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LIVING ON THE WILD SIDE

The worst U.S. wildfire season in years forces thousands of people to evacuate communities bordering wildlands

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Making wildfire prevention a life safety priority

PHOTOGRAPH: KATHY TARANTOLA

ANYONE WHO ENJOYS visiting the wildlands of the United States can probably tell at least one tale about a benign hike in the woods that suddenly brought them back in touch with the realities of nature. On more than one occasion, I have begun a hike in the White Mountains of New Hampshire on a warm spring day, only to find myself fighting through a snowstorm an hour or two later.

Many of the thousands of Americans who choose to live in areas abutting our nation's wildlands have also learned that, along with the beautiful views and peaceful surroundings, comes the threat of wildfire engulfing their communities. This problem has gotten a lot of attention recently, as droughts in the West continue to contribute to large, deadly wildfires.

For years, NFPA has worked hard on the special fire problems of those areas where wildlands and development intersect. Since 1986, NFPA has had a cooperative agreement with the USDA Forest Service to develop and implement fire protection and prevention programs to reduce the nation's wildfire losses. That relationship grew into the National Wildland/Urban Interface Fire Protection Program, sponsored by the Forest Service, the Department of the Interior, the U.S. Fire Administration, the National Association of State Foresters, and NFPA.

Out of that relationship, a new public-private partnership, The National Firewise Communities/USA Recognition Program, was launched. On behalf of NFPA, I signed an agreement last November with the Forest Service and the National Association of State Foresters to promote and encourage this innovative program, which encourages communities to develop local solutions to unwanted wildfire. Through the Firewise Communities/USA Program, NFPA and its partners educate Americans about wildfires and help communities develop programs tailored to their needs.

The Firewise Communities/USA Program projects vary from community to community. In Briargate, Florida, for example, the program was used to develop strategies that will help the community avoid a repeat of problems faced when wildfires hit the area in 1998. A million-gallon (3,785,344-liter) water tank is now available for fighting fires, dirt from excavated lakes was used to establish firebreaks, and pine forests have been thinned. At River Bluff Ranch, near Spokane, Washington, roads have been improved, utilities are now underground, and covenants require fire-resistant roofing, deep side-yard setbacks, and the maintenance of defensible space. And in Sundance, Utah, spring and fall chipper/clean-out days are becoming annual events.

This community leadership is central to the program's success. By creating a framework in which fire and emergency management officials work with concerned citizens, communities most at risk from wildfire can put plans in place to deal with one. That means that the more involved a community is, the more lives will be saved and property preserved.

We can't change the laws of nature. Wildfires will continue to shape and reshape our environment. But that doesn't mean we should withdraw from wildland areas. It does mean that we must take special steps to live responsibly in those areas, to protect both the environment and ourselves. That's what the Firewise Communities/USA Program is all about, and that's why we at NFPA are proud to be involved with it.

James M. Shannon
President, NFPA

REMOTE CONTROL

BUILDING A HOME IN A REMOTE REGION WITH SPECTACULAR MOUNTAIN SCENERY OR WITH THE SPLENDID ISOLATION AND TRANQUILITY OF THE DESERT IS A DREAM COME TRUE FOR MANY URBAN DWELLERS. BUT IT'S A DREAM THAT CAN RAPIDLY BECOME A NIGHTMARE IF HOMEOWNERS AREN'T WILLING TO CHANGE THEIR ATTITUDES TOWARD FIRE PROTECTION.

Chris Heftel, a Washington state land developer, has seen how destructive wildfire can be. So he wanted to minimize the chances that such a disaster would destroy his latest project, an upscale, gated community of $500,000 single-family homes on Lookout Mountain, about 7 miles (11 kilometers) from Spokane. >>

by BILL FLYNN ▮ illustration by JEFFREY FISHER

At first, he was inclined to suggest that prospective buyers follow the concepts outlined in the Firewise Communities/USA program as part of their development contract. But when he was ready to start building last summer, Heftel decided to require prospective buyers to sign a covenant legally binding them to use fire-resistive building materials and follow wildfire prevention practices modeled after those in the Firewise program. When fully built, the development's nearly 100 homes will all be structurally fire-resistive and have a defensible zone around them.

It was a bold step, but, Heftel says, no one buying into the River Bluff Ranch development has refused to sign.

"We made it clear to everyone how important it is to use fire-resistive building materials and to be committed to fuels maintenance in an environment such as this," Heftel says.

Firewise Communities/USA is an education program sponsored by the National Wildland/Urban Interface Fire Protection Program, a consortium made up of the USDA Forest Service, the U.S. Department of Interior, the National Association of State Foresters, the U.S. Fire Administration, and NFPA. The consortium's covenants, which require fire-resistive building materials and defensible zones around properties, are a new concept in the wildland/urban interface. However, community adoption of wildfire standards such as NFPA 1144, *Protection of Life and Property from Wildfire*, is becoming common in many areas, as residents realize that the most effective way to avoid destruction from wildfires is proper construction and fuels maintenance.

"This particular mountain has never had a serious wildfire, but the forest is very vulnerable because unhealthy growth has been allowed," Heftel says. He says River Bluff Ranch is uphill and upwind from 1,000 acres (404 hectares) of public land that hasn't been maintained and is overloaded with fuels.

Among the requirements of the River Bluff Ranch covenants are paved two-lane roads, secondary evacuation roads, and a network of forest roads. Also required are underground utilities; a series of non-potable-water storage tanks with dry hydrants; fire-resistant roofing, double-paned windows, deep side yard setbacks, defensible space, and vegetation maintenance; and an on-site caretaker, equipment, and shop.

The covenants further require that the community's homeowners' association, when formed, enforce the covenants, educate the residents, maintain the roads and water storage facilities, manage an ongoing forest stewardship program, and implement the recommended Firewise Communities budget–currently $2 per person–to be used for future Firewise efforts.

"No one balked at committing to the Firewise covenants," Heftel says. "They view it as physical protection for themselves and their property, and an enhancement to the value of the house."

It's an attitude that Heftel views as a remarkable change.

"Only about five years ago, a similar, upscale development was constructed several miles from here that wouldn't allow anything but wood-shake shingles for the roofing," he says. "Shakes won't come anywhere near this development."

NFPA 1144 PROVIDES THOSE RESPONSIBLE FOR FIRE PROTECTION, LAND-USE PLANNING, PROPERTY DEVELOPMENT, PROPERTY MAINTENANCE, AND OTHERS RESPONSIBLE FOR, OR INTERESTED IN, IMPROVING FIRE AND LIFE SAFETY IN WILD FIRE-PRONE AREAS WITH MINIMUM REQUIREMENTS FOR PLANNING, CONSTRUCTION, MAINTENANCE, FIRE PREVENTION, AND MANAGEMENT.

Changing habits in Montana

Washington isn't the only wildfire-prone state in which NFPA 1144 is used to convince homeowners to change their building material and construction habits. Frenchtown, Montana, with a population of 1,700, adopted NFPA 1144 in 1998.

"One of the things I like about the code is it's a standard we can refer to," says Frenchtown's Fire Chief Scott Waldron. "Except for the cities, there's no building code in Montana, so NFPA 1144 is a tool that we use with builders and homeowners to change their habits regarding the materials they use and the need to cut back on fuels."

NFPA 1144 provides those responsible for fire protection, land-use planning, property development, property maintenance, and others responsible for, or interested in, improving fire and life safety in wildfire-prone areas with minimum requirements for planning, construction, maintenance, fire prevention, and management.

Waldron, whose department covers 150 square miles (388 square kilometers), says that, after adopting NFPA 1144, the community applied for grant money to do risk assessments throughout the town.

"We mapped high-risk areas using GPS (global positioning system) and targeted them for mitigation work," Waldron says. "Then we went to each of the homeowners and explained the risks, both in fuels buildup and construction on the property that was putting the structure at risk."

He says the grants also helped to

A family watches from their front yard as the Missionary Ridge wildfire rages out of control north of Durango, Colorado. Veteran Forest Service worker Terry Barton was charged with deliberately setting the wildfire southwest of Denver that destroyed at least 25 houses and forced 7,500 people from their homes.

secure extra help for a fuels-reduction program. "We've managed to do about 200 properties so far," he notes.

Before new homes can be constructed, the prospective owners must obtain a fire safety permit from the fire department. At this point, Waldron uses NFPA 1144 to inform the homeowners what they need to do to before construction.

"And we go back and check before the permit is issued," he says.

"I think one of the biggest mistakes we make in the business of fighting wildland fires is telling people that we will be there to protect them, because that's not always true," Waldron says. "But in the past few years, I think we've made a lot of progress in educating people on what they need to do, not only to have a defensible perimeter, but to use building materials that will allow a house to survive a crown fire."

According to the Structure Ignition Assessment Model (SIAM), a fire model developed by Jack Cohen, a scientist at the U.S. Forest Service's Fire Sciences Laboratory in Missoula, Montana, a fire-resistive wooden structure surrounded by a 100-foot (30-meter) area in which fuels have been thinned has a good chance of surviving a fast-moving crown fire. However, Cohen's research seems to indicate that the principal cause of home losses during wildfires isn't necessarily the buildup of fuels. Rather, it's the degree to which a home is vulnerable to ignition, a factor that's often overlooked when determining the cause of property loss during a wildland fire.

"A home's ignition zone is pretty much determined by the characteristics of its construction and its immediate surroundings, regardless of what wildfire might be moving through," Cohen says.

Key elements in a structure's ignitability are flammable roofs; burnable vegetation, such as ornamental trees and shrubs, close to the house; the lack of tempered-glass or double-paned windows; and the lack of 1/8-inch (0.3-centimeter) mesh to keep fronds from entering openings in the structure.

The research also seems to suggest that contemporary methods of fighting wildfires by reducing the fuel load may not be as effective as believed because thinning fuels on public lands does little to reduce the ignitability of a home on private land. It also suggests that the wildland/urban interface zone doesn't fully take into account the area of prime fire risk and fuel hazards: the house and surrounding vegetation.

Cohen further stresses the importance of the conditions that exist when a wildfire is raging.

"When an extreme event, such as an intensely hot wildfire occurs, many hundreds of structures may be destroyed," he says. "The involvement of urban fire apparatus at this point is pretty much ineffective."

He points to the Los Alamos, New Mexico, fire in 2000 as an example.

"At one point the fire was threatening 1,000 structures. How does fire apparatus cope with that?" he asks. "Under these extreme conditions, we don't have a choice over the fire's behavior. Where we do have a choice is the home ignition, that 100-foot (30-meter) radius around the house."

Florida uses Montana research

Jim Harrell, the wildland mitigation coordinator for the Florida Division of Forestry, says his division uses Cohen's research to encourage homeowners to create zones around their property to reduce ignitability.

"We took a close look at what

PHOTOGRAPH: AP/WIDE WORLD

Glendale firefighters wrap up hose lines after they ran out of water fighting a house fire Saugus, California.

PHOTOGRAPH: AP/WIDE WORLD

Cohen found out in Montana to see how it applies to Florida," Harrell says.

Over the last three years Florida, which adopted NFPA 299, *Protection of Life and Property from Wildfire*, (NFPA 1144's former designation) as a reference item in the state's Fire Prevention Code, has assembled fire management teams to help the state's 15 fire districts reduce fuel loads, especially those near private property.

Harrell says that Florida has had great success with Firewise workshops.

"We've had 20 one-day workshops since August 2000, and we've had real good attendance from builders and developers who are beginning to buy into the Firewise concepts."

Builders in other states are showing an interest, too. Among them is Leo Scott, who's made a good living for 30 years as a building contractor in Prescott City, a fast-growing community in the high desert of central Arizona. Since 1970, Prescott City's population has almost tripled, from 13,000 residents to nearly 36,000. In 2002, it grew at the rate of 3.3 percent annually, and federal census projections predict a population of 45,000 by 2014.

Prescott City is located in Prescott National Forest 75 miles (121 kilometers) north of Phoenix, 90 miles (145 kilometers) south of Flagstaff, and about a mile (1.6 kilometer) above sea level. Its rugged beauty and hundreds of square miles of forest land is a magnet for thousands of new residents every year, most with little or no experience living in the wildland/urban interface.

"Construction, especially new home construction, is our biggest business," Scott says. "And people who buy property with plans to build a house have a certain expectation that construction costs will remain affordable. That's why there was concern among builders when workshops focused on building materials."

Those workshops were Firewise workshops, and concerned or not, the community opted to pursue the program, with as many people as possible involved in implementing Firewise techniques. Prescott City's been an active Firewise community since 1990, and Scott and his fellow contractors, as well as newer and long-time residents and fire officials from various jurisdictions, participate in the effort to maximize the city's fire resistiveness.

Throughout the 1990s, says Prescott City Fire Chief Darrell Willis, the Firewise Communities effort made slow, steady progress, but it was the Cerro Grande fire near Los Alamos that galvanized the community.

"That wildfire really got people's attention, and we got much more serious about our Firewise program and began stressing the need to use building materials that give structures a chance to survive a wildfire."

Scott says the use of fire-resistive materials was a "touchy subject" because the fire department is in a different business than builders.

"We're trying to produce a product that's marketable and affordable, and you have to be careful that you don't price yourself out of the market," he says. However, he acknowledges that many of the things the Firewise program advocates are just common sense and don't cost much.

"Something as simple as making sure all soffits are fully enclosed (to keep out fire brands) is easily done," he notes. "We were able to get closer to a balance between the need to use fire-resistive materials and a desire of homeowners to build attractive, affordable houses."

Scott says he now regularly uses fire-retardant, Class A-rated shingles made of asphalt or masonry on roofs, although he doesn't often use treated wood because it needs periodic maintenance.

"Who's going to make sure that the wood gets re-treated to keep it fire-retardant?" he asks.

Because the Arizona climate is so dry, Scott says the use of wood on exterior walls is uncommon.

"It dries out quickly, rots, and then needs to be replaced."

Instead, he usually applies one coat of stucco with a one-hour fire rating to exterior walls.

Arizona's climate also requires that homes have excellent ventilation.

"You can't eliminate ventilation in houses because you'll end up with mold and mildew and void the warranty on the new house," Scott says. His solution was to use 1/8-inch mesh to cover such openings as crawl space and attic accesses. It works.

"Flames in wildfires move so fast that there's not enough time for them to penetrate the much closer mesh," Scott says.

"The mesh really works to keep out fire brands and sparks and still allows the house to be well-ventilated," Willis says. Because fire officials worked closely with the building community in developing a consensus approach to choosing building materials, Scott says he's become an enthusiastic supporter of the Firewise program.

THE RESEARCH ALSO SEEMS TO SUGGEST THAT CONTEMPORARY METHODS OF FIGHTING WILDFIRES BY REDUCING THE FUEL LOAD MAY NOT BE AS EFFECTIVE AS BELIEVED BECAUSE THINNING FUELS ON PUBLIC LANDS DOES LITTLE TO REDUCE THE IGNITABILITY OF A HOME ON PRIVATE LAND.

"The whole process has been very positive for our community," he says.

Even before a building permit is issued, however, the fire department inspects the land and identifies the vegetation that must be removed before construction can begin.

"We go out and tell them what needs to be done, how far back they must cut back the trees and brush and other fuels," Willis says. "And we go back to inspect and make sure it gets done before we issue a building permit."

Willis says that, over the past two years, Prescott City has received grant money from the federal government to help pay for a portion of the cost of crews to remove vegetation and create defensible space on property occupied by older homes.

"We've managed to treat more than 1,000 properties in two years," Willis says. "We're making a pretty good dent."

False sense of security

"No place in the United States is completely safe," says the NFPA's James Smalley, project manager for Firewise. "There are floods, hurricanes, blizzards, tornadoes, and wildfires. Every spot in the United States has the potential to be affected by a force of nature, but wildfires don't elicit the same attitudes of self-preservation that those other forces do."

Smalley, a nationally recognized expert on effective methods of minimizing the loss of life and damage caused by wildfires, believes many Americans, especially those new to the wildland/urban interface, have a false sense of security borne of their previous life in an urban or suburban environment.

"So much of our population has lived within 50 miles (80 kilometers) of a large or medium-sized city that we've become accustomed to expecting the local fire department to do it all," Smalley says. "But it doesn't happen like that in areas near wildlands."

Smalley says the issue is no longer how to protect people and property. Effective methods have already been identified. The primary issue now is educating people who live in the wildland/urban interface about these rules and procedures, and emphasizing how important it is that they be closely followed. In addition, Smalley says, it requires a change in attitude among these residents of remote regions.

"When living in the urban, built environment, people can get away with the attitude of 'I'm not responsible for my own protection.' But in the wildland, you're on your own," he says. "City dwellers are taking city-living concepts to places where they don't exist. We need to learn a lot more about living in the natural environment."

That's why the Firewise program and NFPA 1144 are playing such important roles in teaching people how to pick the right location for a house in wildland, how to landscape properly, and how to use fire-resistive building materials.

by RICK COOK

show low arizona inferno

EVACUATION LESSONS LEARNED IN THE RODEO-CHEDESKI FIRE

When fire broke out on June 18, 2002, near the Cibique rodeo grounds on the Fort Apache Indian Reservation in east central Arizona, no one knew what was coming, but fire officials were afraid of what might happen.

"We had a couple of small fires prior to this that gave us a heads-up and scared us to death," says Ben Owens, chief of the Show Low Fire District, about 20 miles (32 kilometers) north and west of the fire's point of origin. "The fire behavior was so erratic and extreme. We felt we were going to have an event this year, and unfortunately, we were right."

Four years of drought had left Arizona's forests so dry and fuel loads so heavy—up to 25 tons per acre (22. 7 metric tons per 0.4 hectares)—that officials from the U.S. Forest Service, state agencies, and local fire departments and districts had worried about a monster fire for months. They had reacted vigorously to threats all summer, trying to keep the wild fires contained and hoping for the best. >>

On June 18, however, their luck ran out. At the Cibique rodeo grounds, the drought and fuel loads combined with high winds and terrain to produce something that was simply unstoppable.

When the fire near the rodeo grounds was reported at 4:11 p.m., firefighters were just wrapping up operations at a smaller forest fire nearby, and they responded aggressively to the new threat. An air tanker and a helicopter, both already in the air, were immediately dispatched, along with an engine, and dropped the first load of water on the fire at 4:23 p.m. By that time, the "Rodeo" fire was already estimated at 15 acres (6 hectares). By evening, it had grown to between 100 and 300 acres (40.5 to 121 hectares). By 5 p.m. the next day, it had burned more than 16,000 acres (6,475 hectares)—and it was just getting started.

Two days later, on the morning of June 20, a stranded motorist trying to flag down a news helicopter started a signal fire at Chedeski, about 15 miles (24 kilometers) northwest of the Rodeo fire's point of origin. The helicopter pilot called in the fire before the motorist even scrambled down the slope where she had set the fire, and firefighters responded promptly. Despite their efforts, the fire took off and jumped the ridge, covering 2,000 acres (809 hectares) in a matter of hours.

On June 22, the Rodeo and Chedeski fires joined to become what would become the worst forest fire in recent Southwest history. Before it was contained on July 2, the Rodeo-Chedeski fire would burn 468,000 acres (189,395 hectares) of brush and Ponderosa pine, destroy nearly 500 structures, and force 32,000 people from their homes in about a dozen communities. Some of them wouldn't return home for nearly two weeks.

Summer and retirement homes

The area in which the Rodeo-Chedeski burned is a study in wildland/urban interface. Most of Arizona is either government land, such as the Apache-Sitgraves National Forest; Indian reservations, such as the Fort Apache reservation; state land; or otherwise unavailable for development. Private land in forested areas is eagerly sought for summer and retirement homes, and the area is full of small communities and subdivisions. Much of the settlement is scattered, and the overall population density is low, although many individual developments are quite closely packed.

As much as they could, developers and homeowners have preserved the trees that, along with the cool temperatures, attract people to the area. Even the mobile home parks preserve as many trees as possible.

"We have people saying, 'We bought the trees up here, and that's why we moved,'" says Owens.

That attitude may be natural for people who normally live in a desert city such as Phoenix, but it makes it difficult to reduce fire danger by effectively thinning the trees around homes.

The front of the Rodeo-Chedeski fire roughly followed state Route 260 as it swept through the wooded Mogollon Rim country from the subdivision of Forest Lakes on the western side of the fire to the town of Show Low on the east. In some places, the fire was halted at or before the highway. In others, notably near the communities of Heber and Overgaard in the east-central part of the area, the fire jumped the highway and burned well north of the line. In general, the areas to the northeast and east were most immediately threatened, while the danger to communities such as Forest Lakes on the western side of the fire came days later.

The timing helps explain the relative destruction the fire caused. Heber, Overgaard, and nearby communities were threatened early, evacuated on June 20, and were relatively hard hit. Overgaard and the nearby community of Aripine lost 251 homes and 16 businesses. Forest Lakes was also evacuated, but the fire was stopped short of the community, thanks in part to the extra time residents had to prepare.

"If that fire had hit us like it did in Heber-Overgaard, where they had a day's notice, well, they had no chance," says Keith Scholl, chief administrator for the Forest Lakes Fire District.

The fire was also a study in community evacuation in the face of a major wildland fire, providing lessons that will affect the way we deal with future fires. Some lessons, like the need for preparation, are perhaps obvious. However, others, such as the problem of pets and livestock left behind, are less so.

Perhaps the biggest lesson gleaned from the Rodeo-Chedeski evacuations, all the participants agree, was the importance of preparation at all levels. In a wildland/urban interface fire involving evacuations, that means preparing both firefighters and the public, and planning for the event with the other agencies that will be involved.

It's important for fire agencies to be honest with themselves about their capabilities.

"Something like this is a major self-assessment of who you are and what you can and can't do," says Owens. "As a fire department, are you prepared for something like this? Do you have the manpower, the training, and the certification in place to integrate with the Forest Service systems? As a community, have we been good stewards of the community?" Stewardship includes making sure that fire apparatus can get into subdivisions and to individual homes in threatened areas, Owens says.

An evacuation is a coordinated effort, and fire departments aren't usually the lead agencies in getting people out of an area. During the Rodeo-Chedeski fire, that role fell to the local sheriff's departments, which decided when and how much territory to evacuate. That meant that fire departments had to plan the evacuation with the sheriff's department and other agencies.

The Show Low Fire District worked closely with the local police, sheriff's department, and the state highway department to plan for a possible evacuation. Among other things, they conducted tabletop exercises well before the fires broke out to determine how a fire might develop and how to conduct an evacuation.

The third major task was preparing the public.

"Early last spring, we started preparing people that this event was inevitable," says Owens. "We started early on evacuation education and how people should be prepared and what they should take with them and things to do with their homes when they left."

Aerial view of a burning wildfire near Heber, Arizona.

"In a community where you've got a wildfire threat, the community is remiss if it doesn't have some kind of evacuation drill at least once a year to let people know what they need to take, what to leave, and what route to take," says Larry Humphrey, incident commander for the National Interagency Incident Management Team during the first days of the fire and, later, one of four incident commanders. Humphrey, who normally works as a fuels specialist with the Bureau of Land Management's Safford, Arizona, office, suggests that the beginning of the fire season is a good time for such a drill.

Evacuation education isn't easy in the kind of communities affected by the Rodeo-Chedeski fire because of their resort-like nature.

"Most of our residents are summer people," says Scholl. On summer weekends, most of Forest Lakes' 900 houses are likely to be occupied, but only about 200 people live there year-round.

"You're trying to get word to people who don't come to meetings and things like that," Scholl says. The community newsletter ran an article about evacuations a couple of years before the fire, and Scholl says it would be a good idea to run such an article annually to get word out.

Show Low, with a larger population and more year-round residents than Forest Lakes, was in a better position to get the word out, and the Show Low Fire District pushed hard.

"We did mailers and had a constant information program on radio and television and with handouts," says Owen.

The county's emergency services department provided the money for the mailers. In addition, the fire district sent speakers to homeowners' organization meetings and to retirement communities to spread the word.

"It was just about a full-time job for a few people," says Owens. But, he adds, it paid off.

"We're confident that 99.9 percent of the community up here had an evacuation handout in their homes," he says.

Communicating during a fire

Keeping the public informed is even more important once a fire breaks out. One way to do this is to use a series of alert levels to warn residents how great the danger has become. Humphrey says that alert levels work well in moderation.

"I don't think people can memorize more than three alert levels," he says.

Because no one was prepared for a fire that moved as quickly or got at big as Rodeo-Chedeski, communicating with the evacuees and the people in the threatened communities was a problem.

"There were never enough avenues to get information out," says Jim Paxon, the information officer for Humphrey's initial incident management team who became the "voice" of the fire to the media. "We

PHOTOGRAPH: AP/WIDE WORLD

used law enforcement officers, and we used Navajo County's 911 rollover dial system. We had door-to-door contact, and we used community television, but that was still one of the real problems."

The rollover system calls a list of numbers in succession and delivers a recorded message. Unfortunately, the telephone system proved completely inadequate, particularly since less than half the evacuees stayed in the evacuation centers. There were only two information lines the public could call to get information, and they were jammed.

"Navajo County is working on its phone system and using grant money to enhance its 911 call out system," Paxon says. "They're consulting Ruidoso and Los Alamos (sites of recent major wildland/urban interface fires) to see what technology they're using."

In fact, one of the most important lessons of the Rodeo-Chedeski fire was that it's worth making a great effort to find out where evacuees are going and how to reach them after they leave.

"I don't think we did enough there," Paxon said.

The Web can be important in getting information to evacuees, Paxon says, pointing out that the fire district for Pinedale had a very good Web site, which became an important resource. However, the Web requires a different approach, one that Paxon says fire organizations are still learning how to use.

"We're used to the information organization pushing information out," he said. "Now with Web sites, people can pull it in. That's something we're going to have to get better at. We're just learning how to use hot links and other ways to use the technology."

For Mel Epps, chief of the Heber-Overgaard Fire District, communicating with the public was such a problem that he isn't going to leave it to outside agencies in the future.

"Our biggest lesson was that we left the public information job to someone else, and it seems they dropped the ball and that created a lot of havoc," Epps says. "The people handling the information didn't do a good job. The evacuees were not kept abreast of what was going on. There were many false reports, things like the fire had gone right through the center of town, the fire station was gone. The news companies were putting stuff like that on the 6 p.m. news."

Because the firefighters from the Heber-Overgaard area were so busy fighting the fire, they didn't realize that false reports were getting out.

"We should have known better than that," Epps said. "I was the public information officer for the city of Mesa, Arizona, for a year and a half, and I should have realized what was going on."

Epps believes that the media should have been allowed into the area earlier.

"I think we need to conduct them in ourselves, and [in the future] we'll take responsibility for doing that," he says.

Because the communities were so hard hit, people from the Heber-Overgaard area were desperate for information. After the fire had passed through the communities, but before evacuees were allowed back in, Epps says the people at the evacuation centers were "like a bunch of children, they were so eager to find out what was happening."

Because the towns don't have local television stations, the Heber-Overgaard Fire District is trying to work with local ham operators to put a radio in the fire station that firefighters can use in the event of another evacuation. The fire district plans to issue reports hourly to the evacuation centers.

Trigger points

Another important tool in managing evacuations is trigger points. A trigger point is a clearly defined location or landmark with which residents are familiar and against which they can measure a fire's progress. Using a landmark as a trigger point helps everyone gauge when an evacuation will be ordered and allows the public to monitor the need to evacuate.

Part of setting a good trigger point is technical. It is the job of the fire behavior analysts and the meteorologist to establish the fire's probable behavior, including the speed at which it is likely to move.

"We told the community up front we were setting trigger points, and as the fire approached these trigger points, we kept them informed," says Owens. "We kept them aware of what was happening with the fire so it wasn't a surprise."

However, Humphrey says trigger points shouldn't be set in stone. Changing conditions may require changing trigger points.

Humphrey recalls working the Moose fire in Glacier National Park in Montana in 2001, where the trigger point was set at a creek. If the fire jumped the creek, the people in the fire's path would be evacuated. However, the fire stopped on the far edge of the creek and stayed there for several days. Eventually, the trigger point was moved from the creek to a ridge, but Humphrey says it should have been moved sooner.

"We kept people in a state of suspense so long the edge wore off," Humphrey says.

Humphrey also stresses that evacuations should be done early, but not too early. If an evacuation is ordered too soon, taking people out of their houses for several days before the fire arrives, pressure to get back into areas that haven't yet been hit will build, he says. If people are allowed back in and the fire picks up, they may have to be evacuated again.

LESSONS LEARNED

- Hold drills and exercises.
- Provide the community with information on evacuation.
- Warn the community as early as possible.
- Don't establish more than three stages of alert.
- Set and publicize trigger points, and revise them if necessary.
- Don't evacuate too early.
- Coordinate with other agencies and respect each other's expertise.
- Plan for pets and livestock.

"When you have to evacuate people from the same point twice, it really turns ugly," Humphrey says.

One way to roughly measure the success of pre-evacuation education and planning is to count the number of traffic accidents during the evacuation. Even a minor accident can cause major problems on the two-lane roads that predominate in the fire area.

"We were pleased with the way the evacuation went," Owens says. "There were no accidents, no injuries, and no bottlenecks. It went just like clockwork."

Coordination

Any wildland/urban fire is an exercise in coordination, and this is doubly true of evacuations. Although the fire team advised evacuating the communities, the actual decision as to what areas to evacuate and when were left to the sheriff and the other local law enforcement officials, whose decisions didn't always coincide with the recommendations.

"For the Pinetop-Lakeside area, the incident management team recommended evacuating Show Low but not Pinetop or Lakeside," says Humphrey. "The sheriff's office decided to evacuate all three communities." The sheriff was concerned about looting, access control, and other issues not directly related to the fire. The difference, Humphrey says, was that "we were looking at it from a fire management standpoint, and the sheriff was looking at it from a people standpoint."

"That's where you need to have a good discussion with the people responsible for the evacuation," Humphrey says. "You've got to let them know what the problems and dangers are, and they have to make a decision on who is to be evacuated."

The key to a successful relationship is to acknowledge each other's expertise and respect one another's concerns, Humphrey says.

Another problems was people who refused to evacuate.

"Everyone remembers Harry Truman and Spirit Lake at Mount St. Helens," says Paxon, referring to the man who refused to evacuate before the volcano erupted and died in the blast. "We had some evacuees who refused to leave. I understand their concern, but we're going to be going to memorial services if people continue to do that and get caught,"

"If we have another evacuation this summer, I'm going to be curious as to how many people won't leave," Epps says. "That will compound our problem and make things critical for us."

The other problem with people who don't leave is that they put firefighters' lives at risk if they become trapped.

"We're going to put firefighters at risk because they'll try to rescue those people, even if the command says no," Paxon says. "That is just plaguing me.

"Do we just say to these people 'Okay, you've made a personal decision and we respect that, but we're not going to go in and get you [if the fire endangers you]?' I don't think we've crossed that threshold where we won't go in and get someone," he says.

This problem is likely to be worse in the next big Arizona fire because a number of people from the community of Clay Springs who defied evacuation orders and stayed behind to save their houses have become something of heroes in news stories. That, together with the loss of houses in the Rodeo-Chedeski fire, is likely to encourage others to stay behind the next time.

Further complicating the issue is the fact that Arizona law doesn't allow people to be ordered to leave their homes. If someone insists on staying, there's nothing the fire teams can do about it. It might be possible to change the law to force people to obey an evacuation order, but observers familiar with the Arizona legislature are skeptical that it would make such a law. What's more, such a law would be very difficult to enforce in forested terrain spiderwebbed with dirt roads and few natural choke points.

Paxon said the fire teams and other officials are still working out what to do when people refuse to evacuate.

Pets and livestock

Not all lessons are as obvious as preparation. Take the pets and livestock left behind, for instance.

"In a lot of community evacuation planning, [animals] are quite often overlooked by the sheriff's office and others," Humphrey says. "They've got places for people to go, but they don't think about the horses, cows, and cats and dogs. I think we had more problems with people trying to get back through the roadblock because their cat was locked in the house or their rabbits were out of water," Humphrey says. "It got to be pretty time-consuming, escorting people back in."

Volunteers who went in to feed and water animals and rescue pets helped, he says. In addition, animal shelters as far away as Phoenix cooperated in housing pets separated from their owners.

One of the most remarkable things about the Rodeo-Chedeski fire was that no one was killed or seriously injured, in spite of the fire's size and intensity.

"National Incident Management Teams have lots of experience and make safety first and foremost in their minds," Humphrey says. There are 17 National Interagency Incident Management Teams across the nation, generally consisting of 35 members from fire and emergency management agencies. These teams usually manage large and complex wildland fires, floods, earthquakes, and other natural disasters.

Although some communities, such as those around Overgaard-Aripine, were hard hit, many others were saved. Days of intense effort halted the fire within a quarter of a mile (0.4 kilometers) of Show Low, for example. Likewise, the communities of McNary, Hon Dah, Lakeside, Forest Lakes, and Heber remained undamaged.

Communities from Forest Lakes to Show Low are now working on their evacuation plans and educating residents about evacuation, but this isn't a case of locking the barn door after the horse is gone.

"We could be right back in the same business next year," Humphrey says. "We have a lot of drought-stressed and bug-killed trees out there waiting for an ignition event. We could be in the same or worse situation next year."

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