Fire Management today

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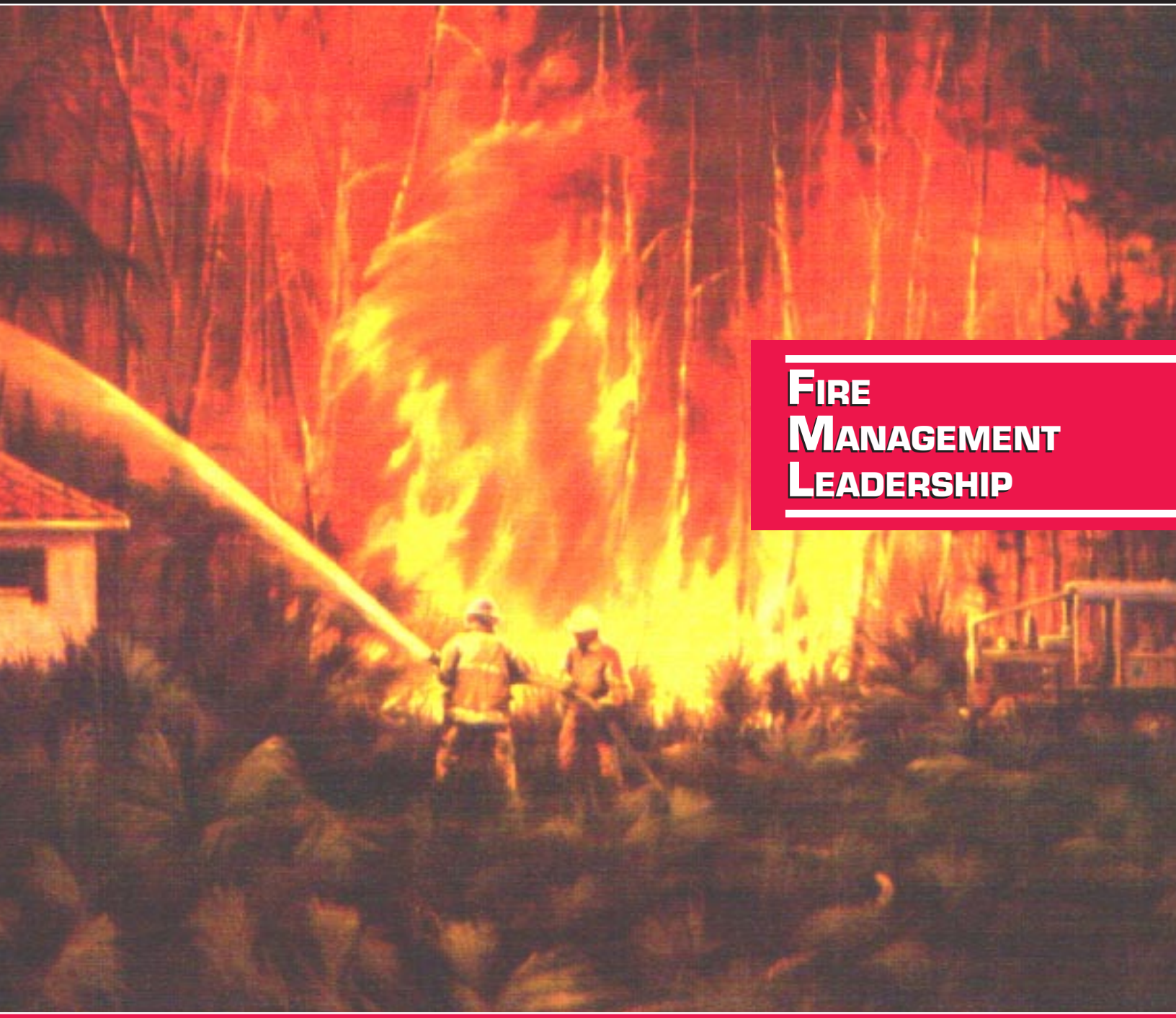

Fire Management Leadership

United States Department of Agriculture
Forest Service

Through the Flames © Paco Young, 1999. Artwork courtesy of the artist and art print publisher Mill Pond Press, Venice, FL. For additional information, please call 1-800-237-2233.

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Fire Management notes

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On the Cover:

Paco Young's painting Through the Flames *(detail—the full painting is reproduced on the opposite page) commemorates Florida's "Firestorm '98." From June 1 to July 22, 1998, 2,282 fires burned 499,487 acres (202,142 ha) in Florida, destroying or damaging 337 homes, 33 businesses, and more than 86 vehicles. In an example of fire management leadership, the Florida Division of Forestry joined the USDA Forest Service, supported by the Florida Division of Emergency Management and the Federal Emergency Management Agency, in a unified area command to battle the blazes. More than 10,000 firefighters were mobilized and 130,000 people were evacuated from their homes, preventing any loss of life.*

The FIRE 21 symbol (shown below and on the cover) stands for the safe and effective use of wildland fire, now and in the 21st century. Its shape represents the fire triangle (oxygen, heat, and fuel). The three outer red triangles represent the basic functions of wildland fire organizations (planning, operations, and aviation management), and the three critical aspects of wildland fire management (prevention, suppression, and prescription). The black interior represents land affected by fire; the emerging green points symbolize the growth, restoration, and sustainability associated with fire-adapted ecosystems. The flame represents fire itself as an ever-present force in nature. For more information on FIRE 21 and the science, research, and innovative thinking behind it, contact Mike Apicello, National Interagency Fire Center, 208-387-5460.

Firefighter and public safety is our first priority.

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The Mann Gulch Fire: They Did Not Die in Vain*

Mike Dombeck

The Mann Gulch Fire on August 5, 1949, left a profound mark on the history of our Nation and on the community of wildland firefighting. Commemorating this historic and tragic event gives us time to reflect on firefighting—and to recognize how the Mann Gulch Fire dramatically changed the firefighting profession.

A Proud Tradition

The USDA Forest Service and other natural resource agencies are proud to employ some of the brightest and most experienced firefighting professionals as our leaders in the fire organization. These leaders have worked their way up the firefighting ladder through years of experience. They have dug line, jumped from airplanes into remote areas to handle initial attack, and planned and conducted prescribed burns to accomplish important natural resource objectives. Every year, thousands of men and women commit their energy and time to fighting wildland fires on firelines across the Nation. The equipment, safety measures, and understanding of wildland fire behavior that buffers these firefighters from potential disasters can be traced back to lessons learned from tragedies such as the Mann Gulch Fire.

Mike Dombeck is the Chief of the USDA Forest Service.

* This article is based on remarks made by USDA Forest Service Chief Mike Dombeck in Helena, MT, on August 5, 1999, the 50th anniversary of the Mann Gulch Fire.

The lessons they taught us at Mann Gulch will be with us for as long as people fight fires.

Since its inception in 1905, the Forest Service has aggressively fought fire. However, early efforts were limited by rudimentary technology, inaccessible terrain, and lack of trained personnel. By 1940, the agency had a professional firefighting organization and an elite corps of smokejumpers who parachuted onto remote fires, containing the fires until ground reinforcements arrived. Even today, as we seek to reintroduce fire into many areas based on our deeper understanding of the role of fire in promoting ecosystem health, the lessons of Mann Gulch loom large.

Mike Dombeck, Chief of the USDA Forest Service, addressing an audience in Helena, MT, during the 50th-anniversary commemoration of the Mann Gulch Fire. Photo: USDA Forest Service, Helena National Forest, Helena, MT, 1999.

We must honor those who perished in Mann Gulch by continuing to stress the importance of safety, communication, and strict adherence to the Ten Standard Firefighting Orders.

Mann Gulch Fire Commemorated*

On August 5, 1949, 13 wildland firefighters died in Mann Gulch on the Helena National Forest, MT, when a fast-moving fire swept over them. On the 50th anniversary of the Mann Gulch Fire, relatives and friends of those who perished, along with many others, gathered to honor the fallen firefighters. Commemorative events included:

- **A wreath-laying ceremony.** On August 4, several dozen people hiked into Mann Gulch to lay wreaths at the markers where each of the 13 firefighters died. They were met by a Missoula smokejumper who had just completed a ceremonial jump near the head of Mann Gulch.
- **A commemorative ceremony.** On August 5, the Mann Gulch Fire was remembered in an outdoor ceremony in Helena, MT. Bob Sallee, the only living survivor of the incident, gave the keynote address; others who made remarks included Montana Governor Marc Racicot and USDA Forest Service Chief Mike Dombeck. The ceremony ended with the unveiling of a commemorative bronze statue.
- **Artistic and educational tributes.** After the commemorative ceremony, the Wilbur Rehmann Jazz Quartet performed the musical debut of the *Mann Gulch Suite*,** followed by exhibits and a demonstration by the National Smokejumper Association and special showings of *Firefight: Stories From the Frontlines*, a Learning Channel film. In the evening, the Artisan Dance Theatre presented "Out of the Ashes," a dance tribute to the Mann Gulch firefighters. On August 7, the Mann Gulch firefighters were again saluted in the Summer Symphony, a musical event involving 155 musicians from 7 city orchestras before an audience of thousands.

* Based on reports in the *Helena Independent Record,* 5–6 August 1999.

** The *Mann Gulch Suite* is available on CD through the Holter Museum of Art, 12 East Lawrence, Helena, MT 59601, tel. 406-442-6400. Proceeds from sales benefit the Artist–Forest–Community program. For more information, contact Amy Teegarden, Helena National Forest, 2880 Skyway Drive, Helena, MT 59601, tel. 406-449-5201 ext. 243.

A Stunning Tragedy

The Mann Gulch Fire severely shook the confidence of the firefighting profession. Thirteen firefighters died in Mann Gulch (on what is today the Gates of the Mountains Wilderness, Helena National Forest, MT) when they were overtaken by a wildland fire during a blowup on a dry, grassy mountain slope. Twelve were smokejumpers. Never before had the Forest Service's elite smokejumper force incurred such a loss of life. It's true that some 85 people died in 1910, when huge fires swept across the northern Rockies; but that was before the advent of a seasoned wildland firefighting organization and smokejumpers. Later fires, along with airplane crashes and other accidents, would incrementally take their toll in firefighter lives. But it was the Mann Gulch Fire that sounded a warning bell within the Forest Service, teaching us that even an effective firefighting force such as the smokejumpers was no match for the unpredictable fury of a wildfire.

Lessons Learned

At Mann Gulch, we learned that more precautions and safety measures were necessary. Subsequent investigations pointed to our desperate need to improve our understanding of fire behavior so we could anticipate and predict future blowups. We also needed better firefighter instruction, safety practices, and personal protective equipment.

Two California fire disasters claimed further lives in the 1950's—15 died on the 1953 Rattlesnake Fire in 1953 on the Mendocino National Forest, and 11 died on the Inaja Fire in 1956 on the Cleveland National Forest.

Mann Gulch, site of a wildland fire blowup that cost the lives of 13 firefighters in 1949. The firefighters were cut off from reaching the Missouri River (foreground) when flying embers from a fire burning on the southern canyon crest (upper right background) ignited dense thickets here at the narrow mouth of the gulch. The firefighters fled back up the gulch, but were soon overtaken by the rapidly moving fire. Photo: USDA Forest Service, Helena National Forest, Helena, MT, 1990.

Following the Mann Gulch Fire and the subsequent tragedies in California, Richard E. McArdle, the Forest Service Chief at the time, organized a 1957 task force to study fires and "recommend action to reduce the chances of men being killed by burning while fighting fire." The task force reviewed 16 fires that had occurred between 1937 and 1956. Its findings became the basis for the well-known Ten Standard Fire-fighting Orders still followed today.

One of the orders was based on a key lesson learned at Mann Gulch: "Know what your fire is doing at all times—observe personally, use scouts."* Another key order is: "Fight fire aggressively, but provide for safety first."

The world-renowned Forest Service Intermountain Fire Sciences Laboratory in Missoula, MT, was created in the wake of the Mann Gulch Fire. Its focus is research into fire behavior and developing safer firefighter gear and equipment. Fire behavior specialists are now standard members of all fire incident command teams. Firefighters come to the battleline equipped with fire-resistant clothing, hardhats, and fire shelters coated with reflective metal, allowing them to survive in burned-over areas.

The Mann Gulch Legacy

The lessons learned from the Mann Gulch Fire have profoundly affected us all. We must never forget the ultimate sacrifice made by the 13 firefighters who died in Mann Gulch. We must honor them by continuing to stress the importance of safety, communication, and strict adherence to the Ten Standard Firefighting Orders. These 13 young men did not die in vain—the lessons they taught us are still with us today. ■

* This is one of the early Ten Standard Firefighting Orders. In the 1980's, the orders were reformulated to help firefighters remember them. Today, each order begins with one of the letters in the term "FIRE ORDERS."

"Many smokejumper foremen have told me that since the Mann Gulch tragedy they don't make a move on a fire without first asking the question, 'If I go there, where can I escape with my crew if the thing blows up?' And if they don't like the answer, they don't go."

–Norman Maclean, *Young Men and Fire*, 1992

Wreath layers sitting beside the markers for one of the 13 victims of the 1949 Mann Gulch Fire. In 1950, concrete crosses were erected at the spots in Mann Gulch where each firefighter died. In 1997, the deteriorating crosses were supplemented by engraved stone monuments. Photo: USDA Forest Service, Helena National Forest, Helena, MT, 1999.

Representatives of the 555th Parachute Infantry Battalion, the "Triple Nickles," standing with a bronze statue dedicated to the 13 firefighters who perished in the 1949 Mann Gulch Fire. The statue, a representation of the smokejumper gear worn by most of the Mann Gulch firefighters, will be on permanent display at the Meriwether Picnic Area on the Helena National Forest, MT. The Triple Nickles were on hand to honor their fellow smokejumpers. During World War II, they jumped onto fires to counter the threat from balloon-delivered Japanese firebombs. Photo: USDA Forest Service, Helena National Forest, Helena, MT, 1999.

The Ten Standard Firefighting Orders

1. **F**ight fire aggressively, but provide for safety first.
2. **I**nitiate all action based on current and expected fire conditions.
3. **R**ecognize current weather conditions and obtain forecasts.
4. **E**nsure that instructions are given and understood.
5. **O**btain current information on fire status.
6. **R**emain in communication with crew members, your supervisor, and adjoining forces.
7. **D**etermine safety zones and escape routes.
8. **E**stablish lookouts in potentially hazardous situations.
9. **R**etain control at all times.
10. **S**tay alert, keep calm, think clearly, act decisively.

A Race That Couldn't Be Won*

Richard C. Rothermel and Hutch Brown

It was 4 p.m. on August 5, 1949. A USDA Forest Service crew of 15 smokejumpers had just completed a jump onto a small fire in Mann Gulch, part of a roadless area in western Montana that is now the Gates of the Mountains Wilderness. The fire was burning on the canyon crest across Mann Gulch, nearly a mile (1.6 km) away. Although the firefighters were downwind from the fire, it didn't look ominous; the day was ending, and at least one smokejumper thought that cooling temperatures were laying the fire down for the night.

By 5 p.m., the crew had gathered its gear. Joined by a Forest Service fire guard who had been singlehandedly fighting the fire, the smokejumpers moved down the gulch. The crew planned to reach the mouth of Mann Gulch on the Missouri River, about 2 miles (3.2 km) away, then move around the canyon crest to the upwind side of the fire for initial attack.

By 6 p.m., barely an hour later, 13 of the 16 firefighters lay dead or dying. What went wrong?

Dick Rothermel is a retired research physical scientist for the USDA Forest Service, Intermountain Fire Sciences Laboratory, Missoula, MT; and Hutch Brown is the editor of Fire Management Today.

* This article summarizes an incident analysis by Richard C. Rothermel under the title, *Mann Gulch Fire: A Race That Couldn't Be Won* (Gen. Tech. Rep. INT–299; USDA Forest Service, Intermountain Research Station; 1993). To obtain the full analysis, contact Publications—Ogden Service Center, Rocky Mountain Research Station, USDA Forest Service, 324 25th Street, Ogden, UT 84401, 801-625-5437 (tel.), 801-625-5129 (fax), pubs/rmrs_ogden@fs.fed.us (e-mail).

Prevailing Conditions

Weather. The day was hot; temperatures in Mann Gulch possibly exceeded 97 °F (36 °C). Around 3:30 p.m., the wind increased and shifted direction; by 5:30 p.m., it was blowing up Mann Gulch toward the crew at speeds of up to 40 miles per hour (64 km/h). Perhaps due to firewhirls or downdrafts from local cumulus cells, firebrands were carried from the canyon crest into the mouth of Mann Gulch. By 5:45 p.m., the firefighters found that spot fires 150 to 200 yards (140–180 m) ahead of them were blocking further progress down the gulch.

Terrain. With the way to the Missouri River cut off, the firefighters turned around and headed back up the gulch. They were in a rock-strewn canyon with treacherous footing. To one side, across the gulch, was the canyon crest with the main fire. To the other side, the slope steepened to 76 percent and was topped by a perpendicular rimrock 6 to 12 feet (1.8–3.6 m) high. Although broken in places by narrow crevices, the rimrock posed a formidable obstacle to anyone trying to cross to safety on the far side of the ridge.

Fuels. Vegetation in Mann Gulch ranged from mature ponderosa pine with a thick Douglas-fir understory at the canyon mouth to grasses and shrubs farther up the canyon. Fuels were tinder dry and highly flammable; dry fuel moisture values reached as low as 3 to 3.5 percent.

Fire Behavior

Under the prevailing conditions, the fire's behavior in Mann Gulch can be calculated with reasonable certainty. The spot fires first encountered by the firefighters were spreading at the slow rate of about 20 feet per minute (6 m/min). However, thick surface fuels at the mouth of the gulch soon sent intense flames into the canopy. Within minutes, the wind-driven crown fire was spreading at the much faster rate of 80 to 120 feet per minute (24–36 m/min). As the fire chased the firefighters up the gulch, it reached grassier fuels where the trees thinned out, increasing its rate of spread to 170 to 280 feet per minute (52–85 m/min). Even farther up the gulch, where the thinning timber finally gave way to grassland, midflame windspeeds might have reached 20 miles per hour (32 km/h), pushing the fire's rate of spread as high as 750 feet per minute (230 m/min)—much faster than the firefighters could run uphill over broken terrain. In the flashy fuels, flame lengths might have reached 40 feet (12 m), with flame temperatures ranging from 1,500 to 1,800 °F (815–980 °C). The high flame temperatures proved lethal, primarily due to respiratory damage.

Human Factors

Lost Communications. Although the jump had gone smoothly, heavy turbulence had forced the pilot to climb before dropping the cargo. The crew's gear was scattered and its only

View of the Mann Gulch drainage from near its head. In 1949, a wildland fire blowup cost the lives of 13 firefighters not far from this spot. Twenty years later, when this photo was taken, signs of severe fire damage were still evident. Photo: Courtesy of National Agricultural Library, Special Collections, Forest Service Photograph Collection, Beltsville, MD (Philip G. Schlamp, 1969; 519698).

radio was broken, causing the crew to lose touch with the outside world.

Tactics and Training. Instead of heading straight uphill for the rimrock while the fire was still moving slowly, the firefighters retreated up the gulch while angling uphill toward the rim. At first, their retreat showed little urgency—one firefighter even stopped to take photos. However, after 450 yards (410 m), with the fire gaining ground and now only a minute behind, the foreman ordered the crew to drop all heavy gear. At this point, the crew probably broke up as the firefighters began running as fast as they could. But the faster the crew moved up the gulch, the lighter and flashier the fuels became, the stronger the wind blew at ground level, and the faster the fire spread.

Realizing that the crew was in a race it couldn't win, the foreman stopped to ignite an escape fire in the grass, with the main fire only 30 seconds behind. Although the escape fire saved the foreman's life, the other firefighters failed to understand his purpose and ignored or couldn't hear his entreaties to lie down with him inside the black. Eleven of the remaining crew continued racing ahead of the main fire at a slight uphill angle; all were caught by the fire within 3 to 4 minutes after the foreman lit his escape fire. Ten died almost immediately and the 11th on the following day.

In the lee of a convection current caused by the main fire, the escape fire was unaffected by wind and therefore spread at an almost 90-degree angle to the path of the main fire, directly toward the rimrock. Four firefighters followed its course, perhaps thinking that it would deflect the main fire. Two of them found a fissure in the rimrock and climbed through to the safety of a rock slide on the far slope. The third firefighter turned away from the fissure and perished in the main fire below the rimrock. The fourth, although caught by the main fire, made it over the rim only to die the next day of his burns.

Lessons Learned

Deeply shocked by the Mann Gulch tragedy and subsequent firefighter fatalities in California, the Forest Service initiated reforms to prevent future disasters. Thanks to improved training, equipment, and safety techniques, another tragedy was averted on August 29, 1985, during the Butte Fire on the Salmon National Forest, ID. Seventy-three firefighters were entrapped for up to 2 hours by a severe crown fire. By calmly moving to preestablished safety zones and deploying their fire shelters, all 73 firefighters escaped serious injury. In part, they owe their lives to the lessons learned from the Mann Gulch Fire. ■

Where Are We Taking Wildland Fire Management?

Interview With José Cruz

Editor's note: As we enter the 21st century, wildland fire managers face challenges ranging from fuel buildups and degraded ecosystems on our Nation's wildlands to protecting lives and property in the wildland–urban interface (W–UI). How will we meet these challenges? For an answer, we interviewed José Cruz, who in 1998 became the Director of the USDA Forest Service's Fire and Aviation Management (F&AM). Director Cruz is one of the Nation's foremost leaders in the wildland fire community.

Fire Management Today (FMT): *Your career began in the early 1960's, when fire exclusion was still practiced. How has wildland fire management changed over the years?*

Cruz: I think we have come to recognize that fire benefits many ecosystems. Without regular fire, we build up fuels to the point where we can't really cope with the situation when we do have fires. I think we'll be utilizing fire a lot more than we have in the past in order to bring our ecosystems back into balance. But fire is not going to do the job alone. It's got to be used together with other types of vegetation treatments, because the stands in many places are so thick that if we burn we'll kill everything. So it's important that we use a combination of treatments to get to the point where we can reintroduce fire for the long-term health of our ecosystems.

I think we'll be utilizing fire a lot more than we have in the past in order to bring our ecosystems back into balance.

FIRE 21

FMT: *That sounds a lot like what the FIRE 21 program calls for. Could you describe your vision for FIRE 21 and how you see it developing in the 21st century?*

Cruz: I think that FIRE 21 incorporates efforts that are timeless in terms of what we need to accomplish in wildland fire management. It fits well into the Forest Service's natural resources agenda and the course to the future that we've laid out for fire management. Essentially, as I see it, we're going to follow the course we've established through FIRE 21 to ensure public and firefighter safety and to integrate fire into land management planning. FIRE 21 will help us actually become activists—activists in helping the Forest Service reach the desired future condition for the national forests. By using wildland fire in conjunction with our own fire management expertise, we will maintain landscapes that we can protect. And if we can't protect our landscapes, then we all lose.

FMT: *You mentioned the natural resources agenda laid out by Forest Service Chief Mike Dombeck. The agenda has four focal areas—protecting the Nation's watersheds, promoting forest health, improving the forest road system, and providing high-quality recreation opportunities. How does FIRE 21 specifically contribute to the natural resources agenda?*

Cruz: FIRE 21 calls for integrating fire into land management planning, which in turn affects each part of the natural resources agenda—watersheds, sustainable forestry, forest roads, and recreation. If we make sure that fire is integrated into land management planning, we will help to realize everything articulated by the Chief in the natural resources agenda. For example, we're going to use fire to help bring ecosystems back into balance. Balanced ecosystems will support healthier watersheds, which in turn will improve waterflows for plants and wildlife, water quality for people downstream, and recreation opportunities for visitors to the national forests. So reintroducing fire into our ecosystems through FIRE 21 is actually an essential part of the natural resources agenda.

Fuels Management

FMT: *One of the biggest challenges facing F&AM is declining forest health and the growing potential for large, destructive fires. The Forest Service has stated*

José Cruz is the Director of Fire and Aviation Management, USDA Forest Service, Washington Office, Washington, DC.

José Cruz, Director of Fire and Aviation Management for the USDA Forest Service, Washington Office, Washington, DC. Photo: Karl Perry, USDA Forest Service, Washington Office, Washington, DC, 1999.

that it intends to increase the level of fuels treatment to more than 3 million acres (1.2 million ha) per year by 2005. A report by the General Accounting Office (GAO) indicates that the problem may be bigger than initially thought. What is the Forest Service doing to prepare a comprehensive and coordinated strategy to address fuel management concerns?

Cruz: We're already working on the fuels management problem. Since 1995, we have almost tripled our fuels treatments, from around 500,000 acres (200,000 ha) to more than 1.3 million acres (530,000 ha) per year. F&AM is also developing a process, in collaboration with Forest Service fire researchers and the U.S. Department of the Interior, for mapping fire risk to determine the extent of the forest health problem. And we haven't stopped there. Shortly after the GAO report came out, we put together an interdisciplinary team led by Lyle Laverty, the Regional Forester for the Rocky Mountain Region, and cochaired by Jerry Williams, the F&AM Director for the Northern Region, to develop a comprehensive strategy for addressing the fuels management problem. We're hoping to have a draft strategy formulated in the first half of December 1999 and then present it to Congress, just as we promised we would.

FMT: *With more and more people moving into areas adjacent to our Nation's wildlands, fuel buildups*

José Cruz: A Wildland Fire Leader for the 21st Century

Since its inception in 1915 as the Division of Fire Control, the USDA Forest Service's Fire and Aviation Management (F&AM) has led the Nation in wildland fire management. Today, F&AM has some of the largest and most complex programs in the Forest Service. As Director of F&AM, José Cruz plays a central role in the wildland fire community.

Like many other Forest Service leaders, Director Cruz gravitated to the agency through a passion for the outdoors. Raised in rural southern California, Cruz learned to cherish the region's richly diverse ecosystems, from the coastal ranges to the interior deserts. While in college, Cruz spent his summers fighting fires with the Del Rosa Hotshots from their base on the San Bernardino National Forest in Del Rosa, CA. After obtaining a bachelor's degree from Humboldt State University in Arcata, CA, Cruz joined the Forest Service full-time. From 1966 to 1987, he acquired a wealth of experience in recreation, timber management, and wildland fire management on six different forests in the Pacific Southwest and Pacific Northwest Regions.

In 1987, Cruz began his rise through the agency ranks when he was named deputy forest supervisor on the Deschutes National Forest in Bend, OR. After 3 years, he was promoted to forest supervisor. In 1995, following 1-1/2 years as Deputy Director of Timber Management in the Forest Service's Washington Office, Washington, DC, Cruz became Director of F&AM for the Pacific Southwest Region in San Francisco, CA. In January 1998, he was appointed Deputy Regional Forester for State and Private Forestry in the Pacific Southwest Region. In October 1998, Cruz accepted his current position in the Washington Office as Director of F&AM.

Throughout his career, Director Cruz has won many awards for superior performance and merit. He is a longstanding member of the Society of American Foresters. Deeply committed to conserving our wildland heritage, Cruz is dedicated to working with Federal and State partners to restore the natural role of fire in wildland ecosystems, to integrate the role of fire into land management planning, and—above all—to maximize public and firefighter safety. ■

in or near the W–UI are a growing concern. What is F&AM doing to address the problem?

Cruz: In the last few years, we've placed priority on treating land adjacent to the W–UI, partly through prescribed burning. Fighting fire along the W–UI is really the most expensive part of our operation, and treating fuels there allows us to get in and put the fires out a lot more easily than if we don't do the prescribed burning and other treatments. As a result, when we do have fires, the overall costs are lower and the damages to adjacent property are fewer. We also encourage people in the W–UI, through the Firewise Program (see sidebar) and other programs, to treat fuels around their residences so that they can be more defensible should we have a fire.

FIRE 21 will help the Forest Service reach the desired future condition for our national forests by using fire management expertise to meet land management objectives.

FMT: *Some people oppose prescribed burning for fear that a prescribed fire might escape and burn adjacent property. How do we address such fears?*

Cruz: I think we need to be honest with the public. Prescribed burning is not without risk, because weather forecasts are not infallible. If unexpectedly severe fire weather occurs during a prescribed fire, it might cause it to burn outside the designated area. But if we carefully follow a well-designed plan for a prescribed burn, usually the only thing that can go wrong is the weather. We need to be honest and simply tell the public that this is always a possibility, however remote. Of course, in terms of the risk that homeowners face, a lot depends on what we do in preparing for a prescribed burn—or, for that matter, for any fire. For example, if homeowners have already thinned around their homes and otherwise made their properties firesafe, it greatly reduces the risk they face.

Workforce Issues

FMT: *As Director of F&AM, what is your most important goal for the Nation's wildland firefighters?*

Cruz: My most important goal, I would say, is that we fight fires safely. During my tenure, I don't want people getting hurt. There's really nothing out there that we protect, except for the lives of other people, that requires us to risk our lives. If we work by the rules, we should be okay. So it's important that our firefighters be properly trained so that we can fight fire safely.

FMT: *Many issues facing the Forest Service will affect the way the agency does business in the future—for example, an aging workforce and uncertain budgets. How is F&AM preparing to meet such challenges?*

Cruz: There are two things going on right now: an agencywide strategic workforce planning process directed from our national office, and strategic planning by

About the Firewise Program

The Firewise Program is designed to help people who live or vacation in fire-prone parts of the wildland–urban interface (W–UI) to reduce the risk of fire loss to themselves, their families, and their neighbors. Through mailings and a Website, the program provides extensive fire protection information, including:

- Publications and videos for ordering or downloading;
- A forum for exchanging information;
- A list of upcoming events related to fire protection in the W–UI;
- Interactive features, such as testing one's "firewise IQ";
- Materials for classroom use; and
- Links to other wildland fire resources.

The Firewise Program is sponsored by the USDA Forest Service; USDI Bureau of Indian Affairs, Bureau of Land Management, National Park Service, and U.S. Fish and Wildlife Service; National Association of State Foresters; and National Fire Protection Association. For more information, see the program's Website at <http://www.firewise.org>.

> Safety comes first—there's really nothing out there that we protect as firefighters, except for the lives of other people, that requires us to risk our lives.

our regional F&AM directors to help determine what direction our fire organization will take in the future. At both levels, one of the key things we'll be examining is the workforce issue. We'll be asking what our priorities should be in terms of our future activities, and we've already identified fuels management as a central priority. Certainly, replacing our aging workforce will emerge as another top priority.

FMT: *What is the Forest Service doing to build its firefighter workforce?*

Cruz: We have an apprenticeship program that just this year became national. It's being managed for us by Ray Quintanar, the F&AM Director for the Pacific Southwest Region. We're training 50 to 100 people per year to come into the Federal fire program. We've had very good success with the program, and all of the Forest Service regions are now putting people into it. The big problem we've had with the program is that the graduates are so good that a lot of other agencies are picking them up. So the Forest Service is losing a lot of highly qualified people after they go through the program. But that benefits the Nation's fire service as a whole, so we're just going to plug more people into the program as long as it proves so beneficial.

Budget Priorities

FMT: *Let's turn to the budget issue. How do you see F&AM budgets developing over the next few years?*

Cruz: You know, fire has really fared better than a lot of other programs in terms of funding. Each year, we've received a nominal increase in overall funding. In fuels management in particular, we've had a substantial increase—from $8 million to $70 million in just a few years. So the fire budget has really done pretty well. What has hurt us is not so much a declining budget as the loss of Forest Service people in other parts of the organization who used to be available to help us fight fires. At one time, we had brush disposal crews, recreation crews, timber stand improvement crews—all of those are gone now. So we've had to rely on our cooperators a lot sooner than in previous years, primarily because Forest Service people just aren't available. The fire organization is still intact, but we've lost a lot of the other people in the Forest Service who used to provide support.

FMT: *Are cooperators filling the gap?*

Cruz: We are indeed getting a lot of help from our partners. If anything, our cooperators are concerned that we're not providing enough of our own people to fight our own fires. But we have very good working relationships with our partners. We have a lot of agreements that help us get our job done, so overall we're doing very well.

FMT: *So you think fire preparedness will be pretty well covered in coming years in terms of staffing and funding?*

Cruz: One of the things our regional F&AM directors did this

Redding Hotshots on a 1990 fire on the Wenatchee National Forest, WA. The Forest Service's Fire and Aviation Management has a California-based national training program to help build the Nation's firefighter workforce. Photo: USDA Forest Service, Washington Office, Washington, DC, 1990.

year is to decide what our number one priority is for our fire organization. What we said is that we really need to maintain our initial-attack capability as our number one priority. So if we get reductions in funding, we will make sure that our initial-attack force does not suffer—it's the most important and successful part of our organization in keeping fires small. And if there's additional money, it will probably go into our initial-attack organization.

Aviation

FMT: *Aviation is one of the largest cost centers for F&AM but also one of its most versatile tools for wildland fire management. What major challenges does the aviation program face?*

Cruz: I think that keeping aviation resources equivalent to what we have now, given rising equipment prices and budget constraints, will be a major challenge for us in the years ahead. We'll probably have to look at new equipment to replace some of the older equipment that will soon wear out or for which we can't find replacement parts. I see the use of type 1 helicopters increasing. They are very effective at providing quick turnaround with water or retardant, giving us more flexibility in targeting specific areas on a fire. Of course, they're basically a tool we use to supplement retardant drops by our large airtankers, which we'll continue to need. The single-engine airtankers used extensively by some States are very effective in certain situations. In fact, we use them as a part of our cooperative ventures with the States.

The number one priority for our fire organization will be to maintain our initial-attack capability, the most important and successful part of our organization in keeping fires small.

An S–64 type 1 helicopter refilling a bucket for a water drop on a wildland fire. Aerial resources are some of the Forest Service's most versatile tools for wildland fire suppression. Photo: Bob Nichols, U.S. Department of Agriculture, Washington, DC, 1994.

The use of type 1 helicopters will increase to give us a quicker turnaround with water or retardant on fires.

FMT: *The 1990 National Shared Forces Task Force Report recommended undertaking a number of national studies. Two of them, the Aerial Delivered Firefighter Study (ADFFS) and Tactical Aerial Resource Management Study (TARMS), are nearing completion. How effective have these studies been in light of some of the budget constraints affecting F&AM?*

Cruz: Most of the national shared forces studies we do are fine studies, but they're not always integrated with the rest of the organization. In other words, if it's going to cost more to field more aircraft, then what are we going to give up if our budget doesn't increase? We made a decision to finish the ADFFS, and its recommendations were recently presented to the F&AM directors. We have a management options team looking at what we can implement from that study to help us do a better job overall. The same thing applies to TARMS—we have a team looking at that study, too. The first thing I asked when that study came out is, "What part of the aviation program are you going to give up in order to implement this part of the aviation program?" I think we need to examine options and make decisions in an integrated way instead of concentrating on just one part of the organization.

Cooperative Fire Management

FMT: *F&AM has a history of strong cooperation with the State Foresters. How effective is the partnership today? Do you see any signs of change in that relationship over the next decade or so?*

Cruz: You know, that relationship is a great relationship. One of the things I've tried to do this year—during my first year here as Director of F&AM—is to get out to all the regions and visit as many State Foresters as possible to discuss things we do that affect them. I've had a lot of good conversations with the State Foresters. I also participate on the National Association of State Foresters (NASF) Fire Committee. We've invited NASF to participate in some of the reviews we're doing—for example, we have a NASF representative participating in our national wildland fire review. And we have other activities going on where we've invited NASF to participate and comment on how we operate. So I believe the relationship is very good and will stay that way for many years to come. The other thing that's really important is that we've been able to give more money through the Cooperative Fire Protection Program to help the State Foresters achieve their goals. For example, our funding for the Volunteers in Fire Prevention program doubled from $2 million to $4 million.

FMT: *As you know, Smokey Bear has been accused of being "too good at his job," of allowing fuel buildups to become a major threat to our wildland resources. Does Smokey still have a role to play?*

Cruz: Smokey is alive and well and plays a very substantial role in conveying messages of fire prevention to kids. He needs to stay with

Smokey Bear posing with a young friend on the Dorr Skeels Recreation Area, Kootenai National Forest, MT. Smokey will continue delivering his fire prevention message, especially to children. Photo: USDA Forest Service, Washington Office, Washington, DC, 1992.

Smokey Bear will continue to play a substantial role in conveying the message of wildland fire prevention to children.

us. In terms of the exclusion of fire from certain management areas, those were management decisions that Smokey had nothing to do with. As I see it, Smokey has done his job and will continue to do his job to help us get our job done.

FMT: What about the role of wildland fire prevention in general?

Cruz: Our fire prevention program has proven very effective, especially in times of severe fire weather. In fact, a recent article in *Fire Management Today** showed without question how our fire prevention/education teams more than pay their own way in reducing the potential for catastrophic wildland fire. In Texas, for example, fires were soaring in number, but when a fire prevention team came in, the numbers plummeted. It's just fantastic, and everyone is on the bandwagon now: Whenever you have severe fire weather, the thing to do is to bring in teams to help get the message out to the public. It cuts down all kinds of human-caused fires, because people are more aware of what's going on—and it pays for itself. So I think we're going to have to look at our prevention program nationwide to see what we need to do to beef it up. Typically, prevention is the first to go whenever you get budget cuts. But now that this analysis has showed the cost-effectiveness of fire prevention, we'll need to look carefully to see if we don't need to keep more of that part of our organization.

International Cooperation

FMT: *One of the least well-known F&AM programs is international fire assistance. You receive many requests each year from all over the world to provide technical assistance in assessing fire potential and to assist countries in developing fire management programs. How do you decide which assistance requests to support?*

Cruz: A lot of requests for international fire assistance come through other agencies and organizations that do international work, such as the U.S. Agency for International Development and the World Bank. They seek our expertise and pay for our services. We provide some of the funding, but most of it comes from them. We also work through the Forest Service's own International Forestry programs. In addition, F&AM has its own strategic workplan for international fire assistance. Right now, Mexico is our highest priority. Following the disastrous 1998 wildland fire season in Mexico,** we worked with the U.S. Department of the Interior and fire and emergency officials from Mexico to provide assistance in developing fire training and leadership courses for Mexico's wildland fire managers.

FMT: *Do you see F&AM's international cooperation expanding in the next decade or so?*

Cruz: Yes, I do. I think it's a growing program. It's just a matter of how much funding we can get to support it. Certainly, the wildland fire expertise that we have in the Forest Service is in great demand all over the world.

FMT: *One last question: What is the one thing you would want all Forest Service employees to know about you and your role in F&AM as Director?*

Cruz: That I've been in their shoes, that I understand their concerns, and that whatever we do, we're going to do it safely. ■

* See Judith K. Kissinger, "Interagency Teams Prevent Fires From Alaska to Florida." (*Fire Management Notes* 59(4): 13–17).

** For a discussion of wildland fire in Mexico, including the 1998 fire season, see Dante Arturo Rodríguez-Trejo, "A Look at Wildland Fires in Mexico." (*Fire Management Notes* 59(3): 15–23).

Fire Management Leadership in the 21st Century*

Tom L. Thompson

More than 40 years ago, I was enticed into forestry by a *National Geographic* article (Kenney 1956) with fascinating images of smokejumpers, fire towers, firefighters, a tote goat (a motorized scooter for hauling supplies), and Smokey Bear. How simple wildland fire management seemed back then!

Today, the issues we face are so complex that they are impossible to circumscribe with a few images and themes. Differences between regions and, to some extent, among our various agencies—with their different missions and perspectives—render our task all the more difficult. And yet, as wildland fire managers, we share a common responsibility for working together. That's why we come together in places such as the National Advanced Resource Training Center (NARTC) in Marana, AZ, to strengthen our leadership in wildland fire management.

In this article, I address three issues critical to wildland fire managers:

1. The need for strong fire management leadership;
2. The key components of fire management leadership; and
3. The expectations that an accountable fire management leader must meet.

> We lead by our attitude, by our responses to authority, by the words we speak, and by the example we set.

Building Leadership

As individuals, resource managers, and members of groups who are trying to work together better, we all understand the need for building our fire management leadership. So do the people who work on the fireline and who depend upon our leadership decisions and support. Good leadership is also vital to the many millions of taxpayers, water users, wildland–urban interface residents, and visitors to the forests, refuges,

The Mescalero Hotshots from New Mexico preparing to fight the 1994 Star Gulch Fire on the Boise National Forest, ID. Collaboration across agencies and regions is the common responsibility of fire management leaders. Photo: USDA Forest Service, Washington Office, Washington, DC.

Tom Thompson is the Deputy Regional Forester, Rocky Mountain Region, USDA Forest Service, Lakewood, CO.

* This article is based on the author's opening comments at the fire management leadership training session on March 7–12, 1999, at the National Advanced Resource Training Center, Marana, AZ.

parks, and other public wildlands across our Nation. Indeed, never before has wildland fire management been so important in the national scheme. Never before have so many been aware of, or affected by, our resource management decisions. Hardly a day goes by without a media report on the issues that we face in wildland fire management.

Perhaps never before have we seen so much interest in what is happening on our public lands. In recent years, the focus on forest health, on financial and budgetary issues, and on a host of associated legislative and political concerns has drawn unprecedented congressional attention and involvement by the administration. Our publics are voicing their concerns at the local, regional, and national level far more effectively than ever before. The scientific and professional journals are full of discussions about the dilemmas we face today in wildland fire management.

More than ever, we can see how wildland fire management connects the various disciplines and program areas we work with. Fire is no longer just a functional piece of what we do—a backcountry concern far removed from anyone who really cares, or perhaps a summer affair for fire departments to deal with. Today, in one way or another, fire figures into everything we do as land management agencies. No longer can we afford for our fire programs, budgets, and organizations to be entities unto themselves. Fire has become the essence of much of our existence as land management agencies.

Today, in one way or another, fire figures into everything we do as land management agencies.

Over the past decade, we've begun to see the consequences of failing to work with fire as an important management tool. Most of us in wildland resource management believe that we're at a major turning point, although it remains to be seen whether we will be permitted—or even able—to fully turn in the needed direction. Hopeful signs include a growing national emphasis on budgetary concerns and on finding ways to protect "acres at risk." Fortunately, the principle of managing fire for resource benefits now seems to be understood and to some extent supported. Implications include closely linking our fire management plans with our land use plans, wilderness plans, recreation plans, watershed plans, forest health plans, and other resource management plans.

The past decade has also shown our limitations and vulnerability in dealing with wildland fire, a lesson we must never forget. Safety must be our highest priority and our primary obligation as leaders in wildland fire management. In view of recent efforts to reform our policy, training, and oversight, we are hopefully moving toward a new awareness of the importance of fire safety.

Our desire for a science-based resource management also tests our leadership. A glance at history can help us understand what has and hasn't changed. To illustrate, I refer to Gifford Pinchot, the first Chief of the USDA Forest Service, who published an article in *National Geographic* more than 100 years ago under the title "The Relation of Forests and Forest

Site of a May 1995 prescribed fire for turkey brood habitat on the George Washington and Jefferson National Forests in Virginia. Land management agencies are increasingly managing fire for resource benefits. Photo: Steven Q. Croy, USDA Forest Service, George Washington and Jefferson National Forests, Roanoke, VA, 1995.

We are only now relearning the need to have a sound land management policy on a thorough understanding of fire's ecological role.

Gifford Pinchot on the Role of Wildland Fire

[…] The study of forest fires as modifiers of the composition and mode of life of the forest is as yet in its earliest stages. Remarkably little attention, in view of the importance of the subject, has hitherto been accorded to it. A few observers who have lived much with the forest, such as John Muir of California, have grouped fire with temperature and moisture as one of the great factors which govern the distribution and character of forest growth; but so little has been said or written upon the subject that the opinion of each man seems to have been reached independently and upon the single basis of personal observation. […] It is unfortunate that our acquaintance with what might almost be called the creative action of forest fires should be so meager, for only through a knowledge of this relation and through the insight which such knowledge brings can there be gained a clear and full conception of how and why fires do harm, and how best they may be prevented or extinguished. […]

–Gifford Pinchot, "The Relation of Forests and Forest Fires," 1899

Fires" (Pinchot 1899). In his article (see the excerpt in the sidebar), Pinchot regrets the "meager" contemporary understanding of "what might be called the creative action of forest fires" in establishing and maintaining wildland ecosystems. "For only through a knowledge of this relation and through the insight which such knowledge brings," he observed, "can there be gained a clear and full conception of how and why fires do harm and how best they may be prevented or extinguished."

Pinchot's insight reflects something we are only now relearning—the need to base a sound wildland fire management policy on a thorough understanding of fire's ecological role. In his article, Pinchot provided a number of examples documented with photos from the Black Hills in South Dakota, the Priest River in Idaho, and the Olympic Peninsula in western Washington. He addressed many of the same issues we still face. Despite vast advances in information and science over the past 100 years, we seem to have more questions than ever. Today, the problem is often not the science, but rather the policies, the politics, and—yes—the leadership. Albert Einstein once said, "Perfection of means and confusion of goals seems, in my opinion, to characterize our age." We have lots of science and the capability to do almost anything, but we are impeded by a confusion of goals.

In the past 5 years, a series of reviews and reports have pinpointed weaknesses in the organizational environment for wildland fire management, including shrinking workforces, fewer skills, and experience concentrated in fewer people. As our experienced people leave, the fire-related experience and interest among the

Hand crew preparing for initial attack in the Interior West. At a time of shrinking workforces, our leadership must encourage the general workforce to become trained, qualified, and available to support wildland fire management. Photo: Ravi Miro Fry, USDA Forest Service, Boise National Forest, Boise, ID.

remaining employees from all of our agencies continues to decline. With fewer red-carded employees, we are having growing difficulty finding overhead and even firefighters in July or August. Our line officers have less experience and interest in fire. They lack a commitment to fire and are not comfortable with, or experienced in, safety leadership. Other priorities drive a lot of their work. Moreover, they are unprepared or inadequately trained to provide effective direction that reflects the long-term integrated-stewardship view of where we are headed. Unit managers emphasize other functional programs ahead of fire. Line officers who do poorly face few adverse consequences, and those who do well enjoy few rewards. In a nutshell, our leadership is not providing strong enough direction or commitment to encourage the general workforce to become trained, qualified, and available to support wildland fire management.

Our areas of weakness indicate where we should concentrate much of our leadership energy. In brief, we want:

- Adequate support for wildland fire activities;
- Careful attention to safety;
- A workforce that understands the connections among wildland fire, fire-related jobs, good science, and ecosystem stewardship;
- Line officers who understand their role and responsibilities, with regard to both safety and cost-effective fire programs;
- Top management that holds line officers accountable;
- Managers with the skills, experience, and qualifications necessary to get the job done; and
- Better recognition of good leaders and help for those who need it.

The one consistent recommendation made in recent reviews is that we should strengthen the abilities and skills of our line officers and leaders through formal training, experience, and—where necessary—direct oversight.

Components of Fire Management Leadership

Leadership is an interesting word. Bennis and Nanus (1997) describe it as the "capacity to translate intention into reality and sustain it." A lot has been written about leadership, although too often we use the word without thinking. Each of us should take a few moments to consider the importance of leadership and what it means to us. We should try to identify our biggest challenges as leaders, acknowledging our strengths and weaknesses.

To lead, you must understand the basics of your program, including the issues and roles that it entails. At NARTC, the leadership course is designed to provide this basic kind of information for the wildland fire program, offering everything a leader needs to know in order to meet basic leadership responsibilities in wildland fire management.

But there's more to leadership than just the basics. As Roy Lessin (1998) writes, "Leadership is not a job title, it is a characteristic of life. We lead by our attitude, by our responses to authority, by the words we speak, and by the example we set. With a vision for the future and a heart for people,

Common Characteristics of Good Leaders

Kouzes and Posner (1993) identify a number of behaviors associated with leadership. According to their followers, good leaders:

- Supported me,
- Had the courage to do the right thing,
- Challenged me,
- Developed and acted as a mentor to others,
- Listened,
- Celebrated good work,
- Followed through on commitments,
- Trusted me,
- Empowered me,
- Made time for people,
- Shared a vision,
- Opened doors,
- Overcame personal hardship,
- Admitted mistakes,
- Advised others,
- Solved problems creatively, and
- Taught well.

Credible leaders, according to Kouzes and Posner, have people under them who:

- Are proud to tell others they are part of the organization,
- Feel a strong sense of team spirit,
- See their own personal values as consistent with those of the organization,
- Feel attached and committed to the organization, and
- Have a sense of ownership for the organization.

You, through your commitment and leadership, will guide the people in our organizations to use and to manage wildland fire as part of our natural systems.

leaders can motivate and inspire others to action. A leader is someone who others want to follow, a good leader is someone who is worth following."

In *Savvy Sayin's* (Alstad 1986), there's a quote I like to remember: "If you're out ahead of the herd, it pays to look back occasionally to see if they're still coming." I think that says a lot about leadership. If you look back and nobody's coming, you're probably not doing the job. Leadership means being out ahead, but it also means that people will follow. Ultimately, that is the real test of a leader—whether or not people will choose to follow.

What are some of the most common characteristics of good leaders? In their highly commendable book *Credibility*, Kouzes and Posner (1993) tell how leaders gain and lose credibility and why people demand it (see sidebar). Leadership, according to Kouzes and Posner, is "not a position, not a skill, but a relationship." Leaders are admired by others; they are valued, motivated, enthusiastic, challenged, inspired, capable, supported, powerful, respected, and proud. Great leaders put principles ahead of politics, looking out for the interests of others rather than their own self-interest. A crucial point to remember is that leadership takes time. As busy as our everyday work keeps us, it's easy to forget to take the necessary time to lead. In his book *Margin*, Richard Swenson (1992) describes how modern pressures can devour the "margin" we need to build leadership. "If you are homeless, we direct you to a shelter," writes Swenson. "If you are penniless, we offer you food stamps. If you are breathless, we connect oxygen. But if you are marginless, we give you yet one more thing to do….Marginless is the baby crying and the phone ringing at the same time, and Margin is grandma taking the baby for the afternoon….Marginless is the disease of the 1990's and Margin is the cure."

Especially in coming years, we will need extra margin in wildland fire management. As leaders, we must make sure that we do not deprive ourselves and others of the margin we need to perform effectively. Unless we find time to devote to leading, we will be consumed by other things that momentarily seem more important. Leaders in wildland fire management need to be engaged year round; it is not enough just to show up for the prescribed burn or to interface with the type 1 team. Take time all year long to build relationships, to let your people know you care about them and appreciate what they are doing. And don't forget to recognize their achievements. As Tom Peters (1985) puts it, "Celebrate what you want to see more of."

Perhaps the most important leadership principles are the most basic:

- Understand the program,
- Know what you believe and stand for,
- Carefully reflect on how best to lead,
- Take the time to lead, and
- Believe that you can meet the challenges of leadership.

Today, more than ever, we expect people throughout our organizations to meet much of the leadership challenge. I call that "leading from where you are at." Certainly, there is much to be done, especially in today's world, and we all share a responsibility for getting it done. But leadership is based on good relationships; if, in our busy workaday lives, we forget the importance of building and maintaining relationships, we will fail to make long-term, sustainable achievements. As leaders, we must set the example. Albert Schweitzer once said, "Example is not the main thing in influencing others, it's the only thing."

Leadership Expectations

What is expected of you today as a leader in wildland fire management? Obtaining a certificate from a leadership training course at NARTC is only a start. It's up to you and other leaders across the country—whether as agency administrators, local unit managers, staff leaders, or line officers—to lead our agencies and our departments in the years ahead. You, by your example, will ensure that safety is the first priority on every project and on every fire, every time. You, through your commitment and leadership, will guide the people in our organizations to use and to manage wildland fire as part of our natural

What Is Expected of You as a Fire Management Leader?

At every level of leadership, we must all work together to implement the policies adopted in the 1995 Federal Wildland Fire Management Policy and Program Review. As a fire management leader, it's up to you to guide, encourage, support, and help the people in our fire organizations to use and to manage fire by:

- Encouraging others to step forward and get involved,
- Asking the tough questions,
- Getting involved and being visible yourself,
- Understanding your role and responsibilities,
- Knowing what's happening, and
- Seeing the big picture.

You can help others see fire as an important management tool and as part of the ecological framework of our natural systems by:

- Working to ensure that others see fire as an integral part of everyone's business;
- Helping fire people see the fire program as part of everyone else's business and not as a separate, independent program;
- Including consideration of fire in ongoing planning processes;
- Helping our publics, through your involvement and encouragement, to understand the role of fire; and
- Communicating the role of wildland fire management on our public lands.

Most importantly, it's up to you, by your example and leadership, to make safety our first priority on every fire, at every opportunity, every time.

A crew boss discussing plans with his crew on the 1985 Schoolhouse Fire, Pisgah National Forest, NC. Fire management leadership is based on good relationships. Photo: USDA Forest Service, Washington Office, Washington, DC, 1985.

systems. You and all of us, at every level of leadership, must work together to implement the plans, actions, and policies outlined in the 1995 Federal Wildland Fire Management Policy and Program Review.

It won't happen without your leadership—without your energy, commitment, time, and attention. But with your leadership, it can and will happen. Are you ready to help your organization promote a new generation of fire that influences landscapes and affects a broad range of people in a positive way? Are you ready to build the needed public support? Are you ready to listen, learn, and lead, ensuring that there are leaders behind you in the decades to come? Most importantly, are you ready to ensure that safety remains our first priority? Leading our wildland fire management into the next millennium is ultimately up to you.

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Twenty Myths About Wildland Fire History*

Stephen W. Barrett

Over the past 20 years, I have studied fire history in every forest type in the northern Rocky Mountains. Despite an ever-growing wealth of knowledge on the subject, foresters and the public alike often hold deep-seated misconceptions about wildland fire history. Shown below in the style made famous by television's David Letterman—that is, in ascending order of importance—are 20 of the most insidious myths about wildland fire history. Some pertain specifically to the northern Rockies, others to the Western United States as a whole. A brief discussion follows each.

Myth 20. *In lodgepole pine, stand-replacing fires average every 150 years.*

Actually, fire regimes in lodgepole pine show some of the widest variation in any forest type. Historical fire regimes in lodgepole pine ranged from low-severity fires averaging every 25 years (for example, in Montana's Bitterroot Valley) to high-severity fires every few centuries (for example, after more than 300 years in Yellowstone National Park).

Myth 19. *In ponderosa pine, nonlethal fires averaged every 10 years before 1900.*

This rule of thumb is too simplistic. On dry sites, nonlethal underburns certainly occurred every 5 to 15 years. But mixed-severity fires also occurred every 20 to 40 years in moist stands of ponderosa pine, western larch, and Douglas-fir.

> Wildland fire severities have often increased beyond the historical range of variability, causing both incremental and sudden loss of old growth.

Myth 18. *A 15-year mean fire interval derived from a ponderosa pine stand is highly accurate.*

The estimate is likely too conservative, because light surface fires often fail to scar trees.

Myth 17. *The terms "stand-replacing fire" and "crown fire" are synonymous.*

Although crown fires are indeed stand-replacing fires, not all stand-replacing fires are crown fires. Severe surface fires can destroy a stand without ever entering the canopy.

Myth 16. *"Fuel buildup" refers to downed woody material.*

This myth is widespread in the general public. Fuel includes not only downed woody material, but also living plants—often as ladder fuels. And *plenty* of such fuels accumulated during the fire exclusion era.

Myth 15. *Historically, most fires in the Rocky Mountains were of short duration and tended to remain local events.*

Before 1900, unhindered fires could easily burn for months, ending far from their points of origin.

Myth 14. *Because many wildland fires have occurred during this century, western forests must still be natural.*

Many fires have indeed occurred in some areas, including "prescribed natural fires"** in parks and wilderness. But fire frequency has nevertheless declined in many areas. As a result, wildland fire sizes and severities are occurring outside the historical range of variability.

Myth 13. *Recent fires burning in a "mosaic" pattern must have been natural.*

It's true that not all modern fires have been "crown fires." But that misses the point. Fire severities have often increased beyond the historical range of variability, causing both incremental and sudden loss of old growth, in addition to other unnatural habitat changes.

Myth 12. *Because many dry ponderosa pine stands are still relatively open (that is, lightly*

Steve Barrett is a consulting fire ecologist in Kalispell, MT.

* This article is based on a presentation the author has made to USDA Forest Service managers and line officers.

** The term "prescribed natural fire" has been replaced by the term "wildland fire use."

stocked), they're still in the nonlethal fire regime.

Fuel buildups can be deceiving. Marked increases in litter and duff at the bases of old trees can promote lethal surface fires, uncommon before 1900.

Myth 11. *American Indian fires couldn't possibly have affected much land, because tribal populations were low and ignitions were probably rare and accidental.*

Although tribal populations were indeed relatively low (especially after depopulation through introduced diseases), just a few people can cause a lot of burned acreage. In fact, American Indians commonly and often skillfully used fire for many purposes, such as improving wildlife habitat, influencing game movements, enhancing browse for horses, stimulating plant growth for food and medicine, facilitating hunting and gathering, clearing trails and campsites, communicating across long distances, and waging war. In many mountain valleys and on the plains, Indian fires were apparently as important as lightning fires—perhaps even more so—in shaping and maintaining ecosystems.

Myth 10. *Human-caused fires in wilderness aren't natural.*

That's a belief rooted in modern philosophy but without a basis in historical or ecological reality. American Indians didn't hesitate to burn whenever and wherever it suited their needs. As a result, many ecosystems evolved with frequent human-caused fires.

Myth 9. *Spring burning isn't natural.*

Not all stand-replacing fires are crown fires—severe surface fires can destroy a stand without ever entering the canopy.

Spring fires certainly were historically less common than late-season burns. But a fire is natural whenever fuels are receptive to fire and ignition occurs.

Myth 8. *Lightning alone is enough to restore fire's natural role in wilderness areas.*

If all lightning fires were allowed to burn unhindered, they would largely restore a natural fire frequency. But fire *severity* is another matter entirely. Long-term fire exclusion has built up fuels in many wilderness areas to the point where fire severity is beyond the historical range of variability. Such fires can radically alter ecosystems for centuries. Still, to protect human lives and infrastructure, managers often can't allow free-ranging fires, even in wilderness.

Myth 7. *On nonwilderness lands, prescribed fire alone can restore forests.*

In many locales, thanks to past management practices, the "horse is already out of the barn"—greatly increased tree densities are promoting more severe fires. Thus, logging and prescribed fire will likely both be necessary to restore a semblance of past stand structures.

Myth 6. *The terms "fire exclusion" and "fire suppression" are synonymous.*

The term "fire suppression" is narrower than the term "fire exclusion." Fire suppression refers to activities associated with extinguishing fires, which became highly effective in the Western United States only after about 1940. But fire exclusion predates fire suppression by a half century or more. In many parts of the West, fire exclusion began with the cessation of traditional Indian burning in the late 1800's, followed by heavy livestock grazing, agriculture, and other settlement activities. Many areas have thus experienced more than a century of effective fire exclusion.

Myth 5. *Fire exclusion really hasn't been very effective or very long term.*

Actually, fire exclusion has quite a long history in many locales, especially where grazing has occurred. Studies in southwestern Montana, for example, have documented a 90-percent reduction in annual burned area since the late 1800's. Least affected are forests under a long-interval, stand-replacing fire regime, about 20 percent of the forests in the northern Rockies.

Myth 4. *Fire ecologists are like Chicken Little, warning of impending holocausts such as the Great 1910 Burn.*

Professionals are simply pointing out the indisputable truth that many fires in recent decades have increased in size and severity relative to their historical range of variability. That might be alarming, but it's not the same as saying that catastrophic crown fires are coming.

Long before European settlement, unhindered fires could burn for months and end far from their points of origin.

Myth 3. *Fire history studies are irrelevant vignettes, because the timespan of 300 to 500 years recorded in tree rings is far too short to be meaningful.*

Actually, 300 to 500 years of fire history, especially if assembled from many locales, are sufficient because most forests have a lifespan of 500 years or less. Moreover, I would argue that the relatively recent past is much more relevant to wildland managers today than data from inherently vague and scarce paleoecology studies (such as on bogs).

Myth 2. *Presettlement fire regimes are irrelevant, because climate and fire patterns are always changing.*

Despite climatic shifts over the past five centuries, most fire regimes have remained relatively stable. Moreover, the climate between 1500 and 1900 included every variation we're likely to see in the foreseeable future.

Myth 1. *There's no need to keep studying fire history, because we've already got enough data.*

Despite numerous attempts to classify fire regimes (such as in the Interior Columbia Basin Ecosystem Management Project), we've only just begun to understand historical and current fire regimes. And there's simply no substitute for local information, particularly when documenting a possible history of fire exclusion in a given area. ■

A surface fire in an open stand of ponderosa pine. Because light surface fires often fail to scar trees, the 15-year fire interval widely attributed to dry ponderosa pine forest is sometimes too conservative. Photo: Paul S. Fieldhouse, USDA Forest Service, Missoula Smokejumper Base, Missoula, MT.

How To Build a Fire Exclusion Map

Stephen W. Barrett and John C. Ingebretson

Fire ecologists often use stand origin maps in interpreting fire history (Heinselman 1973; Tande 1979; Romme 1982; Barrett et al. 1991; Barrett 1994). Such maps reveal stand structures, stand and landscape fire patterns, the presence of old growth, and other key information. However, managers often find stand origin maps too detailed or abstract for easy use.

In 1997, during a study on the Flathead National Forest in northwestern Montana (Barrett 1998), we sought to develop a more user-friendly product. Rather than mapping stand origins, we developed a map integrating two fire frequency variables: mean fire interval (MFI) and years since last fire (Romme 1980). The goal was to portray the effects of fire exclusion at the stand and landscape scales, which is potentially more useful than merely labeling stand origins. The fire exclusion map is also easier, faster, and less expensive to develop than intensive modeling based on statistical analysis (Brown et al. 1994).

The Mapping Process

Building a fire exclusion map requires three steps:

1. Documenting historical fire regimes,
2. Mapping the most recent fires, and
3. Calculating a fire exclusion factor.

Steve Barrett is a consulting research forester in Kalispell, MT; and John Ingebretson is a fuels specialist for the USDA Forest Service, Flathead National Forest, Swan Lake Ranger District, Bigfork, MT.

Managers can use fire exclusion maps to assess fire hazard risk, identify potential insect and disease outbreaks, and pinpoint old growth and fire regimes at risk.

Documenting Historical Fire Regimes. Determining historical fire regimes is fundamental to interpreting fire history (Agee 1993). Our study area (fig. 1) covered 6,000 acres (2,500 ha) next to Flathead Lake, a high-value recreation corridor with a burgeoning wildland–urban interface. Because of the area's importance, we decided to sample fire history (Arno and Sneck 1977; Barrett and Arno 1988) rather than extrapolate from coarse-filter models. We found three historical fire regimes (fig. 2):

- ***Nonlethal.*** On 11 percent of the area, at low elevations on dry sites dominated by grasses, shrubs, and scattered ponderosa pine (*Pinus ponderosa*), nonlethal fires averaged about every 20 years during the presettlement era.
- ***Mixed-severity (MS) I.*** On 38 percent of the area, in warm-moist stands dominated by ponderosa pine, western larch

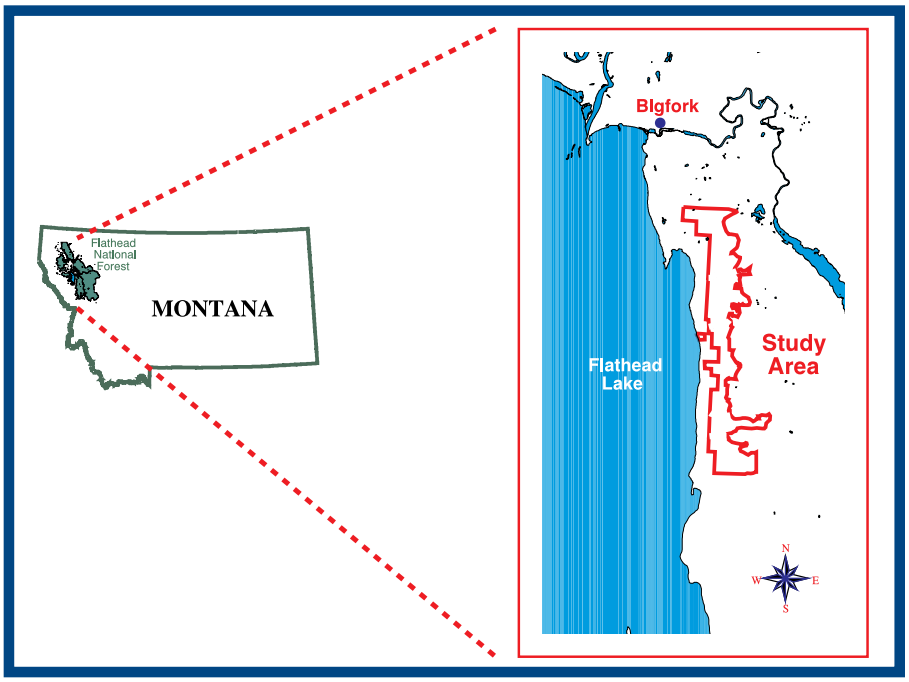

Figure 1—*Fire history study area, next to Flathead Lake on the Flathead National Forest in northwestern Montana.*

The fire exclusion map is easier, faster, and less expensive to develop than intensive modeling based on statistical analysis.

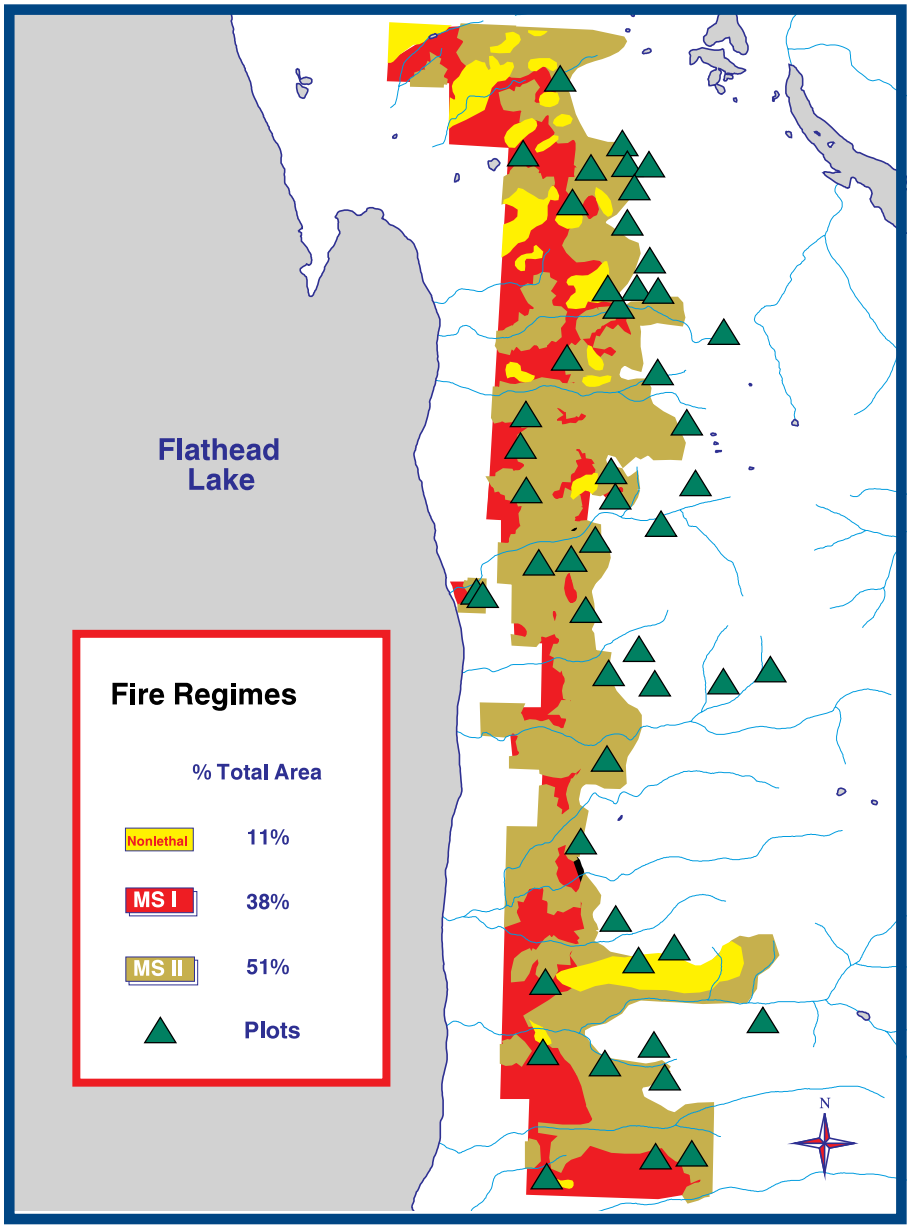

Figure 2—*Fire regimes and plots in the study area. Nonlethal = high-frequency, low-severity fires on dry sites dominated by ponderosa pine; Mixed Severity (MS) I = moderate- to high-frequency and low- to moderate-severity fires on warm-moist sites dominated by ponderosa pine, western larch, and Douglas-fir; MS II = moderate- to low-frequency and moderate- to high-severity fires on cool-moist sites dominated by western larch, lodgepole pine, and Douglas-fir.*

(*Larix occidentalis*), and Douglas-fir (*Pseudotsuga menziesii*), mixed-severity fires averaged about every 30 years.

- ***MS II.*** On 51 percent of the area, in cool-moist stands dominated by western larch, lodgepole pine (*Pinus contorta*), and Douglas-fir, mixed-severity fires averaged about every 80 years, burning more severely than in the warm-moist stands.

If site-specific sampling is not feasible (for example, due to funding constraints), fire regimes can sometimes be modeled. Although such modeling is more error prone, classifications such as "fire groups" (Davis et al. 1980; Fischer and Clayton 1983; Crane and Fischer 1986; Bradley et al. 1992a; Bradley et al. 1992b; Smith and Fischer 1997; Morgan et al. 1998) can be used to estimate MFI's and fire severities. Whether sampling or modeling, the mapmaker should use a geographic information system to extrapolate the area of the historical fire regimes, based on major environmental parameters such as potential vegetation groups (see, for example, Barrett and Arno 1991; Quigley et al. 1996).

Mapping the Most Recent Fires. The next step is to determine the number of years since the last fire. Ranger districts often have fire atlas maps showing the approximate boundaries of fires that occurred after 1900. If there are no such data or if no fires occurred during the past century, then the area must be sampled—that is, fire scars and seral age classes must be used to estimate the years of the most recent fires (Arno and Sneck 1977; Barrett and Arno 1988).

Sample plot density must be based on the complexity of the forest mosaic. Comparatively few plots are needed in areas prone to large, high-severity fires, because the fire boundaries are often readily visible on aerial photographs. Higher plot densities are needed in terrain prone to nonlethal and mixed-severity fires, because such burning produces complex forest mosaics.

In our study area, we sampled 50 plots at well-dispersed locations (fig. 2). The fire atlas revealed just one fire since 1900 (in 1920); plot data showed that most stands had not burned since sometime between 1805 and 1893. We used the plot data together with aerial photographs to map approximate fire perimeters (fig. 3). For burns that occurred within a relatively short timeframe (for example, from 1908 to 1920), we grouped the stands together. Such grouping is acceptable because higher resolution mapping would not yield correspondingly better information for planning.

After grouping, we derived seven fire periods for the entire study area (two single years and five multiyear intervals representing grouped stands—see figure 3). For grouped stands, we calculated the midpoint within the interval of fire years (for example, the midpoint in the interval 1893–1920 is 1914). Based on the two single fire years, the five interval midpoints, and the year of the study (1997), we determined the number of years since the last fire for each part of the study area.

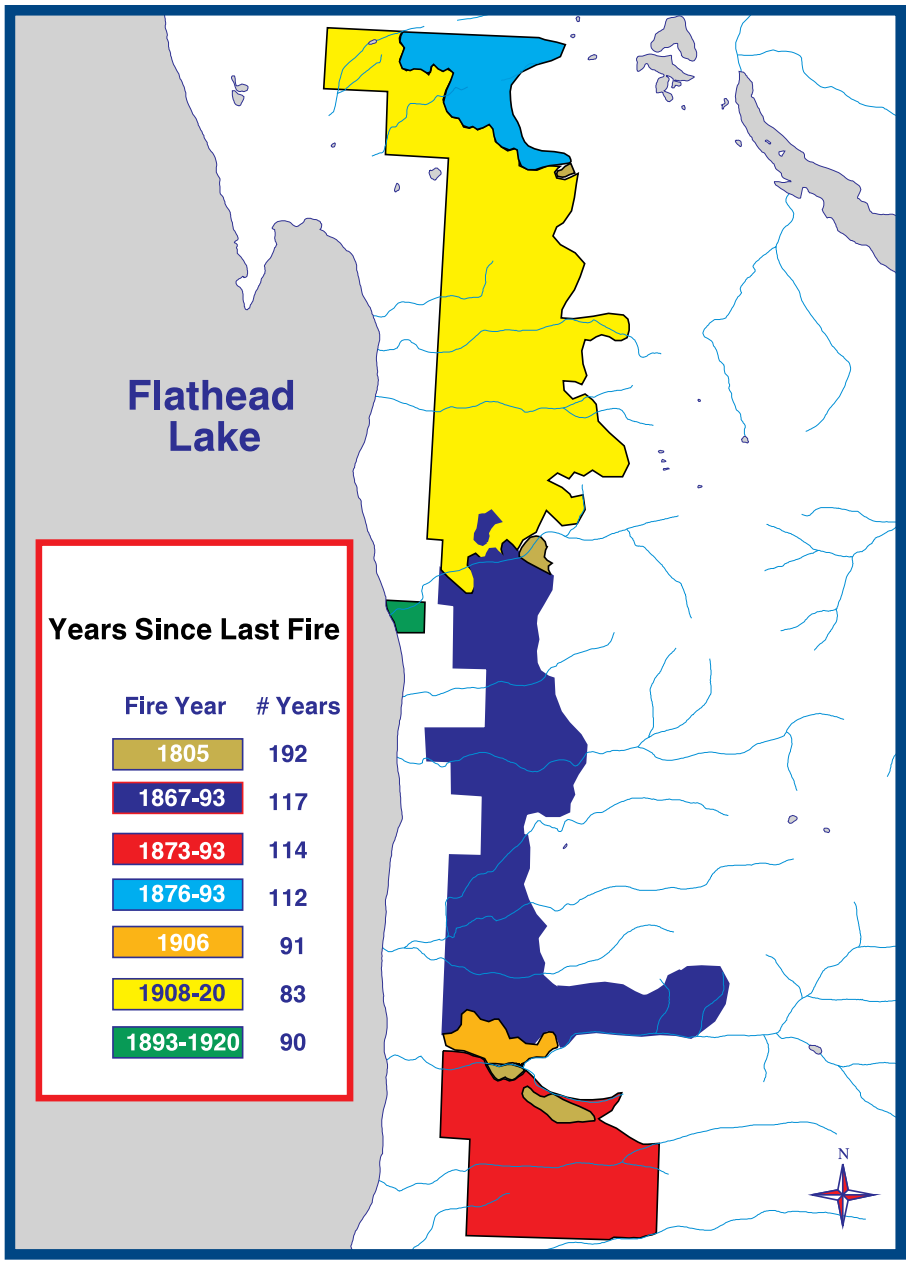

Figure 3—*Years since last fire. Where burns occurred within a few years of each other, stands are grouped (for example, 1867–93). Number of years since the last fire is calculated from 1997, the year of the study. For intervals (for example, 1867–93), years since last fire is calculated from the interval midpoint.*

Calculating the Fire Exclusion Factor. The final step in producing a fire exclusion map is to overlay fire regimes (fig. 2) with the years since the last fire (fig. 3) to produce a "fire exclusion factor" for each stand (fig. 4). The fire exclusion factor is derived by dividing the number of years since the last fire by the MFI for the fire regime.

For example, most stands in the middle to southern portion of our study area have not burned since sometime between 1867 and 1893. If we calculate the interval midpoint as 1880, the number of years from the last fire to the year of the 1997 study is 117. The fire exclusion factor varies according to the

fire regime and corresponding MFI:

- ***Nonlethal*** (MFI = 20 years)—The fire exclusion factor is 5.9 (117 ÷ 20).
- ***MS I*** (MFI = 30 years)—The fire exclusion factor is 3.9 (117 ÷ 30).
- ***MS II*** (MFI = 80 years)— The fire exclusion factor is 1.5 (117 ÷ 80).

Thus, the fire interval is nearly six times longer than the historical mean for dry-site ponderosa pine stands (nonlethal fire regime) and about four times longer for moist-site ponderosa pine stands (MS I regime). Clearly, both fire regimes have been heavily affected by fire exclusion, because the current fire interval is well beyond the historical range of variation (HRV).

Adjacent western larch–lodgepole pine stands in the MS II regime, with a fire interval less than twice the historical mean, have been somewhat less affected. Although the current fire interval is still within the HRV for the MS II fire regime, the hazard of wildland fire remains quite high for those productive stands. Overall, the northern portion of the study area has been less heavily affected by fire exclusion than the southern portion (fig. 4).

For mapping efficiency, we grouped the fire exclusion factors into three classes (fig. 4):

- 0–1 (no change from the historical MFI);
- 2–3 (two to three times the historical MFI); and
- 4–6 (four to six times the historical MFI).

Because such a classification is arbitrary, the results need to be evaluated in an ecological context. For instance, at what point does the current fire interval represent a serious departure from HRV? And how well does the map reflect the current fire hazard? Clearly, a fire exclusion factor of 2 (that is, twice the historical MFI) for a dry-site ponderosa pine stand presents less of a hazard than for a productive western larch–lodgepole pine stand, because ladder fuel buildups (such as shrubs and small trees) are inherently heavier in the latter.

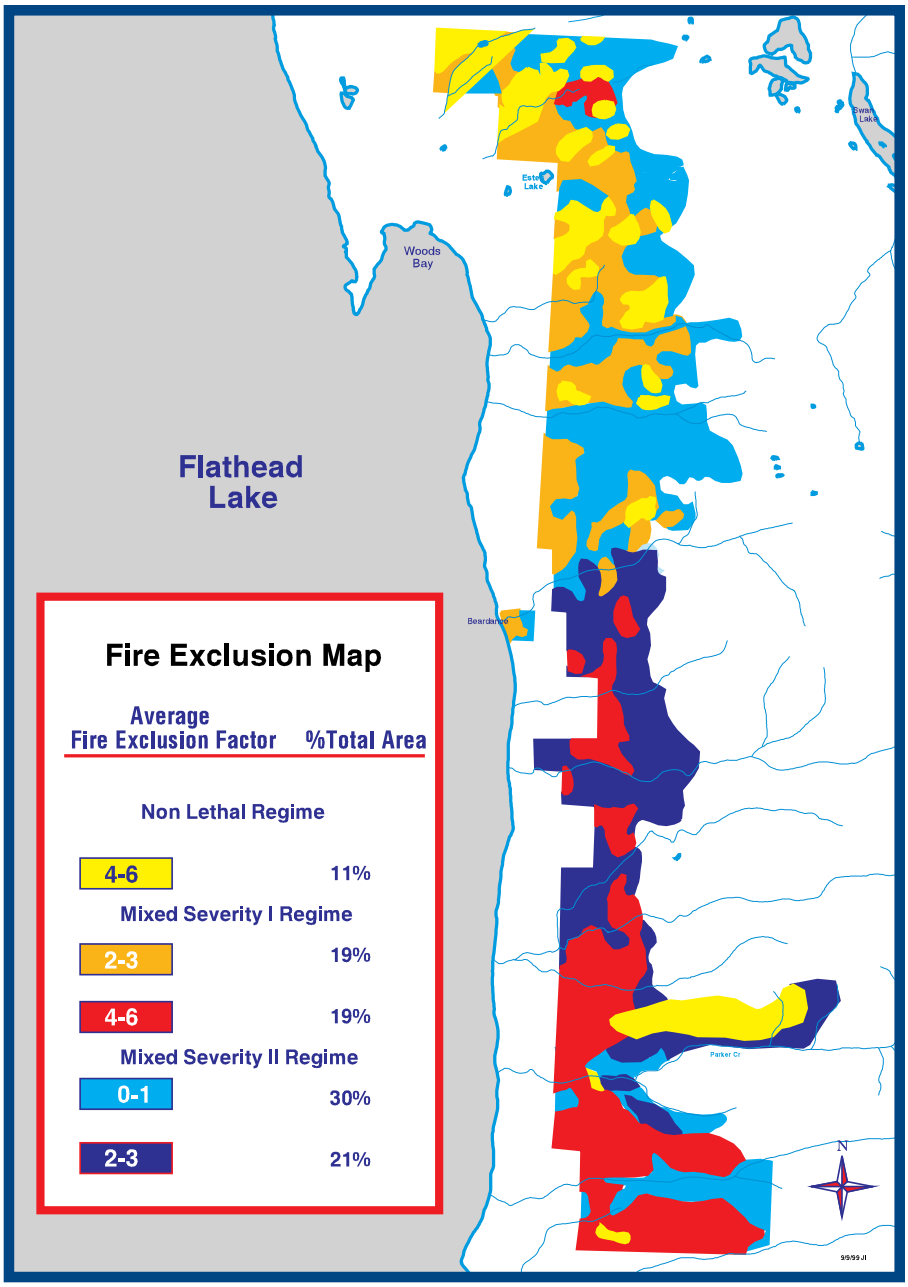

Figure 4—*Fire exclusion factors for fire regimes. For efficiency, fire exclusion factors are grouped: 0–1 = no change from historical mean fire interval (MFI); 2–3 = two to three times historical MFI; 4–6 = four to six times historical MFI.*

Strengths and Weaknesses

For fire-dependent ecosystems, the fire exclusion map serves as a site-specific "road map." It can help wildland managers locate stands profoundly affected by fire exclusion versus those still within the HRV. And managers can use fire

exclusion maps for such purposes as assessing fire hazard risk, identifying potential insect and disease outbreaks, and pinpointing old growth and fire regimes at risk. Fire exclusion mapping is most useful for the nonlethal and mixed-severity fire regimes, because the stand replacement regime has been less affected by fire exclusion (Barrett et al. 1991; Agee 1993). Although possible at various scales, fire exclusion mapping is likely best suited for midscale analyses (e.g., on tracts of 5,000 to 50,000 acres [2,000–20,000 ha]).

Fire history data, including fire exclusion maps, are also useful for public education. During presentations in the Flathead Valley, our maps and fire scar samples generated much interest among neighboring residents in the wildland–urban interface.

Fire exclusion mapping can range from highly precise efforts incorporating extensive data collection in the field, to office exercises based largely on existing data and classifications. The mapping process thus contains inherent flexibility and is potentially economical. For optimal results, however, wildland managers should draw on the expertise of those proficient in sampling and mapping fire history. For more information, contact Steve Barrett at 995 Ranch Lane, Kalispell, MT 59901, 406-756-9547 (phone), barrett@digisys.net (e-mail).

During presentations in Montana's Flathead Valley, our fire exclusion maps and fire scar samples generated much interest among neighboring residents in the wildland–urban interface.

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Winema Hotshots Train on Oregon's Coast

Dave Beck

The Oregon Dunes National Recreation Area (ODNRA) covers 31,566 acres (12,775 ha) on the Siuslaw National Forest along central Oregon's Pacific coast. The area is renowned for its spectacular beaches and lush temperate rainforest. It's a world away from the high-desert town of Klamath Falls, OR, on the arid eastern slopes of the Cascade Mountains, where the Winema Hotshots are based.

So what do the Winema Hotshots and the ODNRA have in common? For the second consecutive year, fire managers from both units have combined efforts to create an ideal training situation for the high-desert hotshots in a coastal-rainforest setting. As a result, both parties have achieved important goals.

Mutual Interests

In the spring of 1998, Winema Hotshot Supervisor Randy Lehman was looking for a suitable site for a team-building and training trip for his crew. When he contacted me here at the ODNRA, my immediate response was, "Have I got a deal for you!" Not only do we have unlimited sand for rigorous physical conditioning, but we also maintain a 20-person bunkhouse with full kitchen facilities and a classroom. And what better place for chain saw certification—a fire training requirement for the Winema crew—than an area where the abundant rainfall creates dense stands of 400 trees per acre growing at the astonishing rate of up to 1-1/4 inches (3.2 cm) in diameter per year?

Dave Beck is the fire manager for the USDA Forest Service, Oregon Dunes National Recreation Area, Siuslaw National Forest, Reedsport, OR.

The Oregon Dunes National Recreation Area offers facilities for fire crew training in an ideal oceanside setting.

For our part, we were very interested in recruiting a well-trained, physically able team to work on our vegetation management projects, some of which have been delayed due to inadequate funding. The 10-acre (4-ha) South Jetty Vista Project, near Florence, OR, seemed particularly suitable, integrating the goals of several ODNRA departments:

- Recreation was interested in restoring the scenic views in an area that had been overgrown by trees and brush;
- Resources was fighting to control the Portuguese broom, a nonnative plant that was becoming established in the area; and
- Fire Management needed to reduce the hazardous fuels adjacent to the main access road for the ODNRA, where several fires had ignited during the previous 5 years.

We offered to provide housing and to pay for part of the Winema crew's daily expenses in exchange for saw work on the South Jetty Vista Project. Several phone conversations later, we had worked out the details for a first-ever training event.

Partnership in Action

The Winema Hotshots arrived in June 1998 for a week of intensive work. They cut slash in the mornings and spent the afternoons power-hiking the dunes, running the beaches, and doing team-building exercises, with classroom studies at night. In the fall of 1998, thanks to site preparation by the Winema crew, we were able to achieve our management goals by broadcast burning the project area using crews from the ODNRA, the Siuslaw National Forest's Mapleton and Waldport Ranger Districts, Siuslaw Valley Fire and Rescue, and the Oregon Department of Forestry.

I was not surprised to hear from Supervisor Lehman again in 1999. We agreed that the 1998 project had been a terrific success. We set goals, worked out logistics, and brought the Winema Hotshots to the beach again! This time, we designated 6 acres (2.4 ha) at Umpqua Beach, near Winchester Bay, OR, as the worksite. Fuel types were similar to those on the South Jetty Vista Project the previous year, but this time the

The hotshots cut slash in the mornings; spent the afternoons power-hiking the dunes, running the beaches, and doing team-building exercises; and had classroom studies at night.

Winema crew worked in a gorgeous setting just a few hundred feet from the Pacific Ocean.

Mutual Benefits

Providing this opportunity was a win–win proposition. The Winema Hotshots visited the 1998 project site to see the results of their work. They also got another chance to train in an environment with fuels and other conditions very different from those in the Klamath Falls area. Away from the interruptions of home, the Winema crew could concentrate on training in a beautiful location. In return, the 20 highly disciplined, competent workers made a real contribution to ODNRA project work—often a low priority for seasonal fire crews.

The ODNRA might have started an annual event. After reviewing overall project success with Winema Hotshot Supervisors Lehman and Neil Austin, I wouldn't be surprised to hear from the Winema crew again in the year 2000. Now, if we could just interest a few more crews in this type of preseason training, we might someday actually complete all of our vegetation management projects on the ODNRA! For more information, contact Dave Beck, Fire Manager, Oregon Dunes National Recreation Area, USDA Forest Service, Siuslaw National Forest, 855 Highway 101, Reedsport, OR 97467, tel. 541-271-6082, fax 541-271-6019. ■

The Winema Hotshots, based in Klamath Falls, OR, pose during training on the Oregon Dunes National Recreation Area (ODNRA), Siuslaw National Forest, OR. In exchange for working on the ODNRA's backlogged vegetation management projects, the high-desert hotshots were able to train in an ideal environment on the Pacific coast. Photo: Dave Beck, USDA Forest Service, Oregon Dunes National Recreation Area, Siuslaw National Forest, Reedsport, OR, 1999.

From the Classroom to the Courtroom: Investigator Trainees Get a Taste of Reality

Rod Nichols

From the classroom to the courtroom, 37 trainees learned wildland fire investigation methods in an intensive, weeklong course held on July 12–16, 1999, in Roseburg, OR. Far from a dry lecture series, the training program immersed the students in the scientific procedures and legal processes employed by professional investigators. "What we're trying to do is give them a taste of reality," said Pete Norkeveck, the chief of investigation for the Oregon Department of Forestry.

Trainees dealt with authentic fire investigation cases, including actual incidents in Oregon.

Authentic Cases

To maintain authenticity, the teaching cadre based the course content on existing case studies, including two large incidents—the Wheeler Point Fire in 1996, which burned 21,980 acres (8,896 ha) near Fossil, OR; and the Rowena Fire in 1998, which consumed 2,208 acres (893 ha) in the Columbia Gorge near The Dalles, OR. For each case, the students learned the basic facts, then traveled to the fire scene to collect evidence and clues. To build student confidence, the trainers prepared small plots of ground for the first field experience. Personnel from the Douglas Forest Protective Association (DFPA) in southern Oregon cleared firelines around the plots to keep the fires separate, then set them ablaze with a variety of ignition sources, including cigarettes, matches, and a bottle rocket.

The students then put their classroom training into action, collecting and preserving evidence, determining the fire's point of origin, and obtaining statements from "witnesses" recruited by the instructors. Although the trainees received guidance during the exercises, they had to work through the investigative process on their own. "We try to expose them to all the different variations they'll encounter out there," explained Chief Norkeveck, "but we don't give them the answers."

The training cadre provided hands-on experience with digital cameras and other sophisticated technological aids. But a demonstration of canine investigative prowess left perhaps the strongest impression. Kent, a Labrador retriever, and his handler Maurice Austin, both from the Arson/Explosives Section of the Oregon State Police (OSP), performed fire accelerant detections on the staged fire scenes. "A dog like this can detect hydrocarbon accelerants such as gasoline and kerosene with 100 times greater accuracy than any device," observed Chief Norkeveck. And when a certified detection dog speaks, judges listen: The discoveries of hydrocarbon residues by Kent and his canine colleagues are admissible in court.

Becoming an effective fire investigator calls not only for acquiring knowledge and honing scientific skills, but also for radical changes in thinking. "We have a motto: 'Open your eyes and shut off your brain,'" remarked Chief Norkeveck. The point is to temporarily inactivate the mind's tendency to rationalize external stimuli—a mechanism that keeps us psychologically right with the world but impedes the discovery process of forensic investigation.

Courtroom Simulation

Chief Norkeveck described the course content as "80 percent science, 20 percent procedure," the latter a reference in part to the courtroom simulation conducted at the end of the course. On hand to grill the trainees as they presented their findings to the faux judge and jury were lawyers from the Jackson County District Attorney's office and the Oregon Department of Justice. They played their role as counsel for the defense with zeal, probing the evidence and findings of the investigators for flaws. Stressful and at times traumatic, the courtroom exercise was designed to take

Rod Nichols is a public information officer for the Oregon Department of Forestry, Salem, OR.

the students successfully through the crucial final step of an arson case: explaining the sequence of events to a jury. "Wildland fire investigators statistically have less courtroom experience than police officers," Chief Norkeveck noted, "so we do our best to create a realistic scenario for them."

A Collaborative Effort

The course is offered on an as-needed basis every few years, whenever the cooperating wildland fire management agencies in Oregon establish a common need to train new fire investigators. Sanctioned as a certified training course by the Pacific Northwest Wildfire Coordinating Group and the Oregon Department of Public Safety Standards and Training, the 1999 course took a year to set up. The teaching cadre comprised attorneys from the Oregon Department of Justice Civil Enforcement Division and the Jackson County District Attorney's office, a forensic expert from California, officers from the OSP's Arson/Explosives Section, and senior investigators from the Oregon Department of Forestry.

DFPA personnel handled the extensive logistics. The Cow Creek Tribe volunteered its tribal offices for the classroom sessions. Course participants included OSP detectives, a USDA Forest Service law enforcement officer, a deputy fire marshal from the Oregon State Fire Marshal's office, and DFPA and Oregon Department of Forestry foresters, along with several Idaho Bureau of Lands personnel who have fire investigative responsibilities in their State.

Although the trainees received guidance, they had to work through the investigative process on their own.

Trainees posing during an interagency course on wildland 'fire investigation methods held on July 12–16, 1999, in Roseburg, OR. Photo: Oregon Department of Forestry, Salem, OR, 1999.

Trainees searching a burned plot for clues to the origin of the fire. Photo: Oregon Department of Forestry, Salem, OR, 1999.

The courtroom simulation took fire investigator trainees through the crucial final step of explaining the sequence of events to a jury.

Burnt matches (with a pencil for scale)—a clue to the origin of a fire investigated by trainees. Photo: Oregon Department of Forestry, Salem, OR, 1999.

Commenting on the class's diverse representation, Chief Norkeveck voiced a theme stated repeatedly during the week. "The days of single investigator cases are gone," he declared. "It's beyond the power of an individual investigator to do the job. We simply have to assist and communicate across agency and jurisdictional lines." For more information on Oregon's fire investigation program, contact Rod Nichols, Oregon Department of Forestry, 2600 State Street, Salem, OR 97310, 503-945-7425 (phone), rnichols@odf.state.or.us (e-mail). ■

Twelve Smokey Awards Presented for 1998

Doris Nance

The Cooperative Forest Fire Prevention (CFFP) Program presented 12 Smokey Bear Awards to honor sustained, outstanding contributions to wildland fire prevention in 1998. Awardees received Smokey Bear statuettes, including four Silver Smokeys and eight Bronze Smokeys. All the awards recognize sustained wildland fire prevention activities over at least 2 years, the use of creative techniques for communicating the wildland fire prevention message, and efforts beyond the scope of each recipient's job. The awards were presented at various ceremonies throughout the Nation by the USDA Forest Service, the National Association of State Foresters, and The Advertising Council.

The Smokey Awards honor sustained, outstanding contributions to wildland fire prevention.

Silver Smokey Bear Awards

The Silver Smokey Bear Award is presented for contributions to wildland fire prevention in regional or multistate areas for at least 2 years. For 1998, Silver Smokeys went to Maureen Brooks, Bruce Turbeville, Jimmye L. Turner, and the Wildfire Prevention Working Team.

Maureen Brooks, an information and education specialist for the Maryland Department of Natural Resources (DNR) in Annapolis, MD, has been instrumental in the success of numerous programs and projects under the Middle Atlantic Interstate Forest Fire Protection Compact (MAIFFPC). She helped develop an Internet homepage for the MAIFFPC; provided leadership and resources necessary to revise the brochure *Wildfire is the Enemy of Your Forest Home*; updated the video *On the Fire Line* to include a specific message for each MAIFFPC member State; and facilitated MAIFFPC adoption of Smokey's Volunteers in Prevention (VIP) program, which provides basic training for volunteers. She has served on the National Wildfire Coordinating Group's Wildland Fire Education Working Team for the last 3 years and is currently its chair. She is also the statewide fire prevention coordinator for the Maryland DNR.

Bruce Turbeville, a public education officer for the California Department of Forestry and Fire Protection (CDF) in Sacramento, CA, coordinates the Department's statewide fire prevention education program and provides technical assistance and staff direction to CDF's field personnel for all departmental fire prevention public education programs. He created and spearheaded numerous fire prevention education programs, including the award-winning and nationally recognized Fire Safe Inside and Out program. He is a member of the California Interagency Fire Prevention Committee, California State Fire Marshal's Public Education Advisory Committee, CalTrans Public Advisory Committee on Highway Landscaping, and Public Utilities Subcommittee on Public Education. He is currently working with the State Fire Marshal's staff to expand the role of public education, and he is also developing a procedure to integrate CDF's VIP program with the Project Learning Tree Environmental Education program. He is the CFFP liaison for the CDF with the Forest Service.

Jimmye Turner, an ignition specialist for the Forest Service in Walla Walla, WA, plays an important role in wildland fire prevention programs in the State of Washington. He has coordinated many special wildland fire prevention programs for the Forest Service. He also represents the Forest Service in an interagency wildland fire prevention group known as the Blue Mountain Fire Prevention Council. In addition to his many local special programs, he has participated in a number of regional and national wildland fire prevention efforts.

The **Wildfire Prevention Working Team** includes the State Foresters from Indiana, Illinois, Iowa, and

Doris Nance is a program analyst for the USDA Forest Service, Washington Office, Washington, DC.

Missouri, and the Forest Service's Area Director of State and Private Forestry in Radnor, PA. The team's purpose is to enhance the protection of human life, real property, and natural resources on lands under protective authority by the member agencies. Although the member States take different approaches to wildland fire management, all are strongly committed to fire prevention education. They have signed a cooperative agreement known as the Big Rivers Forest Fire Management Compact.

Bronze Smokey Bear Awards

The Bronze Smokey Bear Award is presented for outstanding contributions to local or statewide wildland fire prevention efforts for 2 years or more. The 1998 award winners are the California Fire Safe Council, Ray Durham, Gary Lacox, Kimberli Lanier, M.C. Axe and the Fire Crew, Paul F. Sebasovich, Dr. and Mrs. Edwin Smith, and Doug Voltolina.

The **California Fire Safe Council**, based in Sacramento, CA, developed a Fire Safe Community Action Kit for use by local communities in developing firesafe councils. Through the kits, almost 50 local firesafe councils have been formed throughout California to help communities take action to reduce fire hazards and prevent wildland fire.

Ray Durham, a forest area supervisor for the Florida Division of Forestry in Tallahassee, FL, manages wildland fire suppression efforts in Flagler County and the northern portion of Volusia County (between Jacksonville and Daytona, FL). He has led a prescribed fire program mandated for the wildland–urban interface by a Florida statute. His efforts have fostered fire prevention through prescribed burning in the wildland–urban interface areas of the Palm Coast.

Gary Lacox, an assistant department head for the Texas Forest Service in Lufkin, TX, designed and implemented a proactive fire prevention program in 1997 to address increasing fire incidence and risk. When Texas began its fire season in May 1998, he expanded membership on the prevention team and ordered a national cooperative wildland fire prevention/education team to augment ongoing State prevention activities. Under his leadership, the team designed a Fourth of July campaign called "Don't Blow It on the 4th," which highlighted the hazard of fireworks. Hunting-safety posters, handouts, and license covers were developed and distributed by sporting goods outlets. Videos starring such celebrities as former President George Bush and retired baseball pitcher Nolan Ryan were produced to call attention to the fire situation. Defensible-space demonstration projects were implemented near Austin, TX, in several neighborhoods that were at great risk of catastrophic wildland fire. This effort produced additional printed material and eventually led to the establishment of the Bastrop County Fire Prevention Society, made up mostly of concerned citizens.

Kimberli Lanier, a fire prevention specialist for CDF and the Riverside County Fire Department in Perris, CA, was instrumental in securing a nationally sponsored "Learn Not To Burn" grant for the area served by San Jacinto Fire Station. She chose the location after soliciting support from 10 local schoolteachers in addressing San Jacinto's severe problems with wildland fires started by juveniles, who ignite 40 percent of the fires in the area. The Learn Not To Burn program has been a model for other areas in California.

M.C. Axe and the Firecrew is a group of active-duty firefighters from the Fishers Fire Department in Fishers, IN, that has been teaching fire safety to thousands of children throughout central Indiana. The group uses a wildly energetic blend of music, video, and comedy to get across its fire prevention messages. With characters such as "M.C. Axe," "Doc," "Cap," and "Sparky the Firedog," the group appeals to large audiences of schoolchildren in ways that have been heralded as unique and effective by teachers and parents alike.

Paul F. Sebasovich is the State Forester for the Pennsylvania Department of Conservation and Natural Resources, Bureau of Forestry, in Harrisburg, PA. He developed and implemented the Wardens Helping in Prevention (WHIP) program, which encourages volunteer fire wardens to participate in presenting fire prevention programs to audiences of all ages. He is a member of the Pennsylvania Fire Prevention Action Team, which designs training courses for the WHIP program and annually develops a statewide fire prevention theme and related handouts. Together with several retired and current Bureau of Forestry employees, he organized Smokey's 50th birthday celebration in Pennsylvania and is exploring the idea of a museum dedicated to preserving the State's wildland fire prevention and suppression history. He also

Drawing from a 1956 calendar warning against careless fire use by campers. For more than 55 years, Smokey Bear has symbolized outstanding contributions to wildland fire prevention nationwide. Photo: Courtesy of National Agricultural Library, Special Collections, Forest Service Photograph Collection, Beltsville, MD.

established a team with members from various State agencies and private concerns to develop a booklet explaining prevention and suppression methodologies to communities in the wildland–urban interface.

Dr. and Mrs. Edwin Smith of Pueblo, CO, play an active role in local wildland fire prevention. A retired veterinarian, Dr. Smith treated a burned bear cub rescued after the 1950 Capitan Gap Fire on the Lincoln National Forest, NM. The cub went on to gain fame as "the living symbol of Smokey Bear." Over the past 4 years, Dr. and Mrs. Smith have regularly visited area grade schools to tell the story of Smokey Bear and reinforce Smokey's fire prevention message. They speak from a unique perspective, relating their story with an enthusiasm that belies the passing of so many decades since the burned cub was found. When making school presentations, they wear T-shirts showing the famous photograph of Dr. Smith in his office bandaging the burned cub's paw. Their dedication to fire prevention and the joy they take in telling Smokey's story to children represent an outstanding volunteer effort.

Doug Voltolina has served for 22 years as the district manager of the Myaakka River District, Florida Division of Forestry, Tallahassee, FL. The district comprises Charlotte, DeSoto, Hardee, Manatee, and Sarasota Counties. Over the years, Mr. Voltolina has succeeded in changing public opinion regarding the benefits of prescribed fire as a prevention tool. He made sure prescribed fire activities were covered by both newspaper and television, and he initiated a door-to-door campaign to alert the neighbors to coming prescribed fires and to the associated smoke. Another key accomplishment is the training and cooperation he initiated for numerous agencies involved in prescribed burning. His dedication to the wildland fire prevention program goes well beyond his job as a suppression manager.

Nominations

Nominations for Smokey Bear Awards are due each year in the fall. Anyone wishing to submit a nomination should complete a nomination form and attach supporting materials, such as news clippings and photographs. Nomination forms and instructions, including the due date, are available from Forest Service regional coordinators. The completed forms and supporting documentation should be submitted to those coordinators. For more information, contact Dianne Daley Laursen, National Symbols Operation Manager, c/o MN DNR Forestry, 500 Lafayette Rd., St. Paul, MN 55155-4044, tel. 651-296-6006. ■

New Software for Fire Cache Tracking

Tom French

Editor's note: The fire cache tracking system described here will ensure accountability during development of the Interagency Cache Business System (ICBS), the inventory system for the National Interagency Support Caches approved by the National Wildfire Coordinating Group. The ICBS will tie together all levels of the cache support system and will connect to the Resource Ordering Status System. Users at the forest level will enter ordering information once, with orders processed as received at the regional and national levels. The ICBS will likely become available at the local level within the next 2 years. The tracking system described here will no longer be needed.

After years of research, fire personnel on the Payette National Forest, McCall, ID, decided to help develop a fire inventory software program. Working with a local software company (Orchid Software, Inc.),* we identified the types of fire supplies and apparatus we could track and manage while keeping the price of the software under $400. The result is the Fire Cache Inventory and Property Management Software, or "cache tracker" for short. The cache tracker is covered by a site license authorizing the purchaser to use it on multiple computers after a single purchase.

The Program

The cache tracker has the 1999 fire supply catalog for the National Fire Equipment System (NFES) preloaded. This makes adding your supply inventory a breeze.

The software is designed to run on an IBM-compatible PC under Windows 95, 98, or NT. The cache tracker uses a local data base to store the inventory and associated transactions. You can check items out of your inventory and right back in. Items are checked out, as appropriate, to a fire name, fire number, department number, person, or project name. The program will generate usage reports and inventory costs for all fires, departments, persons, or projects used. The program can also tell you which inventory items are below minimum or above maximum stocking levels.

The program allows you to track maintenance for, and generate reports on, all of your property items, including fire apparatus, chain saws, pumps, vehicles, buildings, radios, self-contained breathing apparatus, and ambulance equipment. Items are logged in by NFES number, serial number, property number, unit of issue, description, and General Services Administration number. All of these headings can be changed and moved around, allowing you to tailor the program to fit your specific cache or operation.

Applications

With today's increased accountability regulations for both expendable and property items, and with the documentation now required for fire apparatus, a system like the cache tracker should be used. The software is designed to manage agency and interagency fire cache inventories at the regional, forest, and district levels.

A supply unit leader for an incident management team can use the cache tracker to preload both the team's preorder and the initial order for supplies, equipment, crew, overhead, and aircraft onto a laptop computer to better manage incident resources when the team arrives on the fire. Other applications include:

- Tracking supplies and apparatus for local fire departments, emergency medical services, incident management teams, and wildland–urban interface protection plans;
- Keeping records on local buildings, such as their numbers, addresses, types of construction, defensibility, owner names and phone numbers, and locations (including directions for getting there);
- Updating information for key local contacts, such as property managers, fleet managers, and facility managers; and
- Performing any other function with inventory accountability.

Readers can download the cache tracker from the Internet for a 30-day trial period or for purchase at <http://www.orchidsoftware.com>. For more information, contact Tom French, USDA Forest Service, Payette National Forest Warehouse, Box 1026, 1000 Mission Street, McCall, ID 83638, 208-634-0429 (phone), tfrench/r4_payette@fs.fed.us (e-mail); or Orchid Software, Inc., at 208-634-6090 (phone) or sales@orchidsoftware.com (e-mail). ■

Tom French is the manager of the fire cache for the USDA Forest Service, Payette National Forest, McCall, ID.

* The use of trade, firm, or corporation names in this publication is for the information and convenience of the reader. Such use does not constitute an official endorsement of any product or service by the U.S. Department of Agriculture. Individual authors are responsible for the technical accuracy of the material presented in *Fire Management Today*.

Forest Service Video Highlights the Need for Prescribed Fire

Karl Perry

Since the early 20th century, heavy fuel loads have built up on many of our Nation's wildlands, partly due to past fire exclusion practices. Today, we face unnaturally severe fire hazards on wildlands ranging from Florida to Alaska. Prescribed fire is our most effective tool for treating the fuels, reducing the hazards, and restoring nature's balance. But a successful prescribed fire program, especially in or near areas where people live, will require building public understanding and support.

Karl Perry, who coproduced Prescribed Fire: Maintaining the Balance, *is a visual information specialist for the USDA Forest Service, Office of Communication, Washington Office, Washington, DC.*

That's where the video *Prescribed Fire: Maintaining the Balance* comes in. Featuring USDA Forest Service Chief Mike Dombeck, the 10-minute video introduces nonspecialists to the nature of prescribed fire and the reasons for its use. The video follows Chief Dombeck while he tours a prescribed burn on the Mark Twain National Forest, MO. Key players in the burn, including the forest supervisor, the burn boss, and a wildlife biologist, explain the careful arrangements made for operational safety and success, then show the desirable outcomes, including reduced fuel loads and enhanced wildlife habitat. The video concludes by tying fire use to the Forest Service's natural resource agenda: By improving soil structure, low-intensity fire helps to restore watershed functions for healthier forests, better recreation opportunities, and more plentiful water supplies.

Prescribed Fire: Maintaining the Balance helps nonspecialist agency staff understand the importance of prescribed fire as a land management tool. It is designed to inspire line officers to provide the leadership needed to build public support for prescribed fire programs. For a copy of the video, contact Karl Perry, USDA Forest Service, Office of Communication, 14th and Independence Avenue, SW., P.O. Box 96090, Washington, DC 20090-6090, 202-205-0963 (voice), 202-205-0885 (fax), kperry/wo@fs.fed.us (e-mail). ■

Websites on Fire*

Fight Fire With Fire

Living up to its reputation as a leader in prescribed fire use, Florida has created a Webpage for prescribed fire education. The page was funded with a grant from the Florida Environmental Education Commission. Intended "for Floridians to learn how to protect themselves and their homes from the threat of wildfires," the page provides useful links to State, Federal, and other sites on fire safety, fire ecology, and wildland and prescribed fire use. *Found at* **<http://www.prescribed-fire.org>**

Florida's Prescribed Burning Issues

The Forest Protection Bureau of the Florida Division of Forestry maintains a Website devoted to issues related to prescribed fire. Citizens interested in learning more about prescribed fire can obtain detailed information on fire's role in nature and Florida's prescribed fire policy. Professionals can find Florida's prescribed fire training schedule; in-depth guidance on applying the Keetch–Byram Drought Index; and various informative studies, including a detailed analysis of prescribed fire use for fuels management and a report on utilizing public surveys to facilitate prescribed fire use in the wildland–urban interface.
Found at **<http://flame.fl-dof.com/Env/fire.html>**

* Occasionally, *Fire Management Today* briefly describes Websites brought to our attention by the wildland fire community. Readers should not construe the description of these sites as in any way exhaustive or as an official endorsement by the USDA Forest Service. To have a Website described, contact the editor, Hutch Brown, at 4814 North 3rd Street, Arlington, VA 22203, tel. 703-525-5951, fax 703-525-0162, e-mail hutchbrown@erols.com.

Wildland Fire Terminology Update

Hutch Brown

Successful organizations have one thing in common: good, clear communication. Wildland fire management organizations in particular depend on clear communication for operational safety and effectiveness. There's no time on a fireline, for example, to work out terminological differences between regions or agencies. Interagency wildland fire management works best when collaborators share a common terminology.

Today, the wildland fire community in the United States has a common terminology through the National Wildfire Coordinating Group (NWCG). But even a shared terminology is subject to change in ways that can be confusing. To help wildland fire professionals stay abreast of the latest developments in wildland fire terminology, this article takes stock of recent changes. Where did our current terminology come from? And what glossaries should wildland fire professionals be using today?

An Emerging Terminology Standard

Lack of a common terminology long impeded interagency collaboration in wildland firefighting. In the 1960's, for example, when a fire boss (now known as an incident commander) requested a "tanker," it might arrive at a fire "on wheels or with wings," as one source put it (QCWT 1981). The NWCG was formed in 1976 partly to address the need for a standard wildland fire terminology.

Hutch Brown is the editor of Fire Management Today, *Arlington, VA.*

Using standard terminology improves communication for a safer, better wildland fire organization.

Useful Wildland Fire Glossaries

Every wildland fire professional should stay abreast of changes in wildland fire terminology. Current terminology standards in the United States include:

- Glossary of the June 1997 definitions by the National Wildfire Coordinating Group (NWCG) and the August 1998 fire use terms by the National Interagency Fire Center (NIFC); 30 terms.
  [Reprinted below in this issue of *Fire Management Today.*]
- *Glossary of Wildland Fire Terminology,* published in November 1996 by the NWCG; ca. 2,000 terms.
  [Available for a nominal fee from NIFC, ATTN: Great Basin Cache Supply Office, 3833 S. Development Avenue, Boise, ID 83705, fax 208-387-5573/5548; specify NFES order number 1832 and give shipping address and billing address, including requisition or purchase order number (or, alternately, Visa/MasterCard information). Also posted on the Internet in PDF format at <http://www.blm.gov/fna/training/standards/GLOSSARY.PDF>.]

Other useful references include:

- *Glossary of Wildland Fire Management Terms Used in the United States,* published in July 1990 by the Society of American Foresters (SAF 90–05); ca. 1,900 terms, including many terms used under the obsolete Large Fire Organization.
  [Available for a fee from the Society of American Foresters, 5400 Grosvenor Lane, Bethesda, MD 20814, tel. 301-897-8720; and by Internet at http://www.safnet.org>.]
- *Glossary of Forest Fire Management Terms,* published in 1999 by the Canadian Interagency Forest Fire Centre; ca. 750 terms, plus English–French and French–English lexica.
  [Available for a fee from the Canadian Interagency Forest Fire Centre, 210–301 Weston Street, Winnipeg, Manitoba, Canada R3E 3H4, tel. 204-784-2030, fax 204-956-2398; and by Internet at <http://www.ciffc.ca>.]
- *Wildland Fire Management Terminology,* published in 1986 by the United Nations Food and Agriculture Organization (FAO Forestry Paper 70, ISBN 92–5–002420–7); ca. 1,500 terms in English, French, German, Italian, and Spanish.
  [Under revision by the Global Fire Monitoring Center (GFMC) in Freiburg, Germany; for more information, see the GFMC Website at <http://www.uni-freiburg.de/fireglobe>.]

Until 1980, the NWCG supported the Large Fire Organization (LFO) for interagency collaboration on project fires. As early as 1971, the Society of American Foresters (SAF) published a glossary, titled *Terminology of Forest Science, Technology, Practice and Products*, that contained standard terms associated with fire control and the LFO. *Fire Management Today** supplemented the 1971 SAF glossary with an article (Deeming and Wade 1974) proposing terms for fire use in support of suppression, such as "counter firing" (using fire to manipulate the behavior of an approaching fire) and "burning out" (using fire to widen control lines or to reduce unburned fuels). In addition to such operational terms still in use today, LFO terms such as "line boss" and "air tanker boss" (now "operations section chief" and "air tanker coordinator," respectively) gained widespread currency in the Federal agencies.

But State and local firefighting organizations were slow to adopt the LFO (Newell et al. 1982). In the early 1970's, after disastrous wildland fires in southern California, Congress appropriated funds for a project known as Firefighting Resources of Southern California Organized for Potential Emergencies (FIRESCOPE). Working together through FIRESCOPE, Federal, State, and local agencies in California developed the Incident Command System (ICS) for interagency collaboration in coping with a wide range of emergencies, from small incidents to project fires (Whitson 1982).

As policy evolves and new technologies emerge, wildland fire terminology is subject to constant change.

In 1980, after comparing FIRESCOPE to the LFO, the NWCG adopted the National Interagency Incident Management System (NIIMS). The new system incorporated the ICS, including one of its foremost accomplishments—a common terminology. In 1983, *Fire Management Today* published an early list of ICS terms formally adopted by the NWCG under NIIMS (Editor 1983).

As more and more agencies embraced the ICS, the LFO became obsolete. In 1990, to help ease the transition from the LFO to the ICS, the SAF published its *Glossary of Wildland Fire Management Terms Used in the United States* (McPherson et al.1990). With about 1,900 entries (including ICS as well as LFO terms), the glossary remains a useful reference for wildland fire professionals, particularly for texts that employ older terms.

Despite its usefulness, the SAF glossary did not meet all ICS needs. In 1994, the NWCG's Training Working Team published a glossary of 134 terms used in the ICS National Training Curriculum (TWT 1994). The *ICS Glossary* became the definitive reference for many ICS terms, but its brevity limited its usefulness. In 1995, the NWCG's Incident Operations Standards Working Team, supported by the National Fire and Aviation Training Support Group at the National Interagency Fire Center (NIFC) in Boise, ID, completed a comprehensive glossary (IOSWT 1996). Published in 1996, the NWCG's *Glossary of Wildland Fire Terminology*, with about 2,000 entries, is now the standard reference for wildland fire professionals in the United States.

Recent Terminology Changes

Since publication of the 1996 NWCG glossary, wildland fire terminology has undergone important changes. Today, the NWCG glossary increasingly requires supplementation. In particular, it does not contain many terms needed for wildland and prescribed fire use, a crucial part of today's wildland fire management.

In the 1980's and 1990's, fuel buildups caused by past fire control practices produced unnaturally severe wildland fires, especially in the West (Pyne 1997). Partly to address the fuels problem, the 1995 Federal Wildland Fire Management Policy and Program Review concluded that "wildland fire will be used to protect, maintain, and enhance resources and, as nearly as possible, be allowed to function in its natural ecological role" (USDI/USDA 1995). In June 1997, in accordance with the new policy, the NWCG reviewed and revised its definitions of "wildfire," "wildland fire," and other terms (NWCG 1998). For example, the new definitions restricted use of the term "wildfire," which has strong negative connotations (see sidebar).

* *Fire Management Today* appeared under the names *Fire Management* from 1973 to 1975 and *Fire Management Notes* from 1976 to 1999.

The National Interagency Incident Management System was specifically designed to address the need for a standard wildland fire terminology in the United States.

Safe and effective operations on wildland fires, such as this water drop from a helicopter-borne bucket on the 1994 Soupy Ridge Fire on Montana's Flathead National Forest, depend on good communication using a shared wildland fire terminology. Photo: Paul S. Fieldhouse, USDA Forest Service, Missoula Smokejumper Base, Missoula, MT, 1994.

"Wildfire"—A Tainted Term

The term "wildfire" has long been associated in the English language with violence and destruction unrelated to actual wildland fires, according to the *Oxford English Dictionary* (Simpson and Weiner 1989). In a thousand years of references dating to A.D. 1000, "wildfire" in its various spellings ("wyldefyr," "wilde-fur," etc.) has signified:

- A furious or destructive fire, sometimes breathed by dragons;
- Earthquakes and volcanic eruptions;
- A compound of inflammable substances used in warfare to burn soldiers, towns, and ships;
- Various inflammatory eruptive diseases;
- Rage and other passions unleashed against others; and
- Harm to others in curses such as, "Wilde-fire and Brimstone eat thee!"

Such violent connotations help to explain the fear and loathing often associated with the term "wildfire" in our culture. By contrast, the term "wildland fire" is relatively neutral, partly because it is comparatively new and therefore untainted by centuries of fearful connotations. At a time when wildland and prescribed fire use is increasingly vital for preserving and restoring the health of our Nation's wildlands, the term "wildland fire" seems generally more suitable for use by wildland fire professionals than the tainted term "wildfire."

In August 1998, the new NWCG definitions appeared in a reference guide (NIFC 1998) for implementing the 1995 Federal Wildland Fire Management Policy and Program Review. Adopted as USDA Forest Service policy in June 1999, the Wildland and Prescribed Fire Management Policy Implementation Procedures Reference Guide (or Implementation Guide, for short) supplements the NWCG definitions with a list of practical terms for wildland and prescribed fire use. For reader convenience, the 1997 NWCG definitions and the 1998 fire use terms are reprinted following this article.

As policy evolves and new technologies emerge, wildland fire terminology—like any other living language—is subject to constant change. With the ongoing implementation of the 1995 Federal Wildland Fire Management Policy and Program Review, future terminology revisions are likely. The Implementation Guide published by NIFC is designed to be updated annually to accommodate needed changes in both direction and terminology. For a copy of the guide, contact Dave Bunnell, National Fire Use Program Manager, USDA Forest Service, National Interagency Fire Center, 3833 S. Development Avenue, Boise, ID 83705-5354, 208-387-5218 (voice), 208-387-5398 (fax), dbunnell/wo_nifc@fs.fed.us (e-mail).

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Wildland Fire Management Terminology

Reprinted below (lightly edited) in alphabetical order are:

- Terminology adopted in June 1997 by the National Wildfire Coordinating Group (NWCG) (including obsolete terms, each denoted by a symbol); and
- Definitions for fire use in the August 1998 Wildland and Prescribed Fire Management Policy Implementation Procedures Reference Guide.

Each NWCG term is denoted by an asterisk (*). Terms in *italics* are cross-referenced below.

Appropriate management response.* Specific actions taken in response to a *wildland fire* to implement protection and fire use objectives.

Confinement. Confinement is the strategy employed in *appropriate management responses* where a fire perimeter is managed by a combination of direct and indirect actions and use of natural topographic features, fuel, and weather factors.

Confine/contain/control.* These terms, when used in the context of *wildland fire suppression* strategies, are confusing because they also have tactical meanings. Containment and control will continue to be used to represent the status of a fire for reporting purposes (e.g., "a controlled fire," date of control, date of containment, etc.) but not to represent a type of management strategy.

Escaped fire situation analysis.* This obsolete term is replaced by the term *wildland fire situation analysis*.

Expected weather conditions. Weather conditions that are common, likely, or highly probable based on current and expected trends compared to historical weather records. Expected weather conditions are the most probable weather conditions for a given location and time. These conditions are used in making fire behavior forecasts for different scenarios (one necessary scenario involves fire behavior prediction under expected weather conditions).

Experienced severe weather conditions. Weather conditions that occur infrequently but have been experienced in the fire site area during the period of weather records. For example, rare-event weather conditions that significantly influence fires might have occurred only once, but their record can be used to establish a baseline for a worst-case scenario. Experienced severe weather conditions are the most severe conditions that can be expected. These conditions are used in making fire behavior forecasts for different scenarios (one necessary scenario involves fire behavior prediction under experienced severe weather conditions).

Fire management area (FMA). A subgeographic area within a *fire management unit* that represents a predefined ultimate acceptable management area for a fire managed for resource benefits. This predefined area can constitute a *maximum manageable area* (MMA) and is useful for units with light fuel types conducive to very rapid fire spread rates. Predefining an FMA prevents delay in defining an MMA after ignition; permits preplanning for the fire area; facilitates identification of threats to life, property, resources, and boundaries; and allows identification of initial actions.

Fire management plan (FMP).* A strategic plan that defines a program to manage *wildland fires* and *prescribed fires* and documents the *wildland fire management program* in the approved land use plan. The FMP is supplemented by operational plans, such as preparedness plans, preplanned dispatch plans, *prescribed fire plans*, and prevention plans.

Fire management unit (FMU). Any land management area definable by objectives, topographic features, access, values to be protected, political boundaries, fuel types, major fire regimes, or other factors that set it apart from management characteristics of an adjacent unit. Each FMU is delineated in a *fire management plan*. FMU's may have dominant management objectives and preselected strategies assigned to accomplish these objectives.

Fire use. The combination of *wildland fire use* and *prescribed fire* application to meet resource objectives.

Holding actions. Planned actions required to achieve wildland and prescribed fire management objectives. These actions have specific implementation timeframes for *fire use* actions but can have less sensitive implementation demands for *wildland fire suppression* actions. For *wildland fires* managed for resource benefits, a *maximum manageable area* (MMA) might not be totally naturally defensible. Specific holding actions are developed to preclude fire from exceeding the MMA. For *prescribed fires*, holding actions are developed to restrict the fire inside the planned burn unit. For *wildland fire suppression* actions, holding actions may be implemented to prevent the fire from crossing containment boundaries. Holding actions may be implemented as firelines are established to limit the spread of fire.

Initial attack.* An aggressive *wildland fire suppression* action consistent with firefighter and public safety and values to be protected.

Management action points. Geographic points on the ground or specific points in time where an escalation or alteration of management actions is warranted. These points are defined and the management actions to be taken are clearly described in an approved *wildland fire implementation plan* or *prescribed fire plan*. Timely implementation of the actions when the fire reaches the action point is generally critical to successful accomplishment of the objectives.

Management-ignited prescribed fire.* This obsolete term is replaced by the term *prescribed fire*.

Maximum manageable area (MMA). The firm limits of management capability to accommodate the social, political, and resource impacts of a *wildland fire*. Once established as part of an approved plan, the general impact area is fixed and not subject to change. MMA's can be developed as part of the *fire management plan* and described as a *fire management area* (FMA). MMA's can also be developed as part of the planning and implementation of management actions after a fire has ignited. If MMA's are developed after ignition, they are defined during stage III of the *wildland fire implementation plan*. If a fire occurs in a preplanned MMA or FMA and the local unit determines that the preplanned area is not the best alternative under the present conditions, a new MMA can be developed during stage III. The stage III MMA then becomes the firm limits of the fire and is fixed.

Mitigation actions. On-the-ground activities that will serve to increase the defensibility of the *maximum manageable area*; check, direct, or delay the spread of fire; and minimize threats to life, property, and resources. Mitigation actions may include mechanical and physical nonfire tasks, specific fire applications, and limited suppression actions. Mitigation actions will be used to construct firelines, reduce excessive fuel concentrations, reduce vertical fuel continuity, create fuel breaks or barriers around critical or sensitive sites or resources, create blacklines through controlled burnouts, and limit fire spread and behavior.

Preparedness.* Activities that lead to a safe, efficient, and cost-effective fire management program in support of land and resource management objectives through appropriate planning and coordination. This term replaces the obsolete term *presuppression*.

Prescribed fire.* Any fire ignited by management actions to meet specific objectives. A written, approved *prescribed fire plan* must exist, and National Environmental Policy Act requirements must be met, prior to ignition. This term replaces the obsolete term *management-ignited prescribed fire*.

Prescribed fire plan. A plan required for each fire application ignited by managers. The prescribed fire plan must be prepared by qualified personnel and approved by the appropriate agency administrator prior to implementation. Each plan will follow specific agency direction and must include critical elements described in agency manuals. Formats for plan development vary among agencies, although content is the same.

Prescribed natural fire.* This obsolete term no longer represents a type of fire and has no further use except in historical descriptions. This term is replaced by the term *wildland fire use* (for example, a lightning fire might be designated for wildland fire use).

Prescription.* Measurable criteria that define conditions under which a *prescribed fire* may be ignited, guide selection of appropriate management responses, and indicate other required actions. Prescription criteria may include safety, economic, public health, environmental, geographic, administrative, social, or legal considerations.

Presuppression.* This obsolete term is replaced by the term *preparedness* to match policy and appropriation language.

Trigger points. Synonym for *management action points*.

Wildfire.* An unwanted *wildland fire*.

Wildland fire.* Any nonstructural fire, other than *prescribed fire*, that occurs in the wildland.

Wildland fire implementation plan (WFIP). A progressively developed assessment and operational management plan that documents the analysis and selection of strategies and describes the appropriate management response for a *wildland fire* being managed for resource benefits. A full WFIP consists of three stages. Different levels of completion may occur for differing management strategies (i.e., fires managed for resource benefits will have two to three stages of the WFIP completed, whereas some fires that receive a suppression response might have only a portion of stage I completed).

Wildland fire management program. The full range of activities and functions necessary for planning, *preparedness,* emergency suppression operations, and emergency rehabilitation of *wildland fires* and *prescribed fire* operations, including nonactivity fuels management to reduce risks to public safety and to restore and sustain ecosystem health.

Wildland fire situation analysis (WFSA).* A decisionmaking process that evaluates alternative management strategies against selected safety, environmental, social, economic, political, and resource management objectives.

Wildland fire suppression. An *appropriate management response* to *wildland fire* that results in curtailment of fire spread and eliminates all identified threats from the particular fire. All wildland fire suppression activities provide for firefighter and public safety as the highest consideration, but minimize loss of resource values, economic expenditures, and/or the use of critical firefighting resources.

Wildland fire use. The management of naturally ignited *wildland fires* to accomplish specific prestated resource management objectives in predefined geographic areas outlined in *fire management plans*. Operational management is described in the *wildland fire implementation plan*. Wildland fire use is not to be confused with *fire use*, which is a broader term encompassing more than just *wildland fire.* Wildland fire use replaces the obsolete term *prescribed natural fire* (for example, a lightning fire might be designated for wildland fire use).

Guidelines for Contributors

Editorial Policy
Fire Management Today (*FMT*) is an international quarterly magazine for the wildland fire community. *FMT* welcomes unsolicited manuscripts from readers on any subject related to fire management. Because space is a consideration, long manuscripts might be abridged by the editor, subject to approval by the author; *FMT* does print short pieces of interest to readers.

Submission Guidelines
Submit manuscripts to either the general manager or the editor at:

USDA Forest Service
Attn: April J. Baily, F&AM Staff
P.O. Box 96090
Washington, DC 20090-6090
tel. 202-205-0891, fax 202-205-1272
Internet e-mail: abaily/wo@fs.fed.us

Hutch Brown, Editor
Fire Management Today
4814 North 3rd Street
Arlington, VA 22203
tel. 703-525-5951, fax 703-525-0162
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If you have questions about a submission, please contact the editor, Hutch Brown.

Paper Copy. Type or word-process the manuscript on white paper (double-spaced) on one side. Include the complete name(s), title(s), affiliation(s), and address(es) of the author(s), as well as telephone and fax numbers and e-mail information. If the same or a similar manuscript is being submitted elsewhere, include that information also. Authors who are affiliated should submit a camera-ready logo for their agency, institution, or organization.

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We need your fire-related articles and photographs for *Fire Management Today*! Feature articles should be up to about 2,000 words in length. We also need short items of up to 200 words. Subjects of articles published in *Fire Management Today* include:

- Aviation
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- Cooperation
- Ecosystem management
- Education
- Equipment and technology
- Fire behavior
- Fire ecology
- Fire effects
- Fire history
- Fire use (including prescribed fire)
- Fuels management
- Firefighting experiences
- Incident management
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