

Fire Management *notes*

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COURSE TO THE FUTURE:
Positioning Fire and Aviation Management

Fire Suppression Costs on Large Fires

A Review of the 1994 Fire Season

**FEDERAL WILDLAND
FIRE MANAGEMENT**
POLICY & PROGRAM REVIEW

**The Forest Service
Ethics and Course
to the Future**

Fire Economics Assessment Report

**FINAL REPORT
OF THE
INTERAGENCY MANAGEMENT REVIEW
TEAM
SOUTH CANYON FIRE**

June 26, 1995

**STRATEGIC FIRE AND
AVIATION MANAGEMENT
GOALS AND ACTIONS
In Support Of
ECOSYSTEM MANAGEMENT**

**FIRE
21**



United States Department of Agriculture
Forest Service

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On the Cover:



The fire community has witnessed the generation of a number of documents since the demanding fire season of 1994. From the thoughts, ideas, and policy changes discussed in these documents, FIRE 21 has evolved. Symbol illustration: Rodney C. Kindlund and Michael G. Apicello, USDA Forest Service, 1996.

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FIRE 21—FIRE MANAGEMENT IN THE 21ST CENTURY



Michael G. Apicello

The fire community has witnessed the generation of a large number of wildland fire management reports, reviews, and policy changes since 1994. It has been a challenge to communicate these changes and their effects to all who are in any way involved in wildland fire management. To help communicate the program mission of the USDA Forest Service's Fire and Aviation Management (F&AM) Staff, FIRE 21 has evolved.

FIRE 21 comprises new thoughts, ideas, and proactive communication about the future of wildland fire management and combines the findings and recommendations of many recent, critical studies. As the wildland fire community begins to implement recommendations from these various studies, FIRE 21 serves as a symbol of progress and as a catalyst to move these actions forward. But above all, FIRE 21 stands directly for the safe and prudent use of wildland fire.

The Roots of FIRE 21

FIRE 21 is much more than a logo or a slogan. It is a symbol that synergizes the critical elements of many significant documents and supports those individuals who accomplish the FIRE 21 goals. Specifically, FIRE 21 is found in the following:

FIRE 21 symbolizes the safe and prudent use of wildland fire both now and in the future.

- “The Forest Service Ethics and Course to the Future” (Thomas 1994)—the foundation document that outlines the agency's land and service ethics written by Forest Service Chief Jack Ward Thomas. Critical goals for F&AM program management within this report include: protecting ecosystems, restoration of deteriorated ecosystems, providing sustainable benefits to humans within ecosystem capability, and ensuring organizational effectiveness.
- “Final Report of the Interagency Management Review Team: South Canyon Fire” (IMRT 1995)—which encouraged corrective actions and recommendations necessary to improve public and firefighter safety. This report established a “Code of Safe Practices” and initiated the tenet “Firefighter safety comes first on every fire, every time.” It also emphasizes that all people involved in wildland fire must be personally committed to their own performance and accountability.
- “Course to the Future: Positioning Fire and Aviation Management” (USDA, Forest Service 1995a)—which outlines the key emphasis areas for the future for the Forest Service's F&AM Staff.

It expands Chief Thomas's goals and applies specific action items including increased mechanical and prescribed fire treatments. This document seeks funds for restoring and maintaining fire-adapted ecosystems, develops a capable workforce to achieve these goals, addresses the ecological basis for fire application across fire-dependent landscapes, seeks to renegotiate State and local cooperative fire agreements with partners at the wildland-urban interface, and moves towards preparing 75 percent of the total Forest Service workforce to be trained, qualified, and available to support fire emergencies by the year 2000.

Other influential documents that support “Positioning Fire and Aviation Management” include: “Strategic Fire and Aviation Management Goals and Actions in Support of Ecosystem Management” (USDA, Forest Service 1994), “Fire Suppression Costs on Large Fires, a Review of the 1994 Fire Season” (USDA, Forest Service 1995c,) and “Fire Economics Assessment Report” (USDA, Forest Service 1995b).

Each one of these reports contains critical elements that are now included in:

- The “Federal Wildland Fire Management Policy and Program Review” (USDA and USDI 1995), which serves as the primary guide for Federal wildland fire management agencies. It will be

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followed with an implementation strategy developed by members of the interagency fire community and the geographical area coordinating groups. The implementation strategy will delineate and set the course for interagency, intergovernmental, and community relations for wildland fire management in the 21st century.

These are just a few of the many recent reviews, reports, and studies produced by the interagency wildland fire community. Other associated organizations, along with State and local partners, have made significant contributions toward the FIRE 21 program. In all cases, public concerns, issues, and opportunities were factored into decisions. As we enter the 21st century, communities, agencies, and the public will take responsibility and play a greater role in wildland fire programs and their implementation.

Leadership efforts in developing FIRE 21 have been fostered by the Forest Service's Director of F&AM, Dr. Mary Jo Lavin, and her staff. Their planning and guidance have made significant contributions towards developing the Federal Wildland Fire Management Policy and positioning the F&AM program strategically for the future. FIRE 21 will serve as a tool to help deliver key messages and implement the "Course to the Future" for F&AM.

FIRE 21 Outcomes

FIRE 21 has goals for the present and future that will:

- Improve firefighter and public safety;
- Contribute to restoring, maintaining, and sustaining ecosys-

tem function for healthier forests and rangelands;

- Improve accountability at all agency levels;
- Enact a safe and cost-effective F&AM program; and
- Integrate wildland fire management concerns and the role of fire into all agency resource management programs, where appropriate.

The FIRE 21 Design

The FIRE 21 symbol reflects Forest Service commitment to the safe and prudent use of wildland fire in all fire management activities for the present as well as the 21st century.



The FIRE 21 symbol has evolved from the Forest Service's commitment to the safe and prudent use of fire in the management of natural resources both now and in the 21st century. Illustration: Rodney C. Kindlund and Michael G. Apicello, USDA Forest Service, 1996.

The overall shape of the FIRE 21 symbol portrays the fire triangle: fire management's inherent reason for being. Without the elements of oxygen, heat, and fuel that make up the fire triangle, fire would not exist.

The three outer red triangles stand for the basic functions of fire organizations: planning, operations, and aviation. These small triangles also point inward to the base of the flame, representing the three faces

of fire: prevention, suppression, and prescription.

The black interior represents land affected by fire with three emerging green points representing growth, restoration, and sustainability of fire-adapted ecosystems.

The flame, the fire within, reminds us that fire is an ever-present force in nature. And the FIRE 21 inscription stands for our commitment to safe and prudent use of wildland fire in the 21st century.

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LEADERS COMMITTED TO FIRE 21

Mary Jo Lavin, Ph.D.

Fire and Aviation Management (F&AM) presented a plan for taking its program into the 21st century to the National Leadership Team of the USDA Forest Service on April 16, 1996. FIRE 21 is an evolving response to major direction from the Chief's "Course to the Future," major F&AM studies conducted during the past year, and the "Federal Wildland Fire

Mary Jo Lavin is national director of Fire and Aviation Management for the USDA Forest Service, Washington, DC.

Policy." Joining me at the podium were key representatives from the National Association of State Foresters (NASF), the regional foresters, and the Washington Office directors.

The words of Stan Hamilton (Idaho State Forester and current president of NASF), Regional Forester (R-1) Hal Salwasser, and Regional Forester (R-8) Bob Joslin follow. They, along with Chief Jack Ward Thomas, Deputy Chief Joan Comanor, and Budget Director Steve Satterfield, offered challenges, expressed commitment, and ensured support.



F&AM National Director Mary Jo Lavin says that the Forest Service is ready for FIRE 21. Photo: USDA Forest Service, Washington, DC, 1995.

Reducing the costs of fire activities while ensuring the safety of our fire organization will not be easy. But we are ready, willing, and determined to move fire management into the 21st century. As a program and as an agency, we are ready for FIRE 21! ■

NASF's PERSPECTIVE ON FIRE 21



Stanley F. Hamilton

As President of the National Association of State Foresters (NASF), I represent the State Foresters of all the 50 States and the Chief Foresters for the District of Columbia, Guam, Puerto Rico, the Virgin Islands, the Northern Marianas Islands, and American Samoa. My comments here are focused on some of the wildland fire issues that are of great importance to all of the State Foresters and our counterpart wildland fire agencies in the Federal Government.

Wildland Fire Management Policy

The first important issue is the newly completed "Federal Wildland

Stan Hamilton is the director of the Idaho Department of Lands, Boise, ID, and president of the National Association of State Foresters.

The State Foresters stand ready to work with Federal agency partners to carry out the direction recommended by the "Federal Wildland Fire Management Policy and Program Review."

Fire Management Policy and Program Review" dated December 18, 1995. This report summarizes the hard work of a blue ribbon team of Federal agency employees with support from selected individuals in the private sector and State and local government. The review is an excellent piece of work. While it would have been better had the State Foresters been able to sit at the table and participate with our Federal wildland partners on this review, unfortunately the Federal

Advisory Committee Act (FACA) dictated otherwise at the time.

The easy part of this review is over. The hard part—implementation of the recommendations—lies ahead. That work has already begun, and I am pleased to report that Don Artley, Montana State Forester, will represent the State Foresters on the implementation team. The State Foresters stand ready to work with our Federal agency partners to carry out the direction recommended by the review.

Wildfire in the Wildland-Urban Interface

The next issue is the newly published "Wildland/Urban Interface—Fire Policy Action Report" dated February 1996 by the Western Governor's Association. I am very pleased that we have finally captured the attention of the Western Governors on the important issue of wildfire in the wildland-urban interface. However, we need the undivided attention of all the Governors—perhaps through the National Governor's Association. Wildland fire occurs everywhere—the Sunrise Fire on Long Island last summer, for example, proves wildfire in the wildland-urban interface is not just a western problem.

Unfortunately, I do not believe the Western Governor's Association will take the issue much further. It will be up to the State Foresters and our Federal agency partners to continue our aggressive prevention and suppression programs in the interface with the support and blessings of our Governors. Don Artley, Montana State Forester, and Jim Hubbard, Colorado State Forester, are NASF representatives to the Western Governor's Association on forestry and fire issues.



Stan Hamilton focused on some of the wildland fire issues of importance to NASF at the Forest Service's National Leadership Team meeting. Photo: Idaho Department of Lands, Boise, ID.

Don Artley's star must be ascending. He is also the newly elected chair of the National Wildfire Coordinating Group (NWCG). The State Foresters appreciate the opportunity to fully participate in the important work of the NWCG.

I understand that Mary Jo Lavin has just returned from a fire review in the USDA Forest Service's Pacific Southwest Region (R-5). Fire reviews are always traumatic just because "everyone and everything" goes under the microscope of critical inspection. The benefits, of course, are that we have an opportunity to examine—and improve—our programs.

The State Foresters are very pleased that Richard Wilson, California State Forester, and his staff were invited to participate in the review. We strongly believe that the State Foresters should be invited to participate in all such reviews, and I want to thank Mary Jo for including him.

Cessation of NWS Services

Recently, the State Foresters received a letter from Dr. Susan Zevin of the National Weather Service (NWS). We were disappointed to learn that, after more than a year of discussions, the following services have been designated as nonwildfire and will no longer be available from the NWS to State fire management agencies:

- Spot forecasts for prescribed burning—special forecasts issued on request to describe meteorological conditions in the immediate vicinity of a planned or ongoing prescribed burn.
- Smoke management forecasts—forecasts issued specifically for control of smoke during prescribed burning.

- Land management forecasts—routine daily forecasts issued outside a user-designated fire season.

The cessation of NWS services appears to be budget related. The impacts on State fire management agencies will be expensive and cause considerable uncertainty until other arrangements for weather prediction services can be made. We hope that the National Weather Service can still be convinced of the need to continue these services.

Continuity at NIFC

As you know, for several years, individual State Foresters have been spending a week at a time at the National Interagency Fire Center (NIFC) in Boise during periods of high alert. The purpose of these visits has been to help coordinate the deployment of State fire agency resources to ongoing fires as needed.

For the future, the State Foresters have agreed to place a part-time representative at NIFC to provide continuity to the coordination of State resource deployment. We also expect continued State Forester attendance at NIFC, but the day-to-day coordination will be directed by the NASF staff member.

Structural Fire Protection in the Interface

I would like to return to our earlier discussion about the proposed Forest Service policy regarding the wildland-urban interface. Both the Northern Region (R-1) and the Intermountain Region (R-4) have jurisdiction over parts of Idaho. About 2 years ago, the two regions

Continued on page 8

and the Idaho Department of Lands agreed to rewrite our cooperative fire agreement. This was the second rewrite in the 12 years I have been with the department. We were most willing to participate because these types of agreements need to be reworked periodically anyway.

About 1 year ago, well into our rewrite, the regions gave us the news of proposed changes in the Forest Service policy on structural fire protection in the wildland-urban interface: The Forest Service was not responsible for structural fire protection in wildland-urban interface areas—the State of Idaho was responsible for such protection.

We were surprised because the State of Idaho has never assumed responsibility for structural protection anywhere in the State. And I suspect that is true in most States. The State of Idaho has provided for the creation of Fire Protection Districts and for taxing residents of the district for fire protection services. But the State does not actually provide structural fire protection services to its citizens.

The State Foresters understand that the Forest Service policy direction is to:

- Disengage from wildland fire protection in the wildland-urban interface whenever possible and as rapidly as possible.

- Get the States to accept responsibility for and pay for fire protection—especially structural fire protection—in the wildland-urban interface.

Speaking for Idaho, and the State Foresters, we do not disagree with your direction or intentions. However, the Federal agencies need to understand that they cannot get out of wildland-urban interface or structural protection overnight. The States need time to work with their legislatures for direction and funding. We also need time to rework our cooperative agreements to make them crystal clear to all parties.

The Forest Service must include the State Foresters in planning processes. FACA should not interfere with clear communications between our organizations. When we plan together as partners, we will work together as partners. The States will be far more enthusiastic about implementing “our” plans than we will be in implementing “their” plans.

It is not just a Federal and State conversation anymore either. We now have a three-way discussion including municipal and rural fire districts with which we work in the interface—the people who do provide structural protection in the wildland-urban interface. Those organizations need to be involved in

the discussions to ensure that we are solving problems rather than creating them.

Fire Costs

The last issue is fire costs, which have escalated rapidly over the past several years and have now become a major issue with your State fire agency partners. Many State agencies are very reluctant to call for Interagency Class I teams because of the high costs associated with their involvement—costs not necessarily dependent on the fact that Class I teams mostly handle large, complex fires that do cost more to suppress.

Costs must become a factor in all fire suppression to ensure the most economical use of taxpayer dollars. Every team must consciously consider the costs of alternative suppression strategies. Our constituents will accept nothing less than effective, efficient, economical, and safe wildfire suppression practices.

In conclusion, I was pleased to have attended the Forest Service's National Leadership Team meeting to participate in discussions on the FIRE 21 initiative. The Incident Command System wildland fire protection partnership is an outstanding example of interagency cooperation in government today. The State Foresters are proud to be partners. ■



THE ROLE OF LEADERSHIP IN AN ECOSYSTEM APPROACH TO FIRE MANAGEMENT

Hal Salwasser

Successful implementation of FIRE 21 depends on all of us in the USDA Forest Service. The Washington Office fire staff alone cannot make it happen. Our regional staff members cannot make it happen by themselves. FIRE 21 requires active leadership from all regions working with all our staff members, including temporary and seasonal employees.

Caring for the Land

As we all know, resource conservation is the fundamental job of the Forest Service. The perpetuation of healthy and resilient fire-dependent ecosystems is emerging as one of the biggest conservation challenges of the day. In the Northern Rocky Mountain area, fire or the lack of fire has had a profound effect across the landscape. It may well be the prime factor around which ecosystem management should be organized.

We are a science-based profession. But effective community relationships, above and beyond what science tells us, are key to successfully accomplishing all that we do. At stake are not only the resiliency and productivity of fire-dependent ecosystems but also the safety of people and the long-term capacity of the land to support the people who depend on it.

We are developing a strategic leadership framework to provide a

Hal Salwasser is the regional forester of the USDA Forest Service's Northern Region, Missoula, MT.

"FIRE 21 can help us take what we know about fire, add what we continually learn from research, and integrate this information into our annual work, the next generation of Forest Plans, and our reinvention process."

clear description of who we are, what we do, why we do it, the end results we are seeking, and how we operate. Our principles are based on the "Forest Service Ethics and Course to the Future" (Thomas 1994) and are designed to complement this foundation and vision.

We believe that sound science underlies our conservation efforts. But we cannot expect people to support our actions if they don't



Regional Forester Hal Salwasser presents a Northern Region perspective on FIRE 21 in this article based on his presentation to Forest Service leaders. Photo: USDA Forest Service, Northern Region, Missoula, MT.

understand the basis for them. FIRE 21 can help us take what we know about fire, add what we continually learn from research, and integrate this information into our annual work, the next generation of Forest Plans, and our reinvention process. The ecological, social, and economic impacts of recent fire seasons gave us powerful lessons. They will not be lost as we revise our land management strategies.

Leadership in the Northern Region

In the Northern Region, we have conservation responsibilities for some 25 million acres (10 million ha). On average, we can expect some 1,500 fires to burn about 50,000 acres (20,000 ha) each year. But, of course, we rarely have average years. During years of drought, we can expect about twice the number of fires and up to 10 times the acres burned. These extreme years are costly in terms of lives, property, and finances. Through prevention and presuppression actions, we can reduce these impacts. We can target high-priority areas such as the wildland-urban interface. But we cannot prevent all impacts everywhere.

There's little question that we need to do more if we are to protect, restore, and sustain healthy, fire-dependent ecosystems.

- We will integrate all aspects of fire management with ecosystem

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management and the land management planning efforts underway.

- We will be more opportunistic. When conditions are right for the use of fire, we will switch from a suppression mode to a prescribed burning mode.
- We will be smarter and consider the longer term. Our recovery and rehabilitation efforts on recently burned-over areas may provide the best opportunity to reduce the susceptibility to future catastrophic wildfires. While we need to stabilize burned-over sites, we should not be planting so many trees that we set ourselves up for a subsequent disaster.
- Starting right now and building on results of the Upper Columbia Basin Project, we can take a more holistic, integrated approach. Our vegetative management strategies will integrate the full range of options to get us where we need to be. Grazing practices, timber stand improvements, harvest practices and schedules, and prescribed burning will all be aimed toward protecting and sustaining healthy, resilient ecosystem conditions within the natural dynamics of that particular system.
- We will mobilize more of our workforce to fight fire during emergencies. We will also mobi-

lize more of the tools available to us to prevent the forest stand conditions that predispose costly, dangerous wildfires.

- We will establish land management objectives that are more compatible with the ecological dynamics that define the forests and grasslands we manage.

Our policies enable us to do the job we need to do. We must not rely on wildfires to meet resource objectives, particularly when, in doing so, we circumvent National Environmental Policy Act regulations and jeopardize the public trust by failing to adequately assess tradeoffs.

We will continue to use the Escaped Fire Situation Analysis process to control costs and establish the right level of suppression once a fire has escaped initial attack. But before a wildfire starts, we must reexamine the management practices and traditions that may lead to large, damaging wildfires. In managing fire-dependent ecosystems, we will have to make our case with the communities that look to us as conservation leaders.

Cost-Effective, Well-Managed Budgets

The fire budget is key in enabling us to restore and protect fire-dependent ecosystems. We need to be

more rigorous in ensuring that fire-related budgets are cost-effective and managed as intended. In some parts of the country, fire dollars getting to the ground are 30 percent below "Most Efficient Levels." Several factors help explain this shortfall:

1. The costs of doing business are increasing faster than anticipated in our long-term planning.
2. The indirect costs coming to fire are growing as the budgets in other program areas are declining.
3. Cooperator funding and contributed dollars from other sources are declining.

To successfully implement FIRE 21, we must reduce the cost of wildfires, ensure the safety of our people and the public, and provide for the health and resiliency of fire-dependent ecosystems. As conservation leaders, we will restore and protect fire-dependent ecosystems to sustain their multiple-use benefits for people, both for this generation and for many generations into the future.

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WILDFIRE SUPPRESSION SUPPORT AS PART OF FIRE 21

Robert C. Joslin

Nationally there is a concern about the availability of personnel to support suppression operations on wildland fire. When we discuss fire readiness and hold fire program reviews with various forests, we hear about the lack of personnel to support fire suppression.

Specifically, a small percentage of the Forest Service's total workforce engages in emergency firefighting. In 1994, only half of the Forest Service's 30,000+ employees had redcards. Of this redcarded group, only 25 percent performed 75 percent of the total fire assignments, many spending the entire season in support of suppression operations.

To help solve the problem of personnel availability to support fire suppression operations, we've heard many proposals, including using temporary hires and volunteer fire departments. Most readily available are our own people, but for whatever reason, many have not become involved in the incident response effort.

Robert Joslin is the regional forester for the USDA Forest Service, Southern Region, Atlanta, GA.

Chapter 5130 of the "Forest Service Manual" directs that "Every Forest Service employee has a responsibility to support and participate in wildfire suppression activity as the situation demands . . ." yet we know that we do not have firefighting resources readily available to support unit, regional, and national incidents. Some unit managers still place other program priorities ahead of emergency response, which conflicts with our policy. We may not be providing the direction and commitment needed to encourage the general workforce to become trained, qualified, and available for support of fire emergencies. We need to be held accountable to see that our focus is on response when emergency situations occur.

We recommend placement of a duty statement for support of wildfire suppression in every Forest Service employee's job description. Also, all vacancy announcements should make it clear that fire suppression is a part of the position. The suggested addition would read: "Performs wildfire support as directed within training and physical capabilities."

The Southern Region's Labor Management Partnership Council has reviewed and concurred with this



Regional Forester Robert C. Joslin recommends that in support of FIRE 21, the Forest Service adopt a change to the position description and vacancy announcement. Photo: USDA Forest Service, Southern Region, Atlanta, GA.

wording and position description change. Therefore, no local negotiations are required at forests with the National Federation of Federal Employees bargaining units. Forests with American Federation of Government Employees locals must meet their impact and implementation bargaining obligations.

We must answer two questions: 1) Should the entire agency adopt the change to the position description and vacancy announcements? 2) Should we assure that all line officers are held accountable to meet this commitment? I suggest and recommend that the answer is yes to both questions. ■



MONITORING LIVE FUEL MOISTURE— A TASK FORCE REPORT

David R. Weise and James M. Saveland

Current operational fire behavior prediction methods in the United States generally have not been reliable for predicting fire behavior in fuels dominated by living vegetation. Because live fuels were not included in the scope of the foundation research that led to the development of the Rothermel fire spread model (Rothermel 1972), fire behavior predictions from methods based on the Rothermel model such as BEHAVE (Burgan and Rothermel 1984, Andrews 1986) and FARSITE (Finney 1995) have only very limited application to specific ranges of live fuel conditions. Thus, fire managers cannot directly use live fuel moisture (LFM) data in a fire behavior prediction model and expect reliable fire behavior predictions. To appropriately use LFM information, fire managers must first relate observed fire behavior in live fuels to the most representative LFM data.

LFM's alone do not indicate how a fire will behave. In both live and dead fuels, fire burns according to specific conditions of the fuels, weather, and topography. Whether or not a fire spreads in live fuels depends on many factors, LFM being just one of many. However, for a given area and fuel type, fire

With a relatively modest commitment of personnel and equipment, methods used to gather live fuel moisture (LFM) data can be standardized.

Once LFM data is included in existing reports, the relationship between LFM and fire behavior can be established.

managers can use LFM's and moisture trends to estimate the potential for certain kinds of fire behavior (fig. 1). This estimate, as with fire-danger rating, is strategic level information and supports strategic decisions only. Tactical fire behavior information in live fuels must be gained by observing the actual fire behavior at the head, flanks, and back of specific fires.

Current Live Fuel Sampling Networks

A few LFM sampling efforts have been established across the country—some are rigorous and broad ranging, others are localized, and some sporadic. Generally, efforts have been started to help managers anticipate changes in vegetation important to prescribed fire planning and wildfire preparedness. Consistent sampling routines that

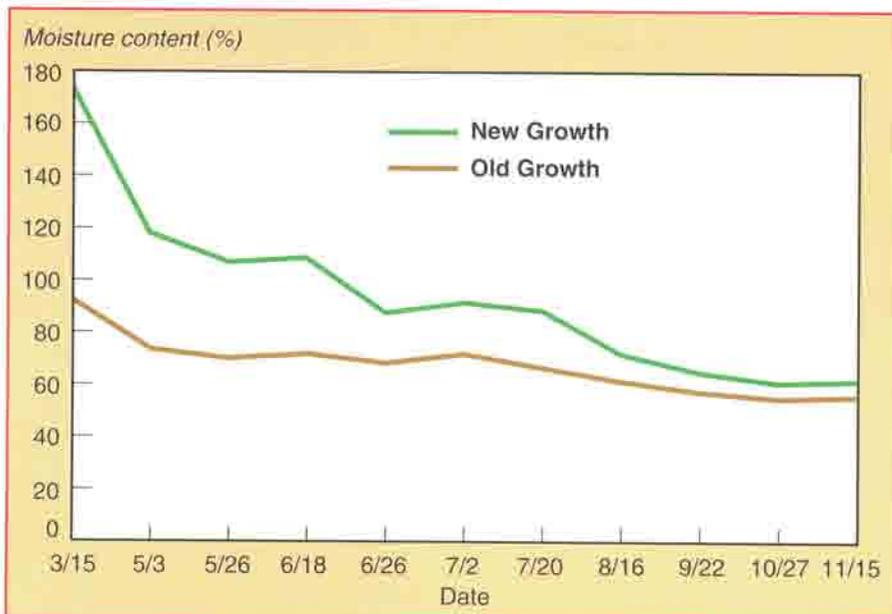


Figure 1—An example of live fuel moisture (LFM) sampling during 1995. Fire managers can use LFM data and moisture trends to estimate the potential for certain kinds of fire behavior. Illustration: David R. Weise, USDA Forest Service, Pacific Southwest Research Station, 1996.

David Weise is a supervisory research forester, Prescribed Fire Research Work Unit, USDA Forest Service, Pacific Southwest Research Station, Riverside, CA, and Jim Saveland is a fire ecologist, USDA Forest Service, Forest Fire and Atmospheric Sciences Staff, Washington, DC.

THE LFM TASK FORCE AND ACCOMPLISHMENTS

A task force to develop a live fuel moisture (LFM) sampling network was chartered in 1994 on the basis of recommendation A.8 by the South Canyon Fire's Inter-agency Management Review Team (IMRT). The chair of the LFM Task Force was Jim Saveland; other team members were Jack Cohen, Corey Grant, Roberta Hartford, Roger Inman, Larry Mahaffey, Melanie Miller, Steve Petersburg, David Weise, and Greg Zschaechner.

The IMRT recommended that the LFM Task Force: "Identify wildland fuel types in which predicted fire behavior can be strengthened through the collection and management of live fuel moisture data. For each of these fuel types, identify that portion of the fuel type (i.e., foliage, stems, boles, blades) on which live fuel moisture data can provide data for analyses. Determine the timing, method, and location of data collection; the frequency of data collection; the distribution of the data analyses and

inclusion of the data in fire behavior predictions" (IMRT 1994). The LFM Task force assessed the current state of knowledge, described several ongoing efforts, proposed a 2-year implementation of a network, provided guidelines for collecting LFM data, and made 13 recommendations to the IMRT. They completed their report and submitted it to the IMRT in June of 1995 (Cohen et al. 1995). This article highlights key points of the LFM Task Force report.

have been carried out for several years and combined with fire behavior observations have yielded guidelines for expected fire behavior and necessary suppression tactics related to LFM content ranges.

The Nevada State Office of the U.S. Department of the Interior (USDI) Bureau of Land Management (BLM) began sampling LFM in 1980; this effort has expanded to include sites in Oregon, California, Idaho, and Colorado. Fire behavior and tactics guidelines have been developed through sampling efforts. For example, sagebrush foliage is sampled biweekly throughout the potential wildfire and prescribed burning seasons; the season-to-date moisture contents are graphed by site, and then the graphics are published periodically for distribution among BLM offices. The sampling has been found to be an effective tool for alerting fire personnel of potential fire behavior or severity in specific areas as well as providing an indicator of seasonal progression over broader areas.

During the past few years, some isolated BLM district offices, in cooperation with USDA Forest Service districts in Arizona, have been informally sharing LFM measurements in the Arizona turbinella oak chaparral communities. The research of Lindenmuth and Davis (1973) and Davis and Dieterich (1976) provided a basis for predicting fire spread rates in this fuel type. Leaf moisture content is an important variable considered in the spread rate computations. Fire managers who have been measuring fuel moistures and weather and noting topographic effects and live-to-dead ratios in this chaparral are gaining a sense of the combinations of conditions that categorize fires as those unlikely to continue burning, those likely to spread under typical burn period conditions, and those that are likely to continue to spread well beyond the normal burn period. These observations have been useful in guiding prescribed burning as well as in forming expectations of wildfire suppression techniques and safety precautions that may be required given specified fuel and weather conditions.

LFM sampling of big sagebrush at the Dinosaur National Monument in Wyoming has been carried out since 1987, following methods and procedures of Norum and Miller (1984), to help improve fire behavior predictions for an active prescribed fire program. LFM's were found to roughly correlate with observed phenological stages: They also responded to weather patterns. Use of measured fuel moistures improved fire behavior predictions using the Rothermel (1972) fire spread model with fuel model 5 with correction given to the windspeed input—the 20-foot (6-m) measured windspeed is used rather than an adjusted midflame windspeed. Empirical guidelines for thresholds of fire behavior have also been gained by observation of prescribed fires and wildfires along with knowledge of LFM.

The Forest Service's Pacific Southwest Research Station at Riverside, CA, and the California Department of Forestry and Fire Protection (CDF) maintained a sampling network to track LFM contents of manzanita and chamise from the

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late 1970's to the mid 1980's (Countryman and Dean 1979). The applicability of the system to real-time fire behavior information was limited because of the timelag between sample collection and distribution of results. The network has since been reduced in scale, but the County of Los Angeles Fire Department and the Los Angeles City Fire Department have vigorously continued using it. They sample LFM currently at 12 locations in the county every 2 weeks, summarize it by area and species, and distribute this information internally and externally. Some national forests in southern California and the southern California region of CDF have continued to sample selected species.

A 1994 survey of fire managers in the United States yielded a list of many sporadic-to-frequent samplers in a full range of fuel types. Most commonly, 1,000-hour or 10-hour dead fuels were listed as the primary fuel of interest. Understory vegetation, shrub crowns, and conifer foliage were also among the sampled fuel components. A variety of collection and drying methods have been used by these samplers to gauge seasonal trends and to calibrate the National Fire-Danger Rating System (NFDRS) (Deeming et al. 1977, Burgan 1979, 1988) at manual weather stations. Some fire managers have attempted to relate observed fire behavior with measured fuel moistures.

LFM Pilot Program

The LFM Task Force originally recommended that the proposed program be implemented in two phases—a pilot year in 1995 and full-scale implementation in 1996. The practicality of the sampling procedure, the inherent variability

of LFM, the delivery system that shares the information with other users, the reasons for failure or cessation of previous programs, and the location of current and needed monitoring sites were to be evaluated in the pilot year by members of the LFM Task Force. Based on the results of the pilot year, modifications to the pilot program could be made and recommended to the agencies for full-scale implementation before the 1996 fire season. The recommended implementation dates have since been changed to a pilot year in 1996 with full implementation in 1997.

Implementation of the LFM Network

To prevent duplication of efforts and minimize travel, the task force recommended that sites be selected with interagency partners to obtain area coverage, interagency coordination, and collection. The species collected should either be the one that carries the fire or is considered to be representative of all the species in a fuel complex. The site should be located near a remote automated weather station (RAWS) or in an area with weather well represented by a nearby automatic or manual weather station so that long-term fuel moisture cycles can be correlated to weather.

The task force report recommended that LFM be sampled every 2 weeks, well before the fire season begins and into the fall, and between 11 a.m. and 4 p.m. To adequately understand the variability of LFM on a particular site, a sample size of 20 plants was recommended for the pilot year. Sampling density was anticipated to be greatest in the first year. Sample size could be adjusted in the following years based on costs of do-

ing business, desired level of accuracy, and utility of information.

The equipment needed to monitor LFM is relatively inexpensive (\$1,200), including aluminum soil cans, a forced air convection oven, and a top-loading electronic scale. Although other devices may provide faster estimates of LFM, the task force recommended ovens because they can dry many larger samples at once. Other equipment needed includes clippers and a carrying case. The task force also described weighing and drying procedures and computational steps.

Data Use and Limitations

Given a particular management area, a fire manager can use LFM to judge the potential fire behavior severity. A full range of LFM information must be related to fire behavior, ranging from nonexistent to severe. The identified fuel moisture regimes (related to fire behavior) become a tool for strategic level decisions in the same context as the NFDRS rates the potential for fire behavior. The information describes a general fire potential condition. Tactical decisions related to fire behavior must be done with site-specific considerations. For example, in conducting prescribed burns, LFM information may indicate areas and times for planning burns (strategic decision), but the manager must use test fires to determine if and how the burns will be conducted (tactical decision).

Fire managers cannot use LFM for decisionmaking without first relating LFM to observed fire behavior. A fire manager cannot simply collect LFM data for input into an available fire prediction model

such as BEHAVE (Burgan and Rothermel 1984, Andrews 1986) and expect reliable fire behavior estimates. Current fire behavior prediction models are limited in their ability to address fire behavior in predominantly live fuels. Fire managers must use additional means for estimating fire behavior potential in live shrub fuels and conifer canopies. Although some fire managers have successfully used fire modeling for live fuels, the application is limited to a specific, predetermined range of conditions. The local fire manager must determine this applicable range of conditions by carefully relating fire model estimates to observed fire behavior.

LFM information must be correlated to fire-behavior observations, since fire occurrence reporting is currently inadequate to assess the quality of fire-danger systems and decisions. When revising reporting mechanisms such as FS 5100-29 and DI-1202 (used by all USDI agencies), managers should include information about the following items: fire growth per day, description of the fuel that carries the fire, and gross qualitative descriptions of fire behavior such as whether the fire is burning at night or downhill and whether significant spread is occurring on flanks.

Conclusion

Current scientific knowledge that can aid in the understanding of the relationship between LFM and fire behavior prediction is limited. LFM data, correlated with observed fire behavior, is valuable for predicting fire behavior; however, there is an immediate need to standardize the methodologies used to gather LFM data in ongoing local efforts. This effort can begin with a relatively modest commitment of personnel

RECOMMENDATIONS OF THE LFM TASK FORCE

- Implement live fuel moisture monitoring program in two phases—a pilot year in 1995 and full-scale implementation in 1996.
- For pilot year implementation, use sites that are already equipped to monitor live fuel moisture using task force guidelines.
- Monitor and determine live fuel moisture content at the lowest possible organizational level.
- Disseminate live fuel moisture information through the intelligence officer at interagency dispatch centers. Coordinate site location through the dispatch centers.
- Sample vegetation of concern and determine live fuel moisture using the protocols contained in this report, which are based on previously established methods (Countryman and Dean 1979, Norum and Miller 1984).
- Estimate mean live fuel moisture and the error associated with the mean for each site for each set of 20 samples.
- Document fire behavior associated with wild or prescribed fires in the vegetation of concern to increase the usefulness of live fuel moisture data.
- Assess the statistical accuracy and sampling costs associated with the pilot year implementation.
- Develop a method to archive the data so that it is readily accessible to fire managers and researchers. The Weather Information Management System is one potential archival location.
- Determine reasons for failure of previous monitoring efforts.
- Consolidate existing live fuel moisture data to aid in further refinement of monitoring protocols.
- Publicize the limited use of live fuel moisture in tactical decisionmaking and its greater use in strategic decisionmaking.
- Revise forms such as FS 5100-29 and DI 1202 to include both qualitative and quantitative descriptions of fire behavior and fuels.

and equipment. Existing fire documentation reports can be modified to facilitate the collection of LFM and fire behavior data. Several years of data collection and analysis will be needed to establish the relationship between LFM and fire behavior. The sustained nature of the project will require a commitment of fire managers as well as researchers.

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HOW TO ORDER THE "FEDERAL WILDLAND FIRE MANAGEMENT POLICY AND PROGRAM REVIEW"

Jill R. Style

The final report of the "Federal Wildland Fire Management Policy and Program Review" is now available. Chartered by the Secretaries of the U.S. Departments of Agriculture and the Interior, this report presents potential policy changes in areas such as pre-

scribed burning, fuel management, fire suppression, and wildland-urban interface protection.

The principles and policies outlined in this report are intended to strengthen cooperation between governmental agencies and to increase safety measures in wildland fire suppression. A common ground in fire management policies throughout the country is essential for controlling wildfire and for saving lives.

Tribal, State, and local governments are encouraged to form

their own fire management strategies based on these guiding principles.

The "Federal Wildland Fire Management Policy and Program Review" can be obtained without cost by writing the Bureau of Land Management's Office of Fire and Aviation, National Interagency Fire Center, Attn: External Affairs Office, 3833 S. Development Avenue, Boise, ID 83705-5354. Orders can also be made by telephoning 208-387-5457 or by faxing 208-387-5386. ■

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FEPP USED FOR COOPERATIVE FIREFIGHTING

Bill Peters

Interdepartmental cooperation in San Bernardino County, CA, has resulted in a very unique wildland firefighting program. This program uses a U.S. Army helicopter that is part of Federal Excess Personal Property (FEPP). In cooperation with the California Department of Forestry and Fire Protection's (CDF) San Bernardino Ranger Unit, the FEPP helicopter was refurbished and outfitted and is now flown by the San Bernardino County Sheriff's Department (SBSD). This combination of Federal, State, and county resources to improve public safety is an excellent example of governmental cooperation.

Cooperation Begins

The cooperative program began limited operation in 1990 when the SBSBD's pilots, using one of their own Bell U-H1 helicopters, assisted the CDF and USDA Forest Service on interagency prescribed fires for vegetation management. Although these fires were under control, assisting on these fires gave the pilots valuable training and experience. For instance, the pilots learned the basics of water dropping. Because experts in aerial firefighting from the CDF and the USDA Forest Service supervised the training of the SBSBD's pilots, the pilots subsequently obtained verification of their firefighting proficiency.

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"The Copter-305 Project saved taxpayers' money, had a fast response, performed exceptionally well on fires, and was available year-round."

Although at the beginning of this interagency program, the SBSBD was using its own equipment, in November 1991, the H-305 firefighting program got a lift. The CDF, through the Forest Service, obtained a FEPP helicopter. Displaying a major commitment by CDF and the SBSBD to the Copter-305 Firefighting Project, CDF loaned the helicopter to the SBSBD,

which agreed to refurbish and outfit the aircraft for future wildland firefighting.

Cooperation Proves Valuable

During the High Fire Hazard Periods of 1992 and 1993, the Copter-305 Project came into its own. Copter-305 is stationed at the CDF's Prado Conservation Camp in Chino, which houses CDF and California Department of Corrections' inmate fire crews, including the helicopter's crew.

When Copter-305 responds, the crew is dropped off to attack hot spots, perform clearing operations, and work in conjunction with the

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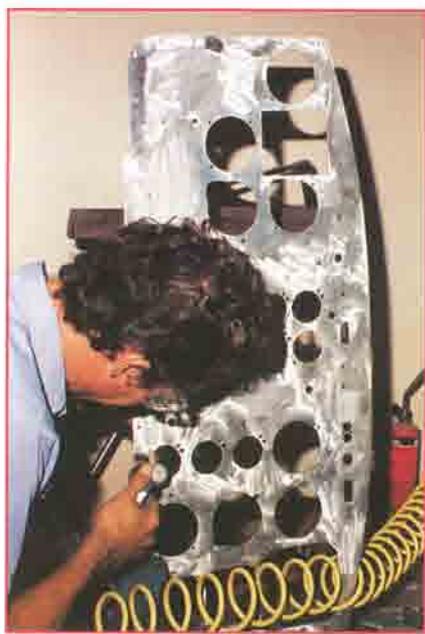


FEPP helicopter as it appeared in 1991; it hadn't been flown since early in 1988. Photo: CDF, San Bernardino Ranger Unit, 1991.

helicopter in line cutting and water dropping operations. The Copter-305 Project saved taxpayers' money, had a fast response, performed exceptionally well on fires, and was available year-round. In 1993, the project became a true firefighting operation when it was designated as an initial-attack resource. The fire siege in California during the fall of 1993 required Copter-305 to log 175 hours on fires, and it added a nine-member hand crew for firefighting.

FEPP Helicopter Transformed

Meanwhile, mechanics from the SBSB Aviation Division continued to work on the FEPP chopper. The mechanics, who finished their arduous task in May 1994, rebuilt the Bell U-H1 from the frame up, using parts that were either built inhouse, obtained from other FEPP equipment, or were purchased to meet their needs. When the Copter-305 was ready, it went to the paint shop. There it received a paint job that matched the



From 1991 to 1994, Copter-305 was completely rebuilt. Photo: CDF, San Bernardino Ranger Unit, 1994.



Flown by SBSB crew, the Copter-305 has logos and markings from both CDF and the SBSB. Photo: CDF, San Bernardino Ranger Unit, 1994.

uniqueness of the program itself—it combined recognizable markings and logos from both the CDF and SBSB.

On June 23, 1994, the new Copter-305 lifted off under its own power for the first time since February 1988. With a nearly new jet engine, 10,000-hour composite blades, and numerous other improvements, the former Army electronic warfare helicopter was ready to respond to a new type of combat. Copter-305, ready to begin its second career fighting fires, was officially placed into service on July 23, 1994.

Pilots who fly the ship say the power and lift are exceptional. While flying with a fully loaded “Bambi” bucket that holds 350 gallons (1,325 l), pilots say that you can tell the ship has a load, but there is still plenty of power to lift it off the ground.

For the 1995 High Fire Hazard Period, Copter-305 logged over 287 hours. Of these, 248 hours were on fires, 22 hours were on vegetation

management projects, and 16 hours were training related. Copter-305 and crew responded to 105 fires, taking action on 71 of these, and they were “first on scene” on 11 fires.

In 1995, the Copter-305 Project conducted 2,113 water drops, placing 681,425 gallons (2,579,474 l) of water on fires. As a transport vehicle, Copter-305 flew 755 firefighters to and from firelines. (Note: This figure does not count the inmate flight crew assigned to the helicopter.) Copter-305 also transported more than 7,100 pounds (3,221 kg) of cargo during fire operations. In addition, the helicopter flew 8 to 9 hours in a reconnaissance role and made four flights for medical emergencies from firelines.

The success of the program has created a great deal of interest because of its unique cooperative efforts. The program is the first of its kind in California and is setting the example for intergovernmental cooperation in public safety. ■

PACIFIC NORTHWEST CONTRACTS FOR ENGINES, TENDERS, AND CREWS



Arnie Masoner

Times have changed in the Pacific Northwest and other areas of the United States for agencies responsible for wildland fire suppression. Many agencies no longer own large fleets of specialized firefighting equipment, and decreasing budgets have forced dramatic downsizing of agency personnel available for wildland fire work. Yet the wildland fire workload continues to exist and there is still a need for the specialized equipment and trained personnel to work on large fires. Over the last several years, the Pacific Northwest and other areas of the U.S. have turned to the private sector for specialized equipment and trained personnel for fire needs. Agencies have always used emergency equipment rental agreements (EERAs) to supplement their own equipment, but usually not for highly specialized fire equipment like engines and tenders that meet Incident Command System (ICS) standards. Many times, personnel hired with equipment under the EERA process had little, if any, training in fire suppression, and the equipment often did not meet ICS standards.

New Source of Work for Contractors

With the agencies turning to the private sector for their needs, a new source of work was made

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Fire crews are short-handed with recent government downsizing—contractors have the necessary equipment and personnel to help fight fires.

available for the private contractors. It is estimated that well over 1,000 contractors in the western part of the United States have equipment and personnel available for fire work. National and local associations have been formed by the private contractors, similar to the associations formed by caterers and air tankers. Some of these associations, such as the National Wildfire Suppression Association (NWSA), have established their own training standards that meet or exceed NWCG 310-1 requirements and they require their members to follow certain rules. In addition, they issue photo identification cards similar to agency red cards that show the positions their employees are qualified for and their step test scores.

A Little History

The transition from using agency equipment and personnel on fires to using contracted equipment and crews has not been easy. Much credit should be given to the Oregon State Department of Forestry for pioneering the efforts to con-

tract for crews. This was an effort spurred by economics that proved to be very successful. However, there were problems:

- The tremendous increase in the numbers of contract equipment and personnel created a management impact on the agency's personnel.
- Many managers needed additional training to understand and administer the contracts. Some resented the fact that contractors were being used; they wanted to return to using agency-owned equipment only.
- Dispatchers were harassed by contractors wanting to go to fires.
- Fire chasing became prominent.
- Some contractors took advantage of the situation and sent "junk" to the fires instead of highly specialized equipment.
- Contractors meeting specifications and those that did not were paid the same rate.

Something needed to be changed. After the 1990 fire season, an inter-agency group met to discuss the problems and come up with solutions. This group consisted of the members of the Pacific Northwest Wildland Coordination Group: The Washington Department of Natural Resources, Oregon Department of Forestry, the USDA Forest Service, and USDI agencies—the Fish and Wildlife Service, Bureau of Land Management, Bureau of Indian Affairs, and National Park Service.

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This group requested input from the fire suppression community on the problems and recommendations for solutions. Using input from the field, they decided to develop a set of standards for contracted equipment and personnel. The group had three primary objectives: 1) Ensure that safe and effective equipment was provided, 2) develop a system to deal fairly with contractors, and 3) ensure that qualified personnel were provided. Many meetings occurred with lots of discussion and negotiation on various items.

The Product

One interagency contract for crews and one interagency contract for engines and tenders were negotiated at these meetings. Any of the agencies could order resources from either contract. The Oregon Department of Forestry issued the contract for crews, and the Forest Service issued the contract for engines and tenders. To make this an interagency contract, each agency's boiler plate clauses had to be attached to the basic contract. The contract set standards for equipment and personnel. Rigid inspections were required for equipment, and the contractor was required to prove that his or her personnel had been trained prior to award of a contract. The contractors provide personnel, hand tools, personal protective equipment, transportation, liability insurance, and required labor and industry insurance. The contractor paid their employees, and, in turn, the agency paid the contractor. The first year everyone learned a lot! As

with anything new, there were problems. However, the contracts showed promise, and over the next several years, the interagency group and the private sector worked toward improvement.

Use of Contract Resources

Acceptance of the contracts by agency personnel and the private sector is not total by any means. On both sides there are some who believe the contracts are a mistake. Many agency personnel believe the contract community is getting rich with the use of the contracts. The contractors are concerned that they have to invest thousands of dollars to bring their equipment up to specifications and train their personnel with no guarantee of any work unless there is a fire. 1994 was a good year for contractors. During the peak of the 1994 fire season, contract resources were used heavily. A report from the NWSA showed their members provided over 120 crews (each crew included 20 members), over 300 engines, and 150 tenders. Many other contract resources were also used during this siege. However, the 1995 season proved to be a year in which many contractors spent thousands of dollars to meet the agency requirements and were not sent on any fires. Some of them have become bankrupt and are no longer in business.

The Future

There is no question that agency resources available for fire suppression have declined dramatically, and all indications are that

this decline will continue. There is still a need for firefighting resources. Contracts with required equipment specifications and qualifications for personnel may provide the primary method to fill this void. Everyone involved in the fire suppression effort needs to meet the established requirements for this dangerous work.

The use of contracts for engines and crews may be just the beginning. Highly trained and experienced resources are available from the private sector. Some contractors can provide crews that meet the standards for Type I crews. Some contractors have personnel who are qualified as incident commanders, operations section chiefs, division supervisors, strike team leaders, and at other command and general staff levels. Many recent agency retirees, with current experience and national qualifications, are working with contractors. The NWSA believes they could provide a nationally qualified incident management team from their members and associate members.

The agencies and the private sector continue to face the challenge of learning how to effectively work together. It is a problem that must be dealt with and solved soon. I personally believe it can and will be solved when both sides realize that they need to sit down face to face at the table and be willing to give a little on both sides. The overall benefits for everyone involved, including the American taxpayer, will be many. ■

Clinton E. Tempereau

Loss of control lies at the heart of all trauma. From the moment wildland firefighters sustain a major burn, they lose command over much of their world. They will, of course, enter a burn facility where professionals will move quickly to limit their losses, but until control is restored, damage accumulates. At the burn center, many of the words will be unfamiliar: "debridement," "homograft," "flashbacks," "regression," "autograft," "donor site," "volitional collapse." But even though the vocabulary differs from that used on the fireline, the principles of management are the same. In both cases, success depends on prompt, aggressive action by a team of experts, and responsibility rests heavily on each team member. And in both cases, the actions of others may affect the outcome.

The First 48 Hours

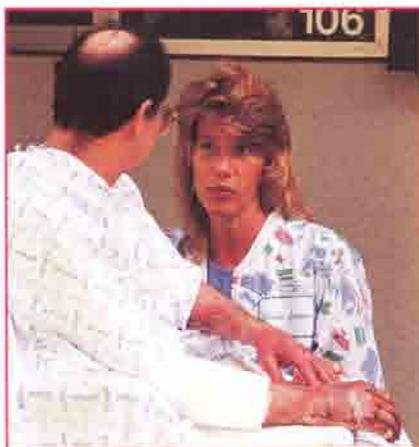
Assume our firefighter is a married man with third degree burns to more than 40 percent of his body surface. Because he is too severely injured to care for himself, responsibility passes to others. For awhile, *his* life will be in *their* hands. Consider "Day One" at the burn center: Team members' first priority is to "reduce traumatic shock and stabilize the patient's condition." They move quickly to administer oxygen, start intravenous fluids, regulate temperature and blood pressure, and provide pain medication and sedation. Then on to cleansing his wounds, dressing the burns, and

Dr. Clinton Tempereau is the chief of psychiatric services, Grossman Burn Centers, Sherman Oaks and Anaheim, CA.

Recovery from a major burn requires professional and nonprofessional support. When a dedicated team of medical specialists and a firefighter's family, friends, and colleagues work closely together, stress is reduced and the inevitable pain and suffering become more tolerable.

designating a primary contact (probably his wife) who will meet regularly with the burn team.

By "Day Two," the treatment plan is in place. Medics are doing their job. Surgery has been scheduled to remove dead tissue (debridement) and apply banked donor skin (homograft). A call has gone out for blood donors. By the end of the day, the overall program is fully operative. But now major events are happening internally to the patient. Toxic breakdown products have entered his blood stream, putting immune system and internal organs under stress. His nervous system keeps replaying its mental tape of



Burn center nurse Elaine Shortall explains procedures for home care to a firefighter who is ready to leave the hospital. Photo: Alan Zuckerman, 1995.

the trauma (flashbacks). A cluster of primitive and childlike behaviors (regression) breaks through in the form of irritability, emotionalism, and exaggerated dependency. None of this is pathological. His built-in acute stress response is working exactly as it should. He is no longer in shock. He has cleared the 48-hour hurdle. He's doing better, *but he's feeling worse!*

The Long Haul

After the dramatic first 36 to 48 hours, life proceeds one day at a time. Adjusting to a daily round of monitoring procedures and dressing changes becomes more or less routine. There will be further surgeries in which thin layers of the firefighter's own skin (autografts) are taken from unburned areas (donor sites) to replace the foreign materials applied earlier. Later there may be touch-ups, scar revisions, and a variety of physical and psychosocial therapies.

During these long days and weeks, much is happening psychologically. Along with stressful experiences come long stretches of quiet time—plenty of time to reexamine priorities and reassess relationships.

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Depletion, Despair, and Loss of the Will to Live

A major burn is an extreme form of trauma. Not just the skin but all internal organs are involved. If a person is truly depleted physically and emotionally for an extended period, it may become impossible to continue to "try harder." A burned firefighter is at extreme risk for volitional collapse, more commonly called *loss of the will to live*. If that happens, all caregivers, professional and nonprofessional alike, should give the person permission to stop an exhausting struggle that is no longer productive, to leave *all* responsibility to others for a while. Experience tells us this is the quickest way to replenish reserves and resume the fight for life.

Support Guidelines

From the beginning, those nonprofessionals who make up the support network—family, friends, fellow firefighters—need to override their panic, put aside their anxieties, and take up their appointed tasks. Here are a few suggestions:

—To the Spouse or Partner

- *Identify your most useful and reliable medical informant.* That may be the primary physician, the patient's personal nurse, or another burn team member—anyone who is qualified to answer your questions and give authoritative advice. A psychiatrist or psychologist may also be available to counsel patient, family, or both. Burn centers differ in the way they deal with psychosocial matters, but you need not be left in the dark.
- *Be at the hospital bedside as much as you can.* In this helpless state, the burned firefighter must depend more than ever on you, partly to take care of everyday tasks but mostly just to be there. You were the "other half" before this accident. Now you're the

"other 95 percent." Any hint of neglect hinders recovery.

- *Be especially generous with physical touch.* Coming from the "significant other" in the firefighter's life, physical touch can lift spirits and even reduce the need for pain medication.
- *Keep the burn victim oriented.* The mixture of potent pain medications, toxicity from the burns, and physiological depletion can cause anyone's mind to drift. Bring your spouse/partner back to reality whenever you can—being helpless and in mental limbo at the same time is terrifying.
- *Take a few minutes to learn about the sickroom equipment.* It's all part of being well informed. You'll feel more secure.
- *Bring in favorite foods.* A burn patient's appetite will diminish, even while the need for calories and nutrients skyrockets. Quantity is more important than quality, though of course any prescribed special diet must be honored. Under no circumstances bring alcohol or drugs.
- *Ask the burn center psychiatrist or psychologist about debriefing and reliving sessions.* As a general rule, carefully supervised reliving of the trauma by the patient in the presence of a trusted confidante (especially the spouse or partner) is therapeutic. Many trauma experts believe this technique reduces the risk of delayed post-traumatic stress disorder, the infamous "Vietnam War Syndrome," in which devastating psychological reactions occur unexpectedly many months after the trauma itself.
- *For now, put concerns about your own emotional state to one side.* No serious harm will be done by suppressing anxiety while you do what you have to do on a loved one's behalf. Parents of a sick child do it all the time and are stronger for it.

—To the Best Friend

- *Provide nonjudgmental acceptance at every turn.* It's the most valuable gift a true friend can offer.
- *If you notice that your friend is becoming discouraged, visit more often.* Be prepared, however, to defer to the spouse/partner. Almost always, this primary caregiver's authority should prevail.
- *Keep in mind that your friend's family members need all the help they can get.* The trauma is theirs as well.

—To Fellow Firefighters

- *Bring in bits of gossip and small talk from the fire camp or Incident Command Post.* It's much like being back for a moment in one's natural habitat.
- *Keep the visits short.* Your stricken colleague will probably try to be entertaining, but that can be very tiring. Exhaustion slows down recovery.

No one emerges from prolonged life-threatening trauma unchanged. Whether the changes are for the better or for the worse depends partly on the firefighter's own reservoirs of strength and partly on the sturdiness of the support network. Loss of control, the defining characteristic of trauma, can almost always be corrected through the combined efforts of the medical staff and the wildland firefighter's family and friends.

Further Reading

- Tempereau, Clinton E.; Grossman, A. Richard; Brones, Michel F. 1990. Psychological regression and marital status: Determinants in the psychiatric management of burn victims. *Journal of Burn Care & Rehabilitation*. 8(4): 289-91.
- Tempereau, C.E.; Grossman, A.R.; Brones, M.F. 1989. Volitional collapse (loss of the will to live) in patients with burn injuries: Treatment strategy. *Journal of Burn Care & Rehabilitation*. 10(5): 464-8. ■

RECIPIENTS OF 1995 SMOKEY BEAR AWARDS HONORED



Janice L. Smith

The Cooperative Forest Fire Prevention (CFFP) Program selected 15 individuals and radio stations to receive Gold, Silver, and Bronze Smokey Bear Awards for 1995. Presented by the USDA Forest Service, the National Association of State Foresters, and The Advertising Council, the statuettes are awarded to those who have made outstanding contributions to the prevention of carelessly caused wildfires.

Golden Smokey Awards

Golden Smokey statuettes were presented to Patrick T. Durland and Rodney C. Kindlund by Mary Jo Lavin, Ph.D., director of Fire and Aviation Management, at a March 29, 1996, ceremony in Boise, ID. Durland is a USDI Bureau of Land Management (BLM) wildland fire prevention specialist in Boise, ID, and Kindlund is a USDA Forest Service Creative Services staff member on the Sierra National Forest, Clovis, CA. The Golden Smokey is the highest award in wildfire prevention; it recognizes exemplary dedication to fire prevention on the national level for at least 2 years.

Since 1991, Pat Durland has been BLM's leader for wildland fire prevention, including the development and implementation of

Janice L. Smith, a technical writer, was a volunteer for the USDA Forest Service, North Central Forest Experiment Station, East Lansing, MI, from January to April 1996.

Smokey Bear statuettes are presented annually to individuals who make exemplary contributions to wildland fire prevention efforts.

modern prevention planning. In addition, the National Wildfire Coordinating Group's (NWCG) Prevention, Education, and Communication Working Team has drawn upon his knowledge and ability to develop a national prevention education curriculum. He has been the driving force behind such national successes as the USDI's "Meet the Wildfire Prevention Team" booklet and Fire Prevention Team POG's (cardboard disks that children use in a game). Because of his efforts, a series of posters featuring Charles M. Russell's art has been produced as well as posters explaining fire's role in nature. Another of his initiatives is the formation of a cooperative approach to prevention and fire education with the interpretive community. In 1993, Durland received a Bronze Smokey.

For the past 12 years, Rod Kindlund has provided graphics for both regional and national programs, including Smokey and the Pros and Smokey and the American Cowboy. He was responsible for placing promotional items in the CFFP catalog such as bilingual fire prevention materials and the

entire collection of "Wildfire Strikes Home" materials. He was the acting manager of National Prevention Special Activities for 2 years and is the originator of the "Smokey Bear Graphic Art Guide and Fire Prevention Clip-Art" binder as well as "The Condensed Guide to Smokey: A Style Manual." Kindlund also helped develop the "Keep It Country, Keep it Green!" campaign which teams up country and western singers with the Forest Service in preventing forest fires and increasing awareness of environmental issues. Kindlund won a Bronze Smokey in 1985.

Silver Smokey Awards

Four Silver Smokey statuettes were awarded in ceremonies across the Nation to those contributing to the prevention of carelessly caused fires in regional or multistate areas for at least 2 years. The 1995 recipients are Steven C. Frady, Jeannette Hartog, Nancy L. Porter, and Billy Jack Terry.

Steve Frady has served as the coordinator of the Sierra Front Wildlife Cooperators for the Nevada Division of Forestry since 1990. He is involved in interagency fire prevention efforts in Federal, State, and local jurisdictions in Nevada and California. Among many other accomplishments resulting in increased awareness of fire danger and the need for defensible space measures, he developed a wildland fire hazard awareness program approved by the Occupational Safety

Continued on page 24



Smokey Bear stands between 1995 Golden Smokey Bear Award recipients Pat Durland and Rod Kindlund. Public Affairs officer Mike Apicello, in Forest Service uniform, accompanied Smokey at the March 29th ceremony in Boise, ID. Photo: Tiana Glenn, Bureau of Land Management, National Interagency Fire Center, Boise, ID, 1996.

and Health Administration for news media that was presented to over 150 journalists in Nevada, Idaho, and Utah. This program has resulted in accurate news coverage of fire-related happenings and increased emphasis on fire prevention and the need for defensible space in wildland-urban interface areas. He is also responsible for the current edition of "Wildfire Protection For Homeowners and Developers."

As the fire prevention specialist for the Forest Service's Intermountain Region since 1991, Jeannette Hartog has made many contributions to the prevention of human-caused wildfires. These have included serving as chairperson of the Great Basin Fire Prevention Working Committee and developing and conducting Great Basin interagency fire prevention workshops. She is a Steering Committee member for the national training course, Ignition Management, and has initiated the adoption of the Ignition Management Assessment Process in her region. As a regional coordinator, she championed a well-coordinated, highly visible celebration of

Smokey Bear's 50th anniversary, both in her region and nationally.

Nancy Porter is the fire prevention specialist for the Forest Service's Pacific Southwest Region. She served as an Incident Commander for California's Interagency Committee for Smokey's 50th and was regional coordinator for the National Smokey Bear Anniversary. She has provided the professional and technical assistance necessary to develop agreements with a variety of partners including Knott's Berry Farm, where Smokey Bear's message has been integrated into various educational programs. In addition to other achievements in Guam, Hawaii, Montana, and elsewhere in the Nation, she has helped develop the training course "Advanced Fire Prevention: Integrating Fire Protection with Ecosystem Management."

Bill Terry, formerly the rural fire defense coordinator for the Northeastern States of the Forest Service, became the national fire prevention officer in Washington, DC, in March of 1996. Terry has developed numerous fire prevention tools over the past 22 years.

For the 50th anniversary of Smokey Bear, he served as the executive director of the Emmy-award-winning children's video "Smokey's Visit." He has been responsible for fire training, State fire council development, and helped in the administration of Federal programs that benefit volunteer fire departments in 20 Northeastern States. Prior to Terry's appointment to the Forest Service, he served as the State wildfire training officer and fire prevention specialist with the Texas Forest Service where he developed a comprehensive fire prevention education program including satellite school broadcasts, a statewide wildfire warning system, and community fire safety seminars.

Bronze Smokey Awards

Bronze statuette recipients have made statewide contributions for a minimum of 2 years in wildfire prevention. Awardees for 1995 include: Rose Ann Edmondson, Lou Gugliotta, Edward F. Jacoby, KOZI Radio Station, KPQ Radio Station, Eileen Machovina, Kathy Sullen, Arthur J. Yagel, and WYOU-WABI Radio.

For over 22 years, Rose Ann Edmondson has worked for the State of Missouri's Department of Conservation. She has coordinated fire prevention programs with 57 fire departments; worked with schools to schedule and conduct fire prevention programs; has been responsible for the development, preparation, printing, and statewide distribution of a children's fire prevention activity book; and participated in numerous activities during Smokey's 50th anniversary celebration.

Lou Gugliotta is the division chief and fire marshal, Jackson County Fire District 3, in southwest Oregon. His contributions include acting as the driving force behind the Rogue Valley Fire Prevention Cooperative; developing a 6-1/2-acre (3-ha) exhibit on Smokey Bear and fire prevention at the Jackson County Fair over the past 11 years; serving as project coordinator for the Pacific Northwest Region's version of the "Firesafe" video; serving on the committee for Smokey's 50th national celebration; and in 1987-88, working with a Forest Service group that aided Mexico in developing a national fire prevention program.

Ed Jacoby was the superintendent of forest fire control for New York's Department of Environmental Conservation from 1985 to 1995. In September of 1995, Jacoby was appointed to serve as director of the New York State Emergency Management Office. As superintendent of New York's Forest Rangers, Jacoby arranged for Smokey to be the major attraction at the Professional Rodeo Cowboy Association finals at Albany's Knickerbocker Arena, made the initial contact for the Smokey historical balloon to be flown in the Macy's Thanksgiving Day Parade in 1993, worked with the Friends of Smokey organization to take the Smokey hot air balloon to numerous area balloon festivals, and helped to bring about the New York State Senate Resolution proclaiming August 6, 1994, "Smokey Bear Day in New York State." This is Jacoby's third Bronze Smokey, receiving his first in 1976 and second in 1987.

Eileen Machovina has worked as the lead fire prevention officer for the Hurricane Andrew Wildfire Prevention Project for the last 2 years. She has developed two fire prevention videos that are shown throughout Florida, arranged for special Smokey appearances with the Florida Marlins baseball team and Florida Panthers hockey team, and also developed wildfire prevention exhibits at the Dade County Youth Fair and the Miami Zoo.

For several years, Washington State radio stations KOZI in Chelen and KPQ in Wenatchee have provided a valuable service to listeners who live in the areas adjacent to the Wenatchee National Forest. They have consistently provided accurate and timely coverage in times of crisis, most recently during the 1994 Chelen County Wildfire. Local listeners were kept well informed of current developments which, in turn, aided in firefighting efforts. Both stations have also provided interviews and numerous public service announcements about forest fires of the past and prevention of such fires in the future.

Kathy Sullen has been a fire tower lookout for Florida's Division of Forestry in the Caloosahatchee (Fort Myers) District for the past 14 years and currently serves as the division's southern fire prevention regional coordinator. She has performed at numerous events as a fire prevention clown known as "Peaches," helped to develop a puppet show on fire prevention for children, and organized an inter-

agency effort to complete an arson wildfire prevention video for teens.

WYOU-WABI Radio, Bangor, ME, has provided consistent coverage, including live broadcasts, of the Maine Forest Service—Fire Control Division's fire prevention events for a number of years, such as Forest Fire Awareness Week during the second week of April. In addition, this station provides numerous interviews and public service announcements about fire prevention to the public.

Arthur Yagel has been a fire prevention specialist and investigator at the West Virginia Division of Forestry since 1982. He has organized annual fire prevention efforts with Smokey Bear, including the Junior Forest Ranger Program, in 9 counties. Yagel also helped in the development of a calendar featuring Smokey and Miss West Virginia, worked with Project Library, served as the State chair for Smokey's 50th Anniversary, and served as a member of the Middle Atlantic Fire Prevention Committee.

Citations were presented to Eileen Bethanis and Walter Jennings, George Geer, Linda Strain, and Theresa Wheeler. The National Weather Service's NOAA and the Bureau of Land Management Cache Unit received plaques.

Nominations are made to USDA Forest Service regional foresters when the call letter comes out in August. ■

SHOUT, "WATCH OUT—SNAG!"



Matt Valdez and Jill R. Style

Firefighters need to be aware of the dangerous and often life-threatening conditions that falling trees and snags can create during all aspects of firefighting in forested areas. In fact, falling trees and snags are one of the leading causes of death and injury for wildland firefighters. For instance, during the 1992 fire season, a Boise National Forest firefighter was killed when struck by a snag that was over 90 feet (27 m) away, and a Pike Hotshot Crew member was injured by a lodgepole snag.

The following discussion, based on the 10 Standard Fire Orders and the 18 "Watch Out!" situations, outlines the steps that firefighters need to take in order to prevent injury from falling trees and snags. These guidelines are based on personal and other firefighters' experiences; they should be taken very seriously in order to save lives.

- **Eliminate hazardous trees while constructing fireline.** Rerouting the fireline is one way to eliminate hazardous trees. Use the correct equipment—explosives, a dozer, or a powersaw—to rid the area of such trees.
- **Know when an area is unsafe.** When hazardous trees cannot be felled safely, flag the area completely, and cut an alternate route for access. Pass on information about the hazardous area to adjoining forces.

- **Be familiar with the area when falling snags are present.** Use extra caution when entering an area where there are falling snags or trees. Know your escape routes and keep them clear. Post lookouts as needed.
- **Know your capabilities and limitations.** Know your strengths and accept that you're mortal. There is no need to be a hero or heroine and end up being paralyzed for the rest of your life. Know the limitations of your colleagues and remind **them** of safe conduct. Be certain your sawyer is qualified and has the right saw for the job.
- **Take breaks in safe places.** When selecting a safe place to take a rest, choose an area that is free of the threat of a tree falling into it. If you are in a hot line situation, pick a spot that is readily available. Keep thinking and watching during rest periods. When your body takes a break, remember—often your mind does too.
- **Be extra cautious on night shifts.** Firefighters are especially vulnerable during nighttime operations due to limited visibility and fatigue.
- **Keep looking up, down, all around.** Look for signs of weakness in trees. This includes trees with an obvious lean to them, burned portions that leave a void, or other types of holes in trees that leave them vulnerable to decay and ultimate toppling. Burning material around the bases of trees can also cause weakness by undermining the root system or the supporting

structure of the tree. Look for wisps of smoke at the top or from a hole in the trunk of the tree. This will let you know that there is fire inside that you cannot see.

- **Stay current with the windspeed and direction.** Any increase in the wind can help you determine if the tree or trees are a hazard. The direction of the wind can also change your initial assessment of a tree. Always know the current windspeed and direction.
- **SNAAAAAAGGGGGGGGG!** Always look up after someone has shouted "snag!" to see where it is going to fall. Otherwise, you may move to the impact spot rather than remain in your previous spot that was safe. Know where it is falling, **not** just that it is falling!
- **Express concerns about your personal safety.** Remember that it is your life that is on the line. When you feel it is necessary, you have the right to voice your opinion and concerns about your personal safety. Don't hesitate to speak up if you feel uncomfortable with the situation or the circumstance in which you find yourself. Firefighting is inherently hazardous. Discuss your concerns with your immediate supervisor or with a safety officer. We are in this together! Once the tree falls on you, the damage is done.

There have been many efforts to educate wildland firefighters on the dangers of falling trees and snags. In 1995, the Boise National Forest, in conjunction with the

Matt Valdez is a station captain for the USDA Forest Service, Pike National Forest, Pikes Peak Ranger District, Colorado Springs, CO; and Jill Style was intern and assistant editor for Fire Management Notes from January to April 1996.

National Wildfire Coordinating Group's Safety and Working Health Team, produced a 15-minute safety video called "If a Tree Falls" that demonstrates these dangers of falling trees, snags, and green trees. This video, like the previous guidelines, is geared toward increasing the awareness of firefighters con-

cerning safety measures to take in these hazardous situations. "If a Tree Falls" received much response last year and sold over 330 copies after its release.

Any agency or organization can order "If a Tree Falls" by writing the National Interagency Fire Center

(ATTN: Supply), 3833 S. Development Avenue, Boise, ID 83705. Orders can also be made by faxing 208-387-5573. Include order number NFES 1847 with your request, and you will be billed \$2.00 plus shipping and handling after the video is shipped. ■

GUIDELINES FOR CONTRIBUTORS

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Fire Management Notes (FMN) is an international quarterly magazine for the wildland fire community. *FMN* welcomes unsolicited manuscripts from readers on any subject related to fire management. (See the subject index of the first issue of each volume for a list of topics covered in the past.)

Because space is a consideration, long manuscripts are subject to publication delay and editorial cutting; *FMN* does print short pieces of interest to readers.

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