well as coordination of the island mutual aid system, with resources available from the Guam Fire Department and the military (including water-dropping helicopters from the Navy). Like nearly everybody else in the West, they would like to improve coordination, communications, planning and training to achieve a more effective system. FSRD is actively involved in training of local forces that would respond to a wildland/urban interface fire problem, providing all facets of a comprehensive training program.



Guam has no codes or regulations aimed specifically at the wildland/urban interface fire problem, but does administer the 1994 edition of the Uniform Fire Code. They have mapped the interface areas, using ArcView software, and have contracted with the Bureau of Planning to provide the fuels, infrastructure, and housing layers of the puzzle.

Like many of the other western states, Guam indicated they would like to have funding for all of the initiatives listed in the questionnaire, except tax incentives to homeowners.

They have an active prescribed fire program, on state lands only, burning primarily for fire hazard reduction. They have a system of fuelbreaks established in the conservation areas. They are also using prescribed fire to attempt to convert the flashy grassland fuels to less flammable tree stands.

The El Nino climate phenomenon, which changes our “normal” fire weather all over the West, visits a drought upon Guam, which in 1998 resulted in the Toto-Tiyan complex of wildfires, which netted a \$600,000 FEMA reimbursement. That year Guam had 1,950 wildland fires that burned 13,315 acres and lost one home (not bad for a tropical climate!). The occasional typhoon can also add significantly to the fuel loading problem.

Long term solutions favored by Guam included mapping/preplanning, hazard reduction, fuelbreaks/firebreaks, and a public education campaign to teach the concept of fire safe homes to residents. The FSRD has no evacuation policy, and evacuation authority lies with the state police and state emergency services authorities. They don’t support the Australian no-evacuation policy, but do support homeowners purchasing fire tools and equipment.

So far, probably because of a distinct shortage of national forests, the Federal Fire Policy has not had any impact on Guam, and they are not making any changes in their fire protection system to compensate for federal program changes.

If Congress were to make funding available, Guam FSRD would like to invest it in demonstration projects, hazard reduction, fuelbreaks, mapping/preplanning, public education, and in support of local initiatives. They believe that there would be opportunities to forge partnerships with the Department of Housing and Development, the local emergency services agency, and housing developers to better mitigate the wildland/urban interface fire problem. They have received a grant from FEMA’s Hazard Mitigation Grant Program (HMGP) to initiate a fuelbreak/firebreak project to compartmentalize their wildland/urban interface fire problem target hazard areas.



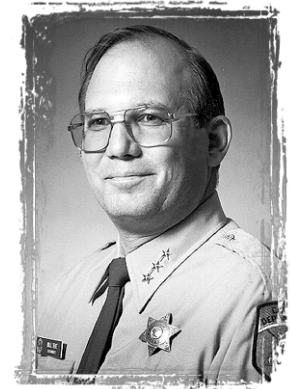


### *About the Consultants*

**William C. Teie** retired from the California Department of Forestry and Fire Protection (CDF) after a successful 34-year career. He worked up through the ranks from seasonal firefighter to Deputy Director for Fire Protection. In this position, he was responsible for all of the fire protection programs within CDF.

Chief Teie was very active in the California fire service. He was on several statewide boards and committees and was elected President of the California Fire Chiefs Association in 1986.

Chief Teie is also very active as a fire protection consultant. He is working with Rockwell International on the application of space and military technology to emergency management and operational support. In August 1996, Chief Teie was involved in the review of the 37,000-acre Miller's Reach Fire in Alaska for the Division of Forestry. He acted as a consultant for the State of Washington after their fire siege during the 1994-fire season and conducted an operational review for the Montana Department of State Lands. He was the fire protection expert used by OSHA in their report on the South Canyon fire tragedy in Colorado in July 1994.



He is the author of the *Wildland Firefighting Fundamentals*, *Firefighter's Handbook on Wildland Firefighting*, and *Fire Officer's Handbook on Wildland Firefighting* and has developed several other training and operational aids for the firefighter.

**Brian F. Weatherford** retired from CDF after a 35-year career that included fighting fires from Alaska to Mexico and from Montana to California. He rose through the ranks from firefighter to fire chief and at the time of his retirement commanded an organization including three county fire departments and two city fire departments with 62 fire stations, 88 engine companies and nearly 900 paid and volunteer firefighters.



He currently provides consulting services to local government agencies in the areas of fire protection planning, budget development, organizational theory, and management audits for specialized services, but only to the extent that these projects do not interfere with his primary avocation of fishing.



# **Report to the Governor**

## **Colorado's Wildland Urban Interface**

**May 2001**



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May 25, 2001

The Honorable Bill Owens  
Room 136, State Capitol  
Denver, CO 80203

Dear Governor Owens:

On behalf of the *Interagency Wildland Urban Interface Working Group*, I would like to present our report on improving Colorado's response to wildland fire. This document, and the accompanying recommendations, represents the expertise and leadership of city, county, state, and federal firefighting agencies.

Wildland Urban Interface issues are complex and require a willingness to seek and implement collaborative solutions. The Working Group accepted this challenge and worked diligently over the past six months to examine many aspects of Colorado's approach to wildland fire preparedness, suppression, and mitigation.

The solutions outlined in the accompanying report will require increased state leadership and investment, but I believe we will be rewarded with better overall protection for Colorado's residents and natural resources.

The collaboration represented by this Working Group and their recommendations will help make Colorado a safer place.

Sincerely,

James E. Hubbard  
Working Group Chair and State Forester

#### **Working Group**

Jim Hubbard, Director, Colorado State Forest Service, Chairman • Greg Walcher, Director, Department of Natural Resources • Al Dyer, Dean, College of Natural Resources, Colorado State University • Tom Grier, Director, Office of Emergency Management • Suzanne Mercer, Director, Department of Public Safety • Ann Morgan, State Director, USDO Bureau of Land Management • Rick Cables, Regional Forester, USDA Forest Service • T. Wright Dickinson, Moffat County Commissioner • Tom Stone, Eagle County Commissioner • Rick Sheehan, Jefferson County Commissioner • Fred Wegener, Park County Sheriff • Larry Donner, Boulder Fire Chief

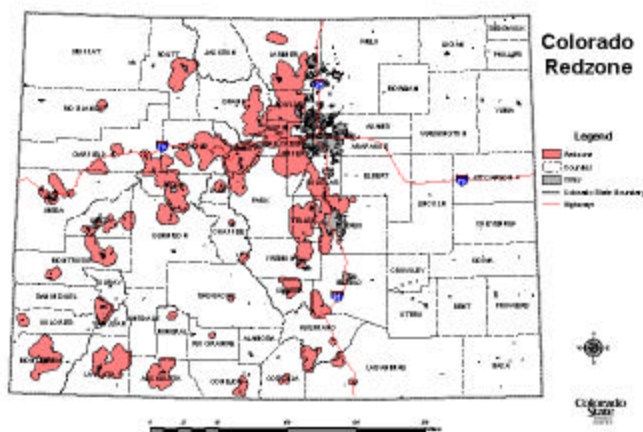
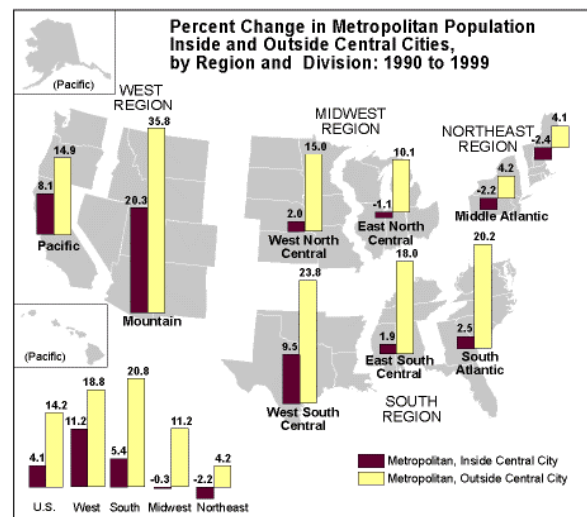
Special thanks to: Carol Small, Jefferson County • Eric Bergman, Colorado Counties, Inc. • Bill Wallis, Bureau of Land Management • Paul Cooke, Division of Fire Safety • Colorado Insurance Industry • Paige Lewis, Colorado State Forest Service • Rich Homann, Colorado State Forest Service

## Executive Summary

The risk of wildfire in Colorado's wildland-urban interface poses a daunting challenge to public safety, fiscal responsibility and natural resource integrity in the state. The 2000 fire season brought this challenge to the forefront of public attention when four wildland urban interface fires along Colorado's Front Range destroyed 74 structures and threatened thousands more, interrupted utility service, and impacted water and air quality. The cost to state coffers for suppressing these fires was a staggering \$10.1 million, contributing to the most expensive wildfire season to date.

While these numbers are dramatic, they are not surprising. A century of aggressive fire suppression, combined with cycles of drought and changing land management practices, has left many of Colorado's forests unnaturally dense and ready to burn.

At the same time, the state's record-setting growth has driven nearly a million people into the forested foothills of the Front Range and along the West Slope and central mountains – the same landscapes that are at highest risk for large-scale fire. This movement of urban and suburban residents into the wildland-urban interface (WUI) significantly increases the values-at-risk from wildland fire – the most critical of these being human life.



The cost of suppressing unnaturally large and destructive fires in the complicated environment of the WUI has pressed state and local resources beyond their capacity and has revealed complexities that are not adequately addressed by the existing system of interagency wildfire response.

Governor Bill Owens, recognizing the urgent need to more effectively address the WUI situation in Colorado, appointed a diverse working group of local,



state, and federal leaders to explore the current situation, identify opportunities for improvement, and make recommendations for change.

Over a six-month period, the Governor's Interagency Wildland Urban Interface Working Group identified several areas of concern:

- ❑ Wildfire suppression in the interface stretches the capability of response personnel in terms of safety, training, and equipment and challenges the ability of local and state governments to cover related costs. Interface protection also demands a higher level of interagency communication and coordination than currently exists.
- ❑ Mitigation of hazardous fuels in the interface is not occurring on a landscape scale, across ownerships. The implementation of planned mitigation projects is complicated by costs to private landowners, availability of a trained work force, compliance with federal requirements, and the lack of options for utilizing removed materials.
- ❑ Efforts to combat wildfire risk are complicated by a lack of awareness and/or support from local communities and the urban public.

Out of the working group's deliberations came the recognition that, in the wildland-urban interface, failure to prepare, communicate, and respond in an interagency manner could result in devastating consequences.

The time is ripe for the State of Colorado to step forward and provide the kind of leadership and coordination needed to ensure the best possible wildfire protection for its citizens.

## **Recommendations**

The Governor's working group identified a total of 15 recommendations within the categories of preparedness and suppression, hazard mitigation, and public awareness. Those recommendations are summarized as follows:

### **1. Strengthen Local Capacity in Wildland Fire Preparedness, Suppression, and Mitigation.**

- Provide state-supported technical and cost-sharing assistance to counties for the development and implementation of expanded county Fire Management Plans.
- Institute a consistent annual appropriation to provide for wildland-urban interface management needs and for a fuels mitigation cost-sharing program.



- Develop a statewide wildland-urban interface training program for local fire service personnel.
- Establish a mechanism for the state to contribute to the Emergency Fire Fund (EFF).

## **2. Enhance State Leadership and Coordination in Interagency Wildland Fire Response.**

- Coordinate and fund the development and implementation of a statewide, county-by-county wildfire risk assessment.
- Provide statutory clarification of wildland fire roles and responsibilities held by county sheriffs, fire protection districts, and related local response personnel.
- Clarify in the *Colorado Interagency Cooperative Fire Protection Agreement* (Master Agreement) interagency roles and responsibilities for fire protection in the wildland urban interface.
- Provide state-level support for expanded state participation in zone dispatch centers and in the extended attack phase of wildfire suppression.
- Investigate and identify statewide protocols for radio communication across local, state, and federal jurisdictions.
- Coordinate interagency implementation and allocation of funds related to the National Fire Plan, the Ten Year Comprehensive Strategy, and similar efforts.

## **3. Improve Statewide Public Awareness Regarding the Role of Fire in Colorado Landscapes and Tools for Wildland Fire Prevention.**

- Provide state leadership in developing and delivering coordinated interagency wildland fire messages to homeowners, landowners, land management agencies, the general public, and others.
- Encourage the development of a professional outreach and information campaign to targeted audiences within the state.





# **Governor's Wildland-Urban Interface Working Group Report**

## **Background**

The risk of wildfire in Colorado's wildland-urban interface (WUI) poses a daunting challenge to both public safety and fiscal responsibility in the state. The 2000 fire season brought this challenge to the forefront of public attention when four wildland urban interface fires along Colorado's Front Range destroyed 74 structures and threatened thousands more, interrupted utility service, and impacted water and air quality. The cost to state coffers for suppressing these fires was a staggering \$10.1 million, contributing to the most expensive wildfire season to date.

The magnitude and urgency of Colorado's WUI problem is influenced by a number of factors. First, among these, is the state's record-setting growth, particularly in the foothills of the Front Range and along the Western Slope and I-70 corridor. The 2000 Census revealed that Colorado gained nearly 1 million people over the past decade, making the state third in the nation in terms of percentage gained. Of this growth, nearly 80 percent occurred in the ten counties along the Front Range, with the central mountain counties of Park, Eagle and Summit close behind.



The Colorado State Forest Service (CSFS) estimates that approximately 1/4<sup>th</sup> of the state's current population resides within the Red Zone, an area characterized by over 6 million acres of forest land at high risk for large-scale wildland fire. The majority of these residents moved to the mountains from urban and suburban neighborhoods, bringing with them little knowledge of fire's natural role in Colorado's ecosystems or

of what they might do to protect themselves and their property.



Low-elevation ponderosa pine, Douglas fir and piñon-juniper woodlands provide the scenic backdrop to much of the state's interface expansion. Unfortunately, these landscapes are also at the highest risk of suffering a catastrophic wildfire. A century

of aggressive fire suppression, combined with cycles of drought and changing land management practices, has left many of Colorado's forests unnaturally dense and susceptible to damage from insects, disease, and fire. Thick ladder fuels characterize many of these landscapes, providing an easy route for fire to climb from



the forest floor to the trees' crowns.

Fires in the WUI are particularly dangerous to firefighters because of the complexity involved in suppressing wildfire around homes and communities. Local fire departments, both volunteer and paid, provide initial attack on most of the state's interface fires. These first responders arrive with an inconsistent range of training and equipment and are often unprepared for the combination of wildland and structural firefighting skills required in the interface. Firefighters are further challenged by subdivisions with inadequate access, lack of available water supply, and structures built with highly combustible materials.

Landowners and managers have several tools available to them to begin mitigating the wildfire risk on their property. The most common of these tools are thinning of dense trees and shrubs and the use of controlled, low-intensity fire, known as prescribed burning. Mitigation and risk reduction efforts achieve maximum effectiveness if they are carried out on a large-scale across ownership boundaries.

This kind of action involves bringing together many individuals and agencies, providing them with guidance and incentives to act, and facilitating a governing environment conducive to change. Such action is particularly complicated in western states like Colorado which are characterized by a checkerboard pattern of federal and non-federal land ownership.

### **Working Group / State's Role**

Governor Bill Owens recognized the urgent need for Colorado to respond to the WUI in a manner that would improve the safety of firefighters and residents, enhance protection of valuable natural resources, and ensure responsible allocation of taxpayer funds.

In August of 2000, Gov. Owens issued an Executive Order charging a twelve member working group, consisting of local, state, and federal representatives, with the following mission:

- Assess and make recommendations on fire policies and funding priorities for implementation in the wildland urban interface;
- Assess and make recommendations on how to increase cooperation and coordination in the use of land management practices to mitigate fire danger in the interface;
- Enhance the involvement of diverse stakeholders, professionals, and decision-makers on fire policy matters;
- Focus on awareness programs, land use development policies, cooperation between landowners, local government and developers, and the sharing of knowledge and policies that increase public safety, reduce wildfire hazards, and achieve desired ecological goals in interface areas; and



- Identify barriers to mitigating wildland urban interface fire hazards and recommend solutions to overcome these barriers.

The Governor's Interagency Wildland-Urban Interface Working Group met from December 2000 through April 2001 to consider these and other issues central to interface protection in Colorado. The group identified several areas of concern in the state and developed recommendations, contained in this report, on those areas they felt would most benefit from the Governor's leadership.

## **Wildland Fire Preparedness and Suppression**

### **A. Current Status**

Response to wildland fire consists of two equally important components: *preparedness* and *suppression*. Preparedness involves activities such as interagency planning; formation of cooperative agreements; training of personnel; equipment maintenance and positioning; and extensive communication. It means knowing what values are at risk to wildfire and having the resources necessary to combat that risk at all levels.

Wildfire suppression is the mobilization of available resources in response to a wildland fire incident. The first phase of suppression, or initial attack, is generally provided by local fire departments, with back up from state or federal resources depending on where the incident occurs. If a wildfire escapes initial attack and continues burning over an extended period of time, personnel with specialized experience and training are called in to manage the fire. The effective transition of fire management from initial to extended attack is essential to both public and firefighter safety.



Although the concepts of preparedness and suppression appear straightforward, a number of complications can arise in the course of an incident. In Colorado, state statute gives county sheriffs the responsibility for managing wildland fire on non-federal land. The sheriff may transfer this duty to the State Forester if he or she feels an incident has exceeded local capacity.

Many communities have also formed fire protection districts (FPD) to respond to wildland fire within a smaller geographic area. Some of these communities believe the county sheriff only has jurisdiction over wildfires outside of FPDs. Most sheriffs disagree with this interpretation. Sorting out this local debate can be risky in the face of a fire.



Wildfire response in the state is coordinated through either local or interagency dispatch centers that track available personnel and resources and mobilize them to a site as needed. Complications arise when a fire in the interface requires people or resources equipped for both structural and wildland fire protection. Most firefighters are prepared for one or the other scenario, but not both. In addition, when structural personnel are called out for an interface fire, crews from other jurisdictions must be brought in to provide backfill protection in their city or area of protection.

Some consensus on wildfire roles and responsibilities in the state is obtained through a chain of voluntary agreements. The state and federal agencies cooperate via a “master agreement” titled the *Colorado Interagency Cooperative Fire Protection Agreement*. The state also negotiates individual cooperative agreements with each county. Local fire departments may enter into mutual aid agreements, but there is no process in place to collect, track, or coordinate these local arrangements. Some counties and local departments also develop mobilization guides and/or Annual Operating Plans to supplement their fire response strategies. No counties currently have a comprehensive Fire Management Plan to bring all their wildfire-related activities and agreements together.

This series of cooperative agreements functions well until an on-the-ground incident reveals areas of conflict that were not adequately resolved during preseason negotiations. The federal responsibility for interface protection is one such issue, as is the authority of the county sheriff to represent fire protection districts in agreement negotiations.

#### Economic Impacts of Catastrophic Wildfire

Fire	Cost (estimates)	Acres
Davis Ranch	\$111,900	125
Bobcat	\$3,330,992	10,599
Hi Meadow	\$5,298,067	10,800
Eldorado	\$1,369,664	1,067

Another area with potential for conflict is the allocation of costs. Wildland-urban interface fires pose new challenges related to cost accountability and responsibility. They can become extraordinarily expensive because of the number and type of suppression resources required, and the values-at-risk. Suppression costs are generally shared by those responsible for the land on which the fire occurs. This distribution of financial responsibility is

much less clear in the interface, where a variety of public and private values are threatened.

The incompatibility of radio equipment and frequencies used by individual fire response entities imposes further limitations on the ability of firefighters, incident managers, and agency leaders to communicate with each other.

Limited financial assistance is available for counties and local fire departments to help defray both suppression and preparedness costs. The CSFS, for example,



administers a federal Volunteer Fire Assistance cost-sharing program that helps local firefighters obtain badly needed training and equipment. Requests for this assistance usually far exceed available dollars.

Counties provide for fire suppression costs that exceed local capacity through the Emergency Fire Fund (EFF). Participating counties pay an annual assessment to the fund, which covers the expenses of a member county once they have depleted their available suppression budget. The EFF is not adequate to cope with interface suppression costs and can be quickly depleted in a bad fire year. If the EFF is fully expended, additional costs are often covered by the State Emergency Disaster Fund or through an Executive Order.

Currently, no direct state assistance is available to strengthen local fire planning or preparedness efforts.

## **B. Recommendations**

### **□ Improve Wildland Fire Response Capability at the Local Level**

- Provide state-level technical and cost-sharing assistance to counties for the development and implementation of county Fire Management Plans.
- Require all relevant entities within a county, including fire departments and fire protection districts, to sign an Annual Operating Plan (AOP).



### **□ Clarify Roles and Responsibilities Related to WUI Response**

- Provide statutory clarification regarding the fire protection responsibilities delegated to county sheriffs versus those held by local fire protection districts.
- Amend the statewide master agreement to include a clarification of interagency roles and responsibilities in the WUI.
- Provide statutory clarification regarding the

state's responsibility for reimbursing local suppression costs once the EFF is expended.

### **□ Enhance Statewide Tracking and Mobilization of Resources**

- Expand state involvement in zone dispatch centers.
- Clarify, in county Fire Management Plans, a process for backfilling of local firefighting personnel and resources that have been dispatched out of their jurisdiction.





## **Hazard Mitigation**

### **A. Current Status**

Fire needs oxygen, heat and fuel to spread across the landscape. The easiest of these factors to influence is the amount and distribution of vegetative fuels. The primary tools used by land managers to reduce hazardous fuels in the interface are thinning and removal of dense trees and shrubs and the use of controlled, low-intensity fire, known as prescribed burning. The USDA Forest Service estimates that every dollar invested in prevention and mitigation activities can save up to \$7 in future wildfire suppression costs.

Limited fuel mitigation projects have been implemented in Colorado by local, state, and federal land management agencies as well as private individuals. Boulder, Jefferson, Larimer, Summit, and Clear Creek Counties, for example, have wildfire mitigation programs that range from fuels reduction and prescribed burning on county-owned lands to assisting private landowners with similar actions on their own property. Some local governments have also adopted defensible space and emergency access requirements for new development in the interface.



The CSFS also works with local government, other state agencies, the federal government and private individuals to plan and implement risk reduction projects across jurisdictional boundaries.

Unfortunately, the majority of hazard mitigation projects in Colorado are contained within specific ownership or jurisdictional boundaries. The isolated nature of these projects means that wildfire risk is not reduced on a scale large enough to provide meaningful protection across a landscape. A homeowner's creation of defensible space will be less effective in the face of a raging fire if his or her neighbors have not taken complimentary action. Likewise, fuel reduction on non-federal land adjacent to a National Forest or Park will not provide the best level of protection if that reduction is not extended over the federal boundary.

The planning and implementation of cross-boundary projects requires the cooperation of a number of landowners. Several obstacles can frustrate these collaborative efforts, including:

- The lack of financial assistance to private landowners to help them participate in a large-scale project that will result in greater public than personal benefit;
- The time-consuming consultation and public-involvement processes required of federal land managers;





- The absence of local or community incentives to encourage defensible space and fire safe development; and



- The lack of a trained and available workforce to carry out fuel reduction on a large number of acres.

The effectiveness of hazard mitigation in Colorado is also limited by the lack of a consistent statewide assessment of wildfire risk. The state's Red Zone map identifies high-risk areas through a combination of data on population, number of structures, vegetative fuel type, and history of fire starts. While useful, this map is ultimately limited by the accuracy, extent and scale of the data on which it is based. Federal land management agencies have also assessed selected portions of their land, but these efforts are generally focused on wildfire risks outside the WUI zone. No system or protocol exists to consistently assess, map and

develop a response to WUI fire risk across the state.

## **B. Recommendations**

### **□ Establish a Statewide Wildland Fire Risk Assessment**

- Facilitate the development of consistent risk assessment data and mapping in each county.
- Provide technical assistance to counties in the application of risk assessment data.

### **□ Increase County-Level Fire Mitigation Plans**

- Assist counties in using risk assessments to prioritize areas for hazard mitigation.
- Encourage counties and local governments to develop and implement programs that promote defensible space and the use of fire-resistant building and landscaping materials.
- Provide state-funded cost-sharing assistance to private landowners within county prioritized areas for fuel reduction on their lands.
- Convene a state-level dialogue with insurance industry representatives regarding the role of insurance carriers in reducing risks associated with homes in the WUI.



- ❑ **Encourage Community Solutions to Workforce and Utilization Challenges**
  - Assist counties in identifying opportunities for local economic benefit through the use of local workers and the development of uses for vegetative material removed in hazard reduction projects.

## **Public Awareness**

### **A. Current Status**

The public's level of awareness regarding the causes and impacts of wildland fire can have a tremendous influence on the ultimate success of both suppression and mitigation efforts. If a local community understands and supports the need to reduce hazardous fuels, for example, projects are more likely to go forward in a timely and successful manner.



Support from local residents and government leaders can also facilitate increased individual and community action such as: creating defensible space around homes and structures; ensuring safe access for fire apparatus; establishing, training, and/or equipping of local fire departments; installing dry hydrants in subdivisions; or promoting the use of fire resistant building materials. All of these actions increase the chances that firefighters can safely control a wildland fire through initial attack and thereby limit damage to property and resources.

The need for public awareness extends beyond local communities to Colorado's urban area, for whom the wildland-urban interface is primarily a recreation zone. Actions taken to reduce wildfire risk on public lands, whether federal or non-federal, must have general concurrence and support from the public. It is also important for the public to understand that although mitigation efforts such as prescribed burning may have short-term impacts on visibility and air quality, they are designed to prevent the large-scale impacts that can result from a catastrophic wildland fire.

Many land management, fire protection, and/or disaster preparedness agencies in Colorado deliver some kind of fire awareness message. These education programs are not generally coordinated between agencies or levels of government, however, and have the potential to generate more confusion than understanding.

The Firewise program, which is aimed at interface homeowners and communities, is an example of a successful, standardized program that could be delivered consistently across the state. A similar kind of program or message is needed for city dwellers and recreational users of wildland and WUI areas.



## **B. Recommendations**

### **□ Increase Consistent Use of Firewise Program Across Government Entities**

- Provide state lead in coordinating the use of Firewise among Land management agencies and government entities at all levels.

### **□ Implement a Professional Marketing Effort to Targeted Audiences Regarding the Role of Fire in Colorado's Forests**

- Provide state seed money and seek matching funds for projects through new and existing partners.

## **Next Steps**

The time is ripe for the State of Colorado to step forward and provide the kind of leadership and coordination needed to ensure the best possible wildfire protection for its citizens. Through their deliberations, the Governor's Interagency Wildland Urban Interface Working Group determined that, with regard to the interface, failure to effectively prepare, communicate and respond to wildland fire in an interagency manner could result in devastating – and unacceptable -- consequences. The recommendations in this report are intended to help the state avoid such a result.

Due to the urgent nature of the interface situation, the Working Group advises that the Governor begin immediately to pursue implementation of this report. Many recommendations need further development and will require the active involvement of local, state, and federal agencies, as well as individual landowners and the public at large.

Fire in the WUI threatens lives, livelihoods, and valuable natural resources. The State of Colorado must act quickly and effectively to mitigate this threat.



## **Glossary**

**Annual Operating Plan:** An annually updated document authorized by the appropriate officials for implementing the Interagency Cooperative Fire Protection Agreement in their respective areas of responsibilities.

**Backfill** (a.k.a. Move-up and Cover): Identifies a relocation of fire suppression resources from their established location to a temporary location to provide fire protection coverage for an initial attack response area.

**Cooperator:** Organized fire forces of other agencies, paid or volunteers, public or private, at the local, municipal, state, or federal level.

**County:** Employees, elected officials, and appointed officers of a county.

**Emergency Fire Fund (EFF):** A fund established and maintained through voluntary participation by counties, governed by a task force of county commissioners, sheriffs, and fire chiefs, administered and managed by the Colorado State Forest Service. EFF is funded by annual assessments to the participating counties. The fund provides financial assistance to participating counties at times when qualifying wildfires exceed the counties capacity.

**Defensible Space:** An area around homes or structures, either man-made or natural, where the vegetation is modified and maintained to slow the rate and intensity of an advancing wildland fire. Provides room for firefighters to work and helps protect the forest from becoming involved should a structure fire occur.

**Dry Hydrant:** A non-pressurized hydrant that provides a water source to firefighters. Requires equipment capable of drafting from the hydrant.

**Fire Management:** Activities and programs that include: the use of fire as a resource management tool, and protection of values from unwanted, uncontrolled wildfire.

**Fire Management Plan:** Statement, for a specific area, of fire policy, objective, and prescribed action; may include maps, charts, tables, and statistical data.

**Fuels:** combustible plant material, both living and dead, and combustible construction material that is capable of burning in a wildland situation.

**ICS (Incident Command System):** The common emergency incident management system used on any incident or event and tailored to fit the specific management needs of the incident/event. Includes "Colorado Incident Command System" at the local level.



**Initial Attack Forces:** Wildfire suppression resources of agencies initially dispatched to a fire in accordance with a pre-existing annual operating plan or mobilization guide.

**Initial Attack Zone:** An identified area in which predetermined resources would normally be the initial resource to respond to an incident.

**Ladder Fuels:** Fuels which provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease.

**Mitigation:** Actions taken that lessen the risk to people, property, and resources from wildfire.

**Mutual Aid:** Assistance provided by a Supporting Agency at no cost to the Protecting Agency. Mutual aid is limited to those initial attack resources or move-up and cover assignments that have been determined to be appropriate and as each may be able to furnish and are documented in Annual Operating Plans. Sometimes called Reciprocal Fire Protection.

**Preparedness:** Activities before fire occurrence to ensure effective suppression action. Includes training, planning, procuring and maintaining equipment, development of fire defense improvements, and maintaining cooperative arrangements with other agencies.

**Prescribed Fire:** The planned and/or permitted use of fire to accomplish specific land management objectives.

**Prevention:** Activities directed at reducing the number of human-caused fires, including such items as public education, law enforcement, dissemination of information, engineering, and the reduction of hazards.

**Protection Boundaries:** Mutually agreed upon boundaries which identify areas of direct fire protection responsibility and are shown on maps in the annual operating plans.

**Resources:** All personnel, items of equipment and aircraft available for assignment of tasks.

**Structure Protection:** Protecting a structure from an advancing wildfire is usually through treatment or removal of fuels from around a structure but may include application of retardants, foams, cooling agents, wraps, etc. to the exterior of a structure. Specific direction for an incident comes from the agency administrator or line officer.



**Suppression:** All the work of confining and extinguishing a fire beginning with its discovery through the conclusion of the incident.

**Thinning:** A cultural treatment made to reduce stand density

**Values-at-Risk:** Includes property, structures, physical improvements, natural and cultural resources, community infrastructure, and economic, environmental, and social values.

**Wildfire:** Uncontrolled fire burning in forest, brush, prairie, or cropland fuels, or conflagrations involving such fuels and structures.

**Wildland:** Lands with few or no permanent improvements.

**Wildland Fire:** Any non-structural fire that occurs on wildland.

**Wildland Urban Interface (WUI):** Defined as the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

