

DISASTER SAFETY REVIEW

Institute for Business & Home Safety
Volume Six ■ Number Two
Fall 2007

A CALL TO ACTION - ADDRESSING THE NATION'S GROWING WILDFIRE THREATS



Editor's Note – About This Issue

Unlike some other natural disasters, wildfires pose a threat nationwide. The early start of the 2007 wildfire season coupled with the growing number of structures being built in the Wildland Urban Interface became the catalysts for this issue of ***Disaster Safety Review***. The authors were selected for their diverse expertise, and we hope their messages will resonate with property owners regardless of where they live.

When selecting wildfire as our focus in July, we could not have foreseen how relevant this issue would be by the time we were ready to go to press.

On Oct. 21, a dozen wildfires sparked in California, stretching from the Mexico border to north of Los Angeles. As of publication, the fires had charred more than 600 square miles, destroyed more than 1,300 homes, and killed four people. In this issue, California Fire Marshal Kate Dargan writes about the adoption of statewide building codes that take effect Jan. 1. These codes likely will now guide thousands of homeowners through the rebuilding process.

The swift destruction in California amid a relatively quiet Atlantic hurricane season is a reminder that we

must always be on-guard against natural disasters that threaten our homes and businesses. Building stronger and with risk in mind is the cornerstone of reducing property losses on a national scale.

In May, the National Interagency Fire Center Predictive Services Group based in Boise, Idaho, released its "National Wildland Fire Outlook." The predictions were grim and the potential fire risk was labeled as "significantly higher" across much of the Southwest and California, portions of the Great Basin, Northern Rockies, Northwest, Alaska and the Southeast. Those predictions have held true and given the state of many drought-ravaged communities, the wildfire threat likely will continue to escalate in 2008.

The Institute for Business & Home Safety is committed to partnering with public and private organizations to make the demand for stronger homes and businesses a public value. We hope this issue will inspire readers to join the cause.

Candace J. Iskowitz
Editor, ***Disaster Safety Review***



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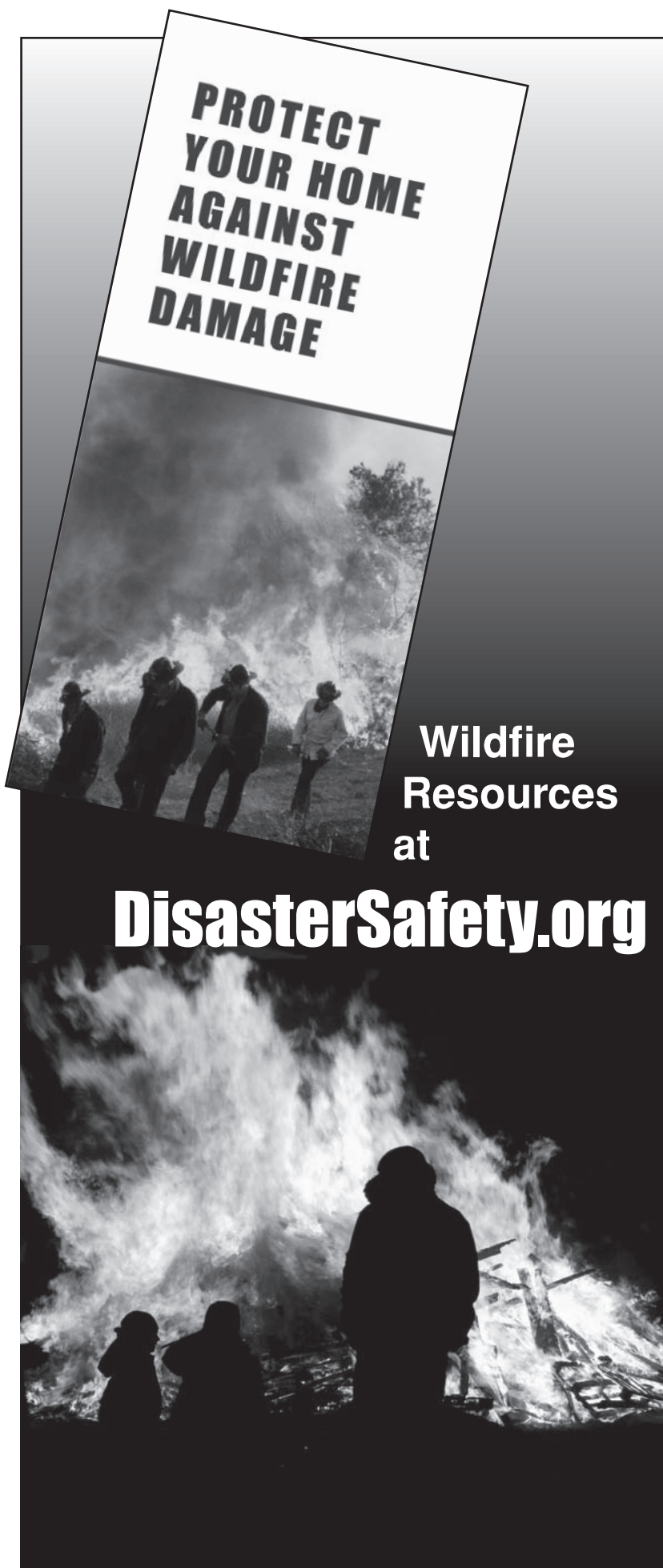
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Photo Courtesy of: slworking2 (flickr.com)
The Harris Fire was burning out of control Oct. 23 on
Mount San Miguel outside San Diego. This view was
captured from Mount Helix in La Mesa, CA.

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President's Letter

As someone who lost his home years ago to a wildfire fueled by Santa Ana winds, my heart goes out to those whose properties have been damaged and destroyed by the fires that have been raging in California. This tragic event stands as a reminder of the need to protect our homes and businesses against the natural hazards that can strike with little warning.

For the last 11 years, I have had the privilege of working with the staff at the Institute for Business & Home Safety to advance public education and research in the field of property loss reduction. As I prepare for the next chapter in my career and IBHS moves toward new leadership, it remains apparent that the nation's need for stronger homes and businesses continues to be paramount.

Looking back on my time here, there are several areas where significant progress has been made and the stage is set for future accomplishments. In that period, IBHS has evolved according to the strategic plan that was adopted in 1996 and revised in 2005 to include reducing losses related to everyday maintenance issues. The organization has prospered through a move from Boston to Tampa, the expansion of its staff and resources, and the adoption of a new name and identity.

As of October, 218 insurance and reinsurance companies have pledged their support for IBHS – tripling our membership since 1996. This industry support likely will continue due to the recent establishment of membership categories aimed at brokers, independent agencies and managing general agents.

While membership figures may be fluid, one thing that remains unchanged is the IBHS commitment to finding ways to reduce property losses.

Building codes continue to be the foundation for everything we do. Research by our engineering staff has demonstrated both anecdotally and quantitatively that strong, well-enforced building codes are the primary means of protecting families and preserving jobs when a natural disaster strikes a community. IBHS staff continues to promote the education of policymakers and the public about the effectiveness of such codes.

The explosive development of the Internet as a public information tool has helped IBHS to share the property protection message with a broad audience. The organization has responded to the emerging use by consumers of online resources with the creation of DisasterSafety.org, the new IBHS web site that is being unveiled this fall. It will focus on home retrofit and maintenance through how-to projects that will empower consumers.

While the need to retrofit existing homes is important, IBHS also has a commitment to stronger new home construction through its **Fortified...for safer living**® disaster-resistant designation program. I have had the pleasure of watching our staff shepherd this program from a concept to the first three homes being built in Florida. Now, the program is in 13 states and there are entire **Fortified** subdivisions that are either under construction or in development. It is a shining example of how consumers and developers can drive the demand for better built homes that will stand up to whatever Mother Nature has in store.

Through the years, IBHS has continually said that a community cannot survive a disaster unless its businesses continue to thrive. To help make this possible, IBHS introduced the **Open for Business**® continuity planning and disaster recovery program. The program has been heartily embraced on a national scale by municipalities, chambers of commerce, small and mid-sized businesses and other IBHS partners.

The organization has performed well through the difficult 2004 and 2005 Atlantic hurricane seasons, the devastating floods and tornadoes that have gripped the nation's mid-section and most recently the tragic wildfires in California. IBHS has provided staff and resources to assist in public education, rebuilding efforts and the promotion of stronger communities.

While it's gratifying to think of all that has been accomplished by this organization, there is more work to be done. I feel confident that Julie Rochman, who will assume her duties as IBHS president and CEO later this year, has the leadership skills and vision to take the organization to even greater heights. I wish her and the IBHS staff continued success.

Harvey G. Ryland
President & Chief Executive Officer
Institute for Business & Home Safety



About the Authors –

Experts in the field of wildfire mitigation research weigh in on the urgent need for a strategic public-private partnership and increased responsibility by homeowners to combat what is shaping up to be one of the biggest threats facing property owners nationwide.



Partnering to Meet the Wildland Fire Challenge

By Tom Harbour, Director – U.S. Forest Service Fire and Aviation Management

Photo credits: Firewise Communities

Wildfires across the United States are more intense, much larger and frequently affect more people than they did a decade ago. The fire management scenario is also changing in response to the increased pressure on firefighting resources, additional danger to firefighters, more threat to public and private property, and higher suppression costs among other wildland firefighting challenges.

The ability to meet these challenges cannot be met solely by federal government firefighting entities. It takes nationwide partnerships at all levels, both public and private, to respond effectively. Government, industry or organization staff, and private citizens all have an important role. We all need to be a part of the continuing discussion and debate about the roles and responsibilities of everyone involved in wildland urban interface fires. The articles featured in this edition of **Disaster Safety Review** are an important part of this continuing dialogue.

Wildland fire statistics during the last decade have signaled the emergence of an alarming trend. More than 74,000 wildfires burned 8.2 million acres as of Oct. 18, 2007; nearly 50% more than the 10-year average. Almost 10 million acres burned in 2006.

Why? Three significant trends are evident: WUI (wildland urban interface), wood and weather.

The WUI is an area where structures meet or intermingle with undeveloped forests or grasslands. More than 8.4 million homes (60% of all new home construction) were added to the wildland urban interface (WUI) in the 1990s alone. About one-third of the housing units in the conterminous United States are in the WUI. Many of these homes are in or adjacent to fire-prone areas. Wildland fires destroyed nearly 2,400 structures in 2006 and more than 4,200 homes in 2003, mostly in California.

Hazardous fuels in the nation’s forests continue to accumulate despite significant progress in reducing woody materials. Over the long-term, this accumulation provides the tinder for the kind of volatile fires we’re experiencing across the country which quickly grow to threaten resources, property and people.

Climate change also plays a significant role in this trend. Weather and moisture patterns are changing in many of the nation’s fire-prone areas. The severe drought conditions over widespread areas make these accumulated fuels ripe for ignition. Increased rain in



This home in Pocatello, Idaho, was surrounded by trees that were too close to the structure, which made it vulnerable to wildfire.



The Firewise program helped the homeowner create a defensible space to help protect the house against wildfire.

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Wildfire Trends Pose Increased Risks for Homeowners and the Nation

By Randy Eardley, Deputy Chief, External Affairs – U.S. Bureau of Land Management, Fire and Aviation Division
National Interagency Fire Center

When Secretary of the Interior Dirk Kempthorne sat down with some of the nation's top fire managers at the National Interagency Fire Center last spring, he asked about a prognosis for the 2007 fire season. He also wanted to know what the primary challenges are that face firefighters and fire managers.

What he heard was a stark discussion of converging factors and trends that are creating fire conditions rarely, if ever, seen before; and how these conditions are elevating the risk to firefighters and the public and changing the way wildfires are managed.

As many of the articles in this issue will go on to discuss, over the past decade three dominant and seemingly disparate trends have increasingly converged to alter the wildfire landscape in the wildland urban interface (WUI). These trends continued in 2007, which now ranks among the top three worst years in terms of acreage burned due to wildfire since 1960. As of mid-October, 8.2 million acres have burned.

Wildfire threat looms large

The fire season began early again this year, with large fires in drought-stricken Georgia and Florida before the majority of activity took off in the West. Large fire activity continues in the equally drought-ravaged states of Kentucky and Tennessee; and the typically late Southern California fire season is in full force.

Whereas large acreage fires were once the exception, the trend now is toward increased numbers of large fires annually. This trend is evident when considering the five-year average of acres burned just since 1990. From 1990 to 1994, the average number of acres burned annually was 3.4 million. This figure grew from 1995 to 1999 to 4.1 million acres and again from 2000 to 2004 to reach 6 million acres. In contrast, in just three years since 2005 the average has increased to more than 8 million acres.

While a number of factors contribute to these increasingly large fires, one factor is the growing number of homes and communities in fire-prone

areas. When a fire occurs, these structures become the primary focus of fire management efforts, adding complexity to suppression operations and making them the focus of most firefighting resources.

Structural losses due to wildfire in 2007 have been above the seven-year average of 2,240. As of late October, more than 3,500 structures have been consumed by wildfire, including 1,586 homes that burned in three days of fires in Southern California, and the 242 homes and 67 outbuildings that burned in the early-season Angora Fire at South Lake Tahoe. These numbers, however, do not reflect the tens of thousands of structures successfully protected by firefighting efforts.

Combined with climate and fuels factors, the continuing expansion of the WUI poses perhaps the greatest challenges to traditional wildfire suppression operations. It also raises the most concern among fire managers about public and firefighter safety, risk management, protection responsibilities and public expectations.

Home construction fuels risks

The Quadrennial Fire and Fuels Review (QFFR), a 2005 report, noted some alarming trends in the WUI. Among them, was the fact that 8.4 million new homes, or 60 percent of the nation's new residential construction stock, were built in the interface in the 1990s. Housing growth rates in the WUI are nearly triple the rates of increase in other areas. This data, combined with census and population trends, indicates that growth in the WUI shows no sign of diminishing in the next 20 years.

Two decades ago, wildfire threatening structures was the exception and wildland firefighters focused primarily on protecting natural resources. Today, it is increasingly rare that wildfires burn without involving structures. For example, according to the QFFR, structures are threatened in 90 percent of all wildfires occurring in Southeastern states.

These trends have a number of ramifications, and raise a number of concerns for fire managers at all

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Partnering to Meet the Wildland Fire Challenge (cont'd)

other areas means an abundance of vegetation that, when it eventually dries, provides additional fuel. Trees that are stressed and weakened by drought are susceptible to pests like the bark beetle. These diseased trees eventually die creating standing fuels. Without the drought many of the trees would have been strong enough to withstand the natural occurrence of pests in their environment.

The Forest Service continues to combat these challenging conditions with additional wildland fire analysis tools, including:

- LANDFIRE, an aggressive hazardous fuels reduction program
- Quality training for firefighters that emphasizes leadership and decision making
- Mitigation projects that partner fire folks with community leaders encouraging fuels reduction projects in the home ignition zone
- Educational programs that teach fire causes and prevention
- FIREWISE, a national program that stresses individual responsibility for mitigation on private property
- Research and development that addresses fire issues in a changing climate
- Purposefully deliberating about how we can fight fire more safely and effectively by choosing appropriate strategies and tactics
- A doctrinal approach to fire management which encourages a common foundation of values and strengths on which to base our choices and actions
- Examining all our shared resources across the agencies and states to find more efficient ways to manage our tools to decrease costs.

It's important for all of us to understand that it will take more than suppression efforts to keep everyone's home safe. Partnerships, cooperation, teamwork and improving the condition of the land are critical to dealing with this national issue.

The Forest Service continues to



This Montana home was spared from the Bitterroot Fire because of the creation of a defensible space.

build its strong legacy of working collaboratively with environmental and conservation groups, national and local organizations who share common goals, citizens' grassroots organizations who take responsibility in their local communities, insurance companies who educate their clients about the home ignition zone, schools who share the message of fire prevention, homeowners' associations who motivate communities to reduce risk on their property, and many

others.

Cooperation between federal, state and local firefighting agencies makes development and implementation of Community Wildfire Protection Plans (CWPPs), as encouraged by the Healthy Forest Restoration Act, possible. Nearly 2,700 communities were covered by CWPPs in 2006 with an additional 600 plans under development.

Firewise (www.firewise.org/) is a national program that stresses the importance of individual property owners taking responsibility for reducing the risk of wildland fire by creating defensible space in the home ignition zone. It informs and involves homeowners, developers, community leaders, planners, and others in the effort to protect people, property and natural resources from the risk of wildfire through Firewise techniques of home construction, design, landscaping and maintenance.

Firewise is funded by a grant from the U.S. Forest Service and the Department of Interior, but it depends on communities, organizations and individuals to do the work on the local level. The Institute for Business & Home Safety has long partnered with Firewise to get the property protection message out through its member insurance companies and combined public education outreach efforts.

By continuing to work through a public-private partnership, it is possible to reduce the wildfire hazard risk for vulnerable properties. Through these efforts, we can grow **Stronger Together**.



This house in Santa Barbara, Calif., was able to survive a wildfire because of a combination of brick and stucco siding construction with double-paned windows and the creation of a defensible space.



Wildfire Hazard Mitigation Lessons Learned: Common Themes

By Pamela S. Ziesler and Douglas B. Rideout, Ph.D.
Colorado State University

The wildland urban interface (WUI) has been growing rapidly for decades. As more people make their homes on the fringes of wildlands, there is an increasing need to reduce wildfire hazards to homes and businesses.

Defensible space, fire-resistant construction, fuel breaks, improved firefighting access and evacuation routes have become a part of life in the WUI. Programs such as Firewise Communities, Fire Safe California, Utah Living with Fire and others have provided interested homeowners and civic leaders with assistance such as funding and workshop facilitation.

Volunteer organizations, fire departments and neighborhood committees provide labor for hazard mitigation. The recent boom in these activities has produced many notable successes. Participants are sharing their stories and encouraging others to follow their example and lessen the wildfire threat in their communities.

Planning and implementing proper hazard mitigation is rarely an easy task. What have we learned in these first years of coordinated efforts? Case studies of successful hazard mitigation programs offer many and varied lessons, but some common themes are apparent.

Wildfire hazard mitigation works

Wildfires have already tested mitigation efforts. In June 1999, residents on the outskirts of Kernville, Calif., marveled at how their homes, which had undergone wildfire hazard mitigation earlier that year, escaped the Hillside fire that swept through their neighborhood.

The widespread wildfires of 2002 also tested neighborhoods in Colorado that had undergone similar wildfire hazard mitigation.

In July 2002, fires burned

across Mesa Verde National Park, scorching thousands of acres. While a few structures were lost, most of the historic buildings and all of the cliff dwellings escaped harm. Ongoing fuel reduction efforts around structures and cliff dwellings slowed the fire, shortened the flames, and permitted successful protection efforts.

Later the same month, the Wonderland Lake fire threatened the Dakota Hills subdivision in Boulder County, Colo. This community was designed with wildfire in mind from the initial planning phase through construction. Access roads around the perimeter of the community are credited with improved firefighter response allowing the protection of many homes.

Champions needed for mitigation programs

All successful programs have had at least one person from the community willing to champion the cause of wildfire hazard mitigation.

Sometimes it is a local resident or group of residents who understand the immediate danger to their homes and neighborhood. Other times it is a fire chief intent on improving safety for residents and firefighters.

However, nearly all successful programs have suffered some setbacks. Reluctant homeowners, squabbling stakeholders with conflicting agendas, and apathy are common obstacles to success.

The key characteristic of mitigation champions is that they are people who will keep the program focused, and, more importantly, keep the energy and enthusiasm going when there are difficulties to overcome.

Effective mitigation takes time

Equipped with the right resources and under ideal circumstances, some wildfire hazard mitigation



actions can be completed in a short time. For example, in 1999 homeowners successfully removed enough fuel from around homes near Kernville, Calif., to save them from a wildfire that sparked a few months later.

This is a rarity. In most cases though, mitigation planning and implementation move much slower.

Patience and persistence are key factors in the accounts of successful programs. Identifying stakeholders, convincing homeowners and civic leaders of the need for action, coordinating partners, securing funding, and building and executing a mitigation plan are time consuming endeavors.

Program coordinators and participants are cautioned to expect success in small increments and to not be discouraged by slow progress. Eventual success is still success.

Learning from neighboring threats

Most communities reporting success with hazard mitigation indicate that a nearby fire was the impetus for action.

While it is necessary to organize, plan and mitigate wildfire hazards before a fire strikes, it often takes the urgency of a devastating fire nearby to motivate people to take action.

Land management agencies, fire departments and other concerned citizens can take advantage of this increased awareness by initiating discussions about wildfire hazard mitigation when the fire is fresh in everyone's mind. These educational moments are often the key to setting a hazard mitigation program into motion.

Diligence is vital to success

The initial planning and fuel reduction efforts are an important beginning to a fire safe community. To be truly successful, however, a wildfire hazard mitigation plan must be flexible enough to address new development, defensible space maintenance and the education of new residents.

The wildfire hazard mitigation plan should address ongoing sources of funding and labor for these activities. If it does, the community will find it easier to continue to protect itself against wildfire hazards.

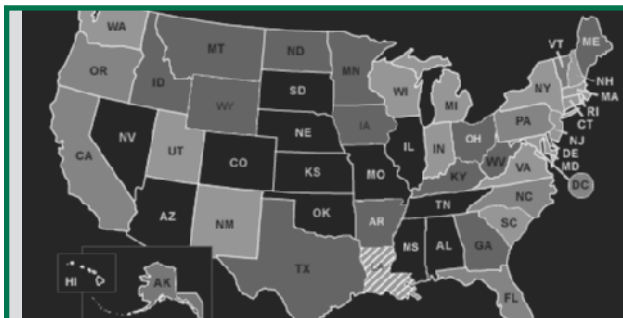
(Wildfire Hazard continued on page 15)

For more information and additional lessons learned:

2004. At Home in the Woods, Lessons Learned in the Wildland/Urban Interface. Federal Emergency Management Agency, U. S. Department of Homeland Security, Washington, D. C. 136 p. Available online http://wildfiremag.com/pub-ed/neighborhood_watch/

Online Resources:

- www.fema.gov/hazard/fire/pubs/athome_woods.shtml
- www.firewise.org/
- www.firesafecalifornia.org/
- www.utahfireinfo.gov/prevention/livingwithfire/intro.htm



Commercial and residential building codes information at
DisasterSafety.org

Research Offers Proof of Homeowners' Role In Reducing Wildfire Risk

By Candace J. Iskowitz
Editor, Disaster Safety Review

A group of scientists may have finally proven what some fire safety experts have been saying for years – making entire neighborhoods fire-resistant is the best way to protect against the spread of wildfire.

The next time a homeowner asks how much they can really do to save their community from the devastating effects of wildfire, point them to this research. The findings revealed houses with no level of wildfire hazard protection can act as fuel, helping to propel a 50-acre wildfire into a 20,000 acre blaze.

The 2007 wildfire season began earlier in most states and wasn't confined to the typically fire-prone western United States. Causes ranging from lightning strikes to unattended campfires sent firefighters scrambling from Florida to Michigan and South Dakota to California. Thousands of homes and businesses were evacuated. Some structures survived, but others did not, leaving behind millions of dollars in property damage and some residents to question what went wrong.

While the study by three scientists does not hold all of the answers, it is the first time researchers have looked at the role houses play in the spread of wildfires. The findings were published in the Sept. 4 edition of the *Proceedings of the National Academy of Sciences*.

Patrick S. Bourgeron, Ph.D., a fellow with INSTAAR (Institute of Arctic and Alpine Research) at the University of Colorado at Boulder, was first inspired to consider the part houses play after watching televised footage from the Hayman Fire. That blaze ignited in the Pike-San Isabel National Forest, 30 miles southwest of Denver, on June 8, 2002. When it was finally contained 28 days later, it had burned 137,760 acres and destroyed 133 homes, 466 outbuildings and one commercial building at a cost of \$39 million.

“What struck me when I saw the fire publicized and the images on television was when you look at the forest it tended to burn, but as a whole it never really

burned to the ground,” Bourgeron said. “But, when you added homes, which for the most part were not fire-resistant, they tended to burn to the ground along with the forest.”

While teaching in Paris, Bourgeron partnered with Michael Ghil, Ph.D., a member of the Institute of the Environment and the Institute of Geophysics and Planetary Physics at UCLA, with a joint appointment in geosciences at France's École Normale Supérieure (ENS), and Vassilis Spyrtatos, an ENS graduate student.

The trio modeled the spread of fires and studied data from forest ecosystems in Colorado, Montana, New Mexico, Utah, Washington and Wisconsin.

The findings were astounding, but the model was relatively simple, Bourgeron said.

In a typical, undeveloped western forest, natural fuel loadings translate into probabilities of the fire spreading from one site to the next ranging from 10 to 40 percent. Under 27 percent, fires are small (as a percentage of the total area); between 27 and 35 percent, there is a sharp transition zone from small to large fires; above 35 percent, fires are very large. Most of the forested landscape where development occurs have probabilities of the fire spreading and still leading to small fires when homes are not present.

“When you add homes that are not fire-resistant, what happens is the transition zone appears much, much earlier,” Bourgeron said. “I did not realize how much if you randomly add fuel, which is what homes can be; you can multiply the size of the fire.”

The study included three types of homes: highly flammable homes that would burn to the ground, homes with some fire-resistance that would burn at the same rate as a forest without homes, and fire-resistant homes that would sustain minimal damage in a wildfire. In the later case, the study indicated that the transition zone appeared later, with the homes acting as fire-breaks and thereby reducing the size of fires below what they would be in an undeveloped forest.

“There is actually more flammable material in a house per square yard than in a forest,” Ghil said. “Neighborhoods where homes are fire-resistant suffer significantly less damage than neighborhoods where they are not.”

The area of the United States where homes are most vulnerable to fire exposures is known as the Wildland Urban Interface (WUI). It occupies 9 percent of the land surface and contains almost 39 percent of all housing units in the country, according to the U.S. Forest Service.

Combine population patterns, which indicate an increasing number of homes being built in the WUI, with the study’s findings, and it seems certain that the risk of wildfire-related property losses will grow unless more is done to make houses fire-resistant.

“When you [make houses fire-resistant] not only do you help preserve those houses, but you also help limit the spread of fires to a much smaller area,” Ghil said.

By understanding that your actions can help dictate the size of a wildfire, it then becomes a matter of personal responsibility, Bourgeron said.

“Not only will these people lose their homes but they are going to contribute to other people losing their homes,” he said. “It’s not just a personal decision. If they do nothing, they contribute at the expense of other people.”

The next step is to take this research and use it to help develop prescriptive methods to reduce this risk. Bourgeron is among the researchers applying for a federal grant to further explore this area of study and determine which partnerships need to be in place to help ensure success.

“We would like people to start taking responsibility for what they do. I think the first thing to do, to be fair to them, is to show them the implications,” Bourgeron said. “I think then we all have to work together to find a solution.”

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Homeowner Education Program Aims to Reduce Wildfire Risk

By Vickie Hodges, CPCU

P&C Underwriting and Loss Mitigation

State Farm Fire & Casualty Company

In 2003, State Farm® launched a wildfire loss prevention education program in the western United States to advise homeowners on ways to keep their families and property safe from wildfire damage.

The program began in Arizona, Colorado, Nevada, New Mexico, Utah, and Wyoming. It has since expanded to include Alaska, California, Idaho, Montana, Oregon and Washington.

The program is aimed at increasing policyholder awareness of wildfire danger and making insured homes better equipped to withstand a wildfire. In the targeted states, homes and the surrounding property are inspected to identify any need for treatments to reduce wildfire hazard.

The selection of homes is based on potential wildfire risk. The degree of risk is determined using a combination of factors such as vegetation characteristics and topography (slope and aspect), combined with State Farm's underwriting and claims data.

The program's purpose is to:

- Protect the lives, homes, and personal property of State Farm customers.
- Create a safer environment for the fire and emergency officials who respond to wildfires.
- Educate customers who live in high risk areas about the dangers associated with wildfires and how they can better protect their property and themselves.
- Reduce the potential for future financial losses in some high hazard areas.

Insured homeowners selected for the program receive a letter from State Farm before their property is inspected. Insurance inspectors, who are contracted with State Farm and trained by state forestry agencies, look at the exterior of the structure and the surrounding property for the kinds of wildfire loss prevention measures often recommended by state forestry services and emergency response organizations.



If potentially hazardous situations are found, the homeowners are mailed a list of recommendations for their property. Homeowners are asked to follow applicable loss-prevention techniques for Firewise Communities™. Some of the prevention recommendations may include to rake duff (dead and down leaves, pine needles, etc.), mow and aerate the lawn, keep pine needles out of rain gutters and off roofs, cut back tree limbs if they overhang the home, keep tree crowns 10 feet apart, and install spark arresters if there is a fireplace. Some recommendations are informational in nature; others are mandatory.

Some recommendations may require more extensive work to address the hazards. From the time of the initial notification, customers are given ample time (at least 18 months in most areas) to make the necessary improvements to their property.

As part of the program, State Farm encourages its customers to use the resources available through local, state and federal agencies for additional support in mitigating wildfire risk. Any charge assessed by local fire or emergency management authorities for help in developing a corrective plan is the responsibility of the customer, as is the cost of completing the recommended safety measures.

(Homeowner Education continued on page 15)

Wildfire Trends Pose Increased Risks for Homeowners and the Nation (cont'd)

levels, for government and emergency management officials and, increasingly, for home and property owners.

For the fire community, these trends mean altering strategies and tactics to deal with the complexities wrought by homes, businesses and citizens in the fire zone. It means more time, effort and resources must go toward protecting the public and structures. It also means re-assessing how risk is managed, and raises questions about risking firefighters' lives to protect homes or structures where the owners have done nothing to protect themselves.

Personal responsibility a must

For homeowners it means there is a need to learn about the hazards of living in fire-prone areas, to take steps to reduce the risk and also to consider the expectations they have for wildland firefighters. With the current and expected growth in WUI areas, there are simply not enough fire engines, firefighters or suppression resources to be at every single home every single time.

Jack Cohen, a research physical scientist with the Fire Behavior Research Project at the Missoula Fire Sciences Laboratory in Missoula, Mont., is considered one of the nation's leading experts in wildfire home ignitions. His research has repeatedly demonstrated that a home or structure's survivability in a wildfire is determined in a relatively small area that includes the structure and its immediate surroundings. As a result, he notes that "... the ultimate responsibility for home wildfire protection lies with private homeowners, not public land management agencies and taxpayers."

Home and property owners can take a number of

measures to reduce their risk of loss to wildfires. Some steps are admittedly costly, such as replacing flammable roofs; but many others require only time and effort, such as trimming vegetation, cleaning out under decks, moving woodpiles, and more. Each individual step increases the survivability of a structure in a wildfire. Combined, these measures can have nearly an exponential effect on reducing risks to both structures and firefighters.

Progress is being made to effectively manage WUI trends and wildfires. Already, more than 60 percent of the projects and acres being treated to reduce hazardous fuels are being carried out near homes and communities.

Some communities are instituting strict wildfire-related building codes, such as the state of California. The state's Fire Marshal Kate Dargan writes more about this movement later in this issue. Insurance companies are increasingly involved in encouraging homeowners to reduce their risk; and many homeowners are learning to be Firewise and are taking action. Articles regarding State Farm Fire and Casualty Company's wildfire mitigation program and the efforts of Firewise are also included in this publication.

Those are all positive steps. But there is a long way to go in effectively protecting homes and managing wildfire in the WUI and it will require increasing levels of cooperation and collaboration among federal, state and local entities, as well as increased participation of home and property owners.

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Internet Map Services: Bringing the Weather to Your Desktop

By Bernd J. Haupt, Maurie Caitlin Kelly, Ryan E. Baxter, and James F. Spayd
The Pennsylvania State University

Advancements in Internet-based technologies have had a dramatic effect on society's ability to prepare for and manage disasters. From the ability to acquire and disseminate information in a matter of seconds to allocating services and resources, the Internet has permanently altered that landscape of Emergency Management Planning (EMP).

These advancements are amplified when considered in the application of weather-related emergencies, the potential for extreme climate events, and technologies such as Geographic Information Systems (GIS).

From government-based emergency responders to service organizations, forecasting and analyzing weather data in the context of information served through a GIS interface can transform a potentially catastrophic event into one that was forecasted, planned for and, in some cases, mitigated. Now, it's possible to gain access to this valuable information free of charge.

Researchers at The Pennsylvania State University set out to develop a protocol to aid those who specialize in emergency preparedness and the mitigation of property losses by providing easier access to crucial weather data.

Internet Map Services (IMS) represent the latest in GIS and Internet combined technologies that have opened up an important window of opportunity for increased information sharing.

The Penn State initiative focuses on identifying climate and weather data vital to potential users and converting and providing that data via IMS. The first series of data came from the National Oceanic and Atmospheric Agency's National Weather Service (NWS) and is part of the National Digital Forecast Database (NDFD).

This breakthrough is particularly significant to those who work within the emergency management and disaster-planning arena, who are seeking to mitigate the impacts of these events.



Example of a web-based disaster event mapping application: Aerial photographs show City Island, a park located within the Susquehanna River near Harrisburg, Pa. These images are included in a web-based GIS application developed by PASDA, the public geospatial data clearinghouse for Pennsylvania, to show damage to the region following Hurricane Ivan. (top) City Island in 2003. (bottom) City Island post-Hurricane Ivan in 2004.

The future of GIS and its application within emergency management and property loss mitigation efforts is potentially limitless. The variety of situations within which IMS can be used is vast, and as technology, user interests, capabilities, and the Internet improve and increase, the list of potential applications expands exponentially.

What is GIS?

All disasters and crises have one common element: They need to be managed and mastered. In other words, they require preparation, planning, and response.

To effectively address emergency situations, well-designed, coordinated and timely data and information systems must be in place and easily accessible. Whether it is an environmental threat, such as Hurricane Katrina, or an emergency of local, national or international

proportions, GIS is there to help manage and mitigate situations that arise on a daily and sometimes hourly basis.

Those familiar with this system will say it is software that supports the integration of digital map data such as roads and streams, points of interest, elevation, aerial photos and satellite imagery into a single interface. It provides an overview of an area or a problem, and even allows the user to model a potential problem or impact.

In reality, it is all of that and more. The system incorporates all aspects of data and information processing, modeling, and integration. In addition to data and software, GIS can also help manage, analyze, and model events and responses.

GIS software and data allow for querying and integrating information and associated attributes that are spatially referenced to a point or area on the earth. Simplified, this system can be seen as one capable of integrating, storing, editing, analyzing, sharing, querying and displaying geographically referenced information.

In its infancy, the system was bound to the world of the desktop computer. The user was required to have the software installed and the data loaded on a computer or an internal network. Advances in technology have broken GIS out of this confined environment.

This interactive information can be easily shared with personnel for the assessment and coordination of post-disaster response efforts and the allocation of resources.

These advances now allow the user access not only at home or in the office, but also in the field. This provides the ability to search for, gather and combine information through queries to quickly access and visually display critical information by location.

The powerful combination of the Internet's exponential growth, the increasingly widespread and easy access, and the widespread availability of information from data clearinghouses, has pushed GIS into the mainstream. It is now possible for Internet users to view aerial photos and satellite imagery with no GIS software requirement simply by using a browser or Google Earth.

It is also possible for users to access web-based mapping applications and view data through data clearinghouses across the country. Many of these clearinghouses have specialized applications and some have developed applications tailored to disaster response on behalf of state government agencies.

Breaking the barrier: IMS and weather data

The development of Internet Map Services (IMS) has increased the ability and ease of sharing information. Users are no longer required to access data in different formats, scales, or projections and convert them.

With IMS, the data is managed and made accessible through a host server and automatically integrates with any data currently in use in a desktop GIS software program. These services are also revolutionizing the use of weather and climate information; previously some of the most complex and time-consuming data for users to access, convert and integrate. This development can empower those working in the emergency management and disaster-planning arena and their ability to mitigate the impacts of these events.

This article focuses on temporal, real-time, short-term weather forecast data, which encompass everything from radar to precipitation to wind speed. This information is designed to be integrated with the data created for pre-disaster planning, disaster prevention, as well as mitigation, recovery, and risk management.

The data is offered free of charge, primarily because it has already been paid for using federal tax dollars through projects done on behalf of the federal government. This is unlike third-party companies who offer similar services and charge annual fees to repackage this information.

The Penn State IMS allows any user with GIS software to add real-time weather data to an existing application with a click of a button.

The services currently offered are three temporal satellite and radar images, 14 NDFD (National Digital Forecast Database) and four NDGD (National Digital Guidance Database) data sets, all provided by the National Weather Service.

(continued on page 14)

Internet Map Services: Bringing the Weather to Your Desktop (cont'd)

These services are updated round-the-clock daily at predetermined time intervals. This takes the burden of continually downloading and reformatting data off the user since the work is being done on the server side, not the user side.

For example, the user no longer downloads and checks hundreds of megabytes of compressed data that can potentially expand to thousands of files and several gigabytes. In addition, the IMS ensures that the data are continuously available and that they have real-time stamps, such as the time and date of every forecast interval. The data also come with metadata, which gives the user comprehensive information about each IMS data set.

Surface smoke concentration is besides ozone data one of the most recently added data layers. One example of its use is a depiction of the surface smoke concentrations in $\mu\text{g}/\text{m}^3$ caused by two large wildfires in Northern California, including the 14,000-acre blaze burning at Henry Coe State Park in southern Santa Clara County. It clearly illustrates the wildfire's negative impact on the air quality in the San Francisco Bay Area as of 1 p.m. on Sept. 6, 2007. As a result, residents, especially children, seniors, and those with respiratory problems, in the affected areas were advised to close windows and stay indoors.

Smoke information combined with forecasts of temperature, precipitation levels, wind speed and direction, can help officials, scientists, as well as communities analyze, plan and make the appropriate decisions with regard to the potential threats facing their regions.

Based on user input and feedback, we are constantly adding new data. Recent requests from organizations such as the National Hurricane Center in Miami alerted us to additional layers that could bring an added dimension and provide even more time-sensitive data to users in the field.

On the horizon

The future of these applications within emergency management and disaster mitigation is as vast as the variety of situations within which IMS can be used. These will only continue to grow as technology advances.

The use of personal handheld devices outfitted with GIS and wireless capabilities increases the portable dimension and real-time applications for IMS.

The emergence of Google Earth, as both an informative and interesting resource to one that allows real time integration of IMS, is one example of the possibilities. The Penn State IMS data can currently be viewed within the Google Earth interface, but this capability just scratches the surface of the power that such readily-available visualization tools offer. The development and integration of these applications can span the globe and cross state, regional, and international borders.

The aim of the Penn State initiative is to put the NWS data in a GIS-ready format that can improve the safety of communities while reducing the associated costs. By putting this information into the hands of the people charged with reducing losses to lives and property associated with natural disasters, it may be possible to gain a better understanding of how they may be better managed and ultimately prevented.

Author's Note: The development of these services was initially funded by a grant from The Pennsylvania State University GIS Council. This information is being made available free of charge through the support of several outlets including PASDA <http://www.pasda.psu.edu> and the regional Mid Atlantic Information Node (MAIN) of the geospatial National Biological Information Infrastructure (NBII) data portal <http://main.nbii.gov>. Questions regarding these services should be directed to Dr. Bernd J. Haupt, bjhaupt@psu.edu. The authors would like to thank Jack Settelmaier, Ken Waters, and other members of the National Weather Service for their collaboration and advice in developing these services.



Homeowner Education Program Aims to Reduce Wildfire Risk (cont'd)

The customer's State Farm agent conducts a follow-up to verify the recommended measures are completed or underway. If a homeowner chooses not to complete the recommended safety measures – potentially putting his or her property and the lives of their local firefighters at great risk – State Farm looks at various options, which could include choosing not to continue insuring the property.

State Farm's program has garnered praise from customers as well as numerous state and federal fire officials. For more information about what customers can do to safeguard against wildfires, visit www.statefarm.com/learning/disasters/learning_disas_wildfire.asp.

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Wildfire Hazard Mitigation Lessons Learned: Common Themes (cont'd)

After all, a successful effort usually motivates residents to continue to want to reduce the risks.

While hazard mitigation is a pressing issue for many communities in the United States, many neighborhood groups - in cooperation with local, state and federal agencies - have successfully tackled the problem.

There are lessons to be learned from the efforts of successful mitigation programs, including the common themes of patience and persistence. Successful programs also need people with vision and energy that can enlist others and who will communicate the need for a sustained process.

You're all packed and ready for vacation. But is your house ready? Find out what to do before you leave your home alone.



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Wildfires are Inevitable; Disastrous Home Losses Can Be Prevented

By Kate Dargan
California State Fire Marshal

During a California summer, just the act of using a weed eater or lawnmower can cause a wildland fire if a spark lands in dry grass. Such a grass fire can send embers onto the roof of a home a mile away causing that structure to ignite.

In the state's Wildland Urban Interface there is an abundance of grass, brush and trees that are dry, ready to burn and dangerously close to vulnerable buildings. It is a place where hot, windy conditions will cause a vegetation fire to rapidly ignite many buildings and overwhelm the fire suppression capabilities of the community.

Californians face these fires every year, primarily during the summer and fall. The Wildland Urban Interface is in the densely populated areas of Los Angeles and the forested resort communities of Lake Tahoe. It is both urban and rural. It is anywhere that a vegetation fire can overwhelm a fire department.

These areas are classic examples of California's fire-prone ecosystem.

We must change how we live and how we build in the interface or we will continue to see the kind of disastrous property losses that we witnessed in 2003 in Southern California and again this summer in South Lake Tahoe.

Stemming losses through tougher codes

In October and November of 2003, I served on the incident command team that responded to the Cedar Fire in San Diego County. This horrific blaze killed 15 people, including one firefighter, and burned approximately 280,000 acres. It destroyed 2,232 homes and 22 commercial properties.

This incident was one of several devastating blazes that were part of the worst wildfire siege, for structural losses, to ever hit our state as of September 2007.



As state fire marshal, I believe one of our biggest challenges is to address this natural hazard through a two-pronged approach: defensible space and new building codes. When these two mitigation practices are combined, research and fire ground experience has proven that a building's chance of survival is dramatically improved.

California's climate makes wildfires inevitable. But we don't have to accept catastrophic loss of homes and businesses in our communities.

The first component is something we have been preaching for years – clearance around the structure. Just by removing flammable materials from 100 feet around the house, the homeowner creates a defensible space – a buffer between burning vegetation and buildings.

The second component of our plan is new.

Buildings in this state will be safer from wildfire in the future because of the California Building and Fire Codes which will go into effect in January 2008. These codes require ignition-resistant construction standards and methods for all new buildings in California's fire-prone interface.

Keeping burning embers at bay

The new requirements specifically address the threat of wildland fires by preventing burning embers from entering and igniting the building. These standards will increase construction costs slightly, but ignition-resistant construction greatly increases the chances that a home in the interface will still be standing after a fire passes through the area.

2007 California Wildfire Statistics

Interval	Fires	Acres
1/1/2007 through 10/06/2007	6,717	84,771
1/1/2006 through 10/06/06	7,932	212,644
5 year average (same interval)	8,136	142,880

(All statistics are for CDF jurisdiction fires only and are subject to change until final fire season reports are completed and tabulated.)



Kate Dargan
California State Fire Marshal

Not every home in California needs the added protection of wildland fire-resistant construction.

The new codes only apply to properties located in the state responsibility areas or in areas identified as very high fire hazard severity zones. A map of the designated areas is available on the CAL FIRE website at www.fire.ca.gov/wildland_zones.php. More information on wildland fire hazard is available on the CAL FIRE website at www.fire.ca.gov/wildland.php.

The hazard maps and building codes reflect the best available science and technology as it applies to fire and emergency response.

These new maps and codes are the result of thousands of hours of collaboration among the fire service, building organizations, planning associations, civic and environmental groups. All of us working together to make California a safer place to live.

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