

JOHN R. SWANSON

United States
Department of
Agriculture

Forest Service



Volume 45, No. 4
1984

Fire Management Notes

RON CE
GARY SW
JOHN last



Fire Management Notes

An international quarterly periodical devoted to
forest fire management

United States
Department of
Agriculture
Forest Service



Volume 45, No. 4
1984

Contents

- 3 Staying Informed—The FIREBASE System
Arlene Fields
- 5 JEFFCO Interagency Aviation and Fire Service Center
Robert F. Willmot
- 7 The National Wildfire Coordinating Group's Publication Management System Unit
Jim Whitson
- 8 Fire Suppression for College Credit
John E. Roberts
- 10 Building a Fire Prevention Trailer
Ed Eichner
- 12 Burning Another Empire
James B. Davis
- 18 How NIIMS Keeps Qualification Standards From Becoming a Barrier to Interagency Cooperation
Jim Whitson and Dave Hanson
- 19 Complementary Systems—IEMS and NIIMS
Marvin Newell and Jim Whitson
- 20 Smokey's Birthday Celebrated Across the Nation
Gladys D. Daines
- 23 Recent Fire Publications
- 24 The Forest Service
- 26 Fire Lookouts of the Northwest

Fire Management Notes is published by the Forest Service of the United States Department of Agriculture, Washington, D.C. The Secretary of Agriculture has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through September 30, 1984.

Subscriptions may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. The subscription rate is \$7.50 per year domestic or \$9.40 per year foreign. Single copy cost is \$2.00 domestic and \$2.50 foreign.

NOTE—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.

Send suggestions and articles to Chief, Forest Service (Attn: Fire Management Notes), P.O. Box 2417, U.S. Department of Agriculture, Washington, DC 20013.

John R. Block, Secretary
U.S. Department of Agriculture

R. Max Peterson, Chief
Forest Service

L.A. Amicarella, Director
Cooperative Fire Protection

Francis R. Russ,
General Manager

Cover: C.P. Cockrell, first woman employed by the USDA Forest Service as a fire lookout—Olympic National Forest, WA, 1920.

Staying Informed—The FIREBASE System

Arlene Fields

*FIREBASE Manager, Boise Interagency Fire Center,
Boise, ID.*

Whether you are a field practitioner, a researcher, an administrator, an educator, or a student, doing your job right means being informed. In the rapidly changing field of wildland fire, staying informed could mean spending large amounts of time reading journals, reports, proceedings, and hundreds of other information items each year. However, if you use the most efficient information tools available to you, staying informed need not take up so much of your time.

One tool that has already proven its ability to help you keep up with the information explosion is the FIREBASE system. FIREBASE is a computerized file of sources of information related to wildland fire. It is a collection of bibliographic citations and, in most cases, digests of documents and other items dealing with wildland fire. To keep up with new information, citations and digests are continually being added to the file.

When a user requests information from FIREBASE on a particular subject, all items in the file dealing with that subject are automatically retrieved by the computer. As a result, with a very small investment of time, the user is brought up to date on the subject of interest.

- Fire detection
- Fire suppression—including retardants, equipment, and techniques
- Fire behavior—including case histories

- Smoke management
- Fire history—historical fire occurrence in specific areas
- Fire effects—ecological aspects of fire and fire damage
- Fire statistics
- Fire weather
- Fire hazard
- Fire danger indexes
- Fuel management
- Prescribed fires—including both “planned ignition” and “chance ignition” fires

FIREBASE now has approximately 8,800 citations on-line. About 50 percent of the items cataloged on FIREBASE were produced since 1960 and about 30 percent since 1970. However, for historical purposes, the file contains information dating back as far as 1890.

The FIREBASE file contains only bibliographic citations and digests. It should not be confused with systems that store and manipulate raw data. For example, FIREBASE does not contain fire weather data or fire statistics, but it does contain digests of items that deal with fire weather and fire statistics.

Content of FIREBASE

Most of the items cataloged on FIREBASE deal with wildland fire. However, because structural fire is important to wildland fire in areas such as the urban/wildland interface, some structural fire information is also included.

FIREBASE is not restricted to items produced in the United States. Work from dozens of foreign countries, including Canada, the U.S.S.R., and Australia, is represented.

The following list gives the broad topic areas included in FIREBASE:

- Fire and fuel fundamentals—including chemistry and physics
- Experimental fires
- Fire management—general information
- Fire management analysis
- Fire management economics
- Fire management planning
- Fire management training
- Wilderness fire management
- Fire prevention

How To Use FIREBASE

If you wish to have a FIREBASE search made, contact the search center that services your geographic location. When you have determined the exact nature of information you need, call, or write, to make the search request. Make your request as specific as possible. Sometimes it is helpful to identify what you don't want, as well as what you do want, in order to eliminate looking at references that are only of marginal interest. The response to your request will come in the form of a computer printout listing the pertinent references.

If you have a search request and do not know which of the following

search centers to contact, call or write the FIREBASE Operations Center.

Regions 1 and 4. USDA Forest Service, Intermountain Forest and Range Experiment Station, 507 25th Street, Ogden, UT 84401. Attn: Rugh Hyland. (801) 625-5446; FTS 586-5446.

Regions 2 and 3. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, 240 W. Prospect, Fort Collins, CO 80526. Attn: Bob Dana. (303) 221-1267; FTS 323-1267.

Region 5. USDA Forest Service, Pacific Southwest Forest and Range Experiment Station, P.O. Box 245, Berkeley, CA 94701. Attn: Dennis Galvin. (415) 486-3686; FTS 449-3686.

Region 8. Science Library, University of Georgia, Athens, GA 30602. Attn: Ginger Rutherford. (404) 542-4535; FTS 520-2477.

Regions 6, 9, 10, and all foreign requests. Forest Resources Library AQ-15, University of Washington, Seattle, WA 98195. Attn: Dale Burke. (206) 543-7484; FTS 399-1076.

FIREBASE Operations Center. USDA Forest Service, Boise Interagency Fire Center, 3905 Vista Avenue, Boise, ID 83705. Attn: Arlene Fields. (208) 334-9457; FTS 554-9457.

At present, there is no charge for a FIREBASE search. However, as budget and personnel cutbacks continue to be made, a change in the FIREBASE policy might be necessary. Should this happen, we would of course notify users as to the probable charges prior to performing the requested services.

Need for More Information

The ability of the FIREBASE system to keep up with the changing laws, policies, and technologies of wildland fire depends on people like you. There are many more sources of fire information available than the FIREBASE input center can monitor. We need your help.

If you have information in any form—published or unpublished—that should be shared with the fire community, you are urged to send the items to the FIREBASE Operations Center, USDA Forest Service, Boise Interagency Fire Center, 3905 Vista Avenue, Boise, ID 83705. If you would like the items returned to you, please mark your name on each item in a conspicuous place. If the items are already included in the system, they will be returned to you immediately. ■

JEFFCO Interagency Aviation and Fire Service Center

Robert F. Willmot

Fire Management Officer, USDA Forest Service, Arapaho and Roosevelt National Forests, Fort Collins, CO.



The JEFFCO Aviation and Fire Service Center, located just northwest of Denver in Broomfield, CO, celebrated its first anniversary in September 1984. Named for the Jefferson County general aviation facility that is its home, JEFFCO is an idea that took 20 years to realize.

Origins of JEFFCO

For nearly two decades, wildfire suppression experts in several agencies worked to develop a unified approach to firefighting. Wildfire is no respecter of property boundaries or agency jurisdictions, but different policies and administrative approaches are difficult to reconcile. The strong leadership of Jerry Mauk (then Regional Director of Air, Aviation, and Fire Management for the Forest Service) and a general shortage of forest fire protection funds acted as catalysts to make a long-term dream a reality.

How JEFFCO Functions

JEFFCO is an interagency aviation and fire center, unique in concept and operation. It combines the resources of many agencies into one location, under one line of supervision. Federal, State, and county agencies work together in a common environment, doing complementary tasks, not segregated by unit. For example, a State employee may work a regular dispatch shift, dispatching State, county, and Federal resources. The national air tanker

contract may be managed by a county employee. The interagency helitack crew may provide initial attack services on county, State, or Federal fires. JEFFCO performs interagency regional duties in aviation operations, fire dispatching, and cache materials management in an effective, efficient manner.

Mission

JEFFCO is a multilevel service organization charged with supporting governmental agencies and their cooperators in the management and protection of public lands against wildfire and other natural disasters. Participating agencies are the Bureau of Land Management (USDI), Forest Service (USDA), National Park Service (USDI), the State of Colorado, and five Front Range Colorado counties. The onsite base manager is supervised by the Fire Management Officer of the Arapaho and Roosevelt National Forests.

Services

JEFFCO provides services in six general areas:

1. Fire weather data from established stations is broadcast daily to units requesting this information during fire season.
2. Administrative and Forest Fire Information Retrieval and Management Systems (AFFIRMS) data is broadcast daily to units inputting weather data and requesting AFFIRMS information. This data will

be transmitted through the Forest Level Implementation Planning System (FLIPS) when all units are on-line.

3. There are 2 Class I fire crews and 18 Class II fire crews within JEFFCO's jurisdiction that are dispatched upon request.

4. JEFFCO controls two Incident Management Teams at the Class I level and two Class II teams. All overhead management teams and groups are trained and qualified to operate under the Incident Command System. Each team and group is composed of interagency personnel. Units outside the Rocky Mountain Region are often surprised to discover a team composed of county, State, and Federal personnel in response to a request for management of an incident.

5. National Interagency Fire Qualification System (NIFQS) records are compiled, and qualification cards (red cards) are issued through JEFFCO to cooperating units.

6. Transportation, reconnaissance, aerial photography, helicopters, and air tanker aircraft are dispatched by JEFFCO.

Incident Dispatch Center

The nerve center for JEFFCO is the incident dispatch center. Dispatchers at JEFFCO are trained professionals who perform a service for the cooperating agencies. Normal operating procedure is to provide data and resources on a first-come,



JEFFCO Aviation and Fire Service Center, located northwest of Denver in Broomfield, CO.

first-served basis. If two or more incidents are competing for the same resources, priorities are established by the Regional Fire Coordinator, or by a unified command if any of the incidents is not on National Forest lands.

JEFFCO dispatchers do not independently establish policy or make management decisions for the individual land management units. The agency land manager declares the need for incident resources; the JEFFCO dispatcher coordinates the logistics of getting the right resource to the right place at the right time in a safe, cost-effective manner.

Zone Incident Cache

The normal stocking level of the JEFFCO cache is adequate to supply 700 firefighters plus supporting equipment. JEFFCO can be immediately resupplied by Denver's General Services Administration (GSA) regional office or by air from the Boise Interagency Fire Center (BIFC) if the restocking level falls too low during multiple incidents.

Three division-sized radio caches and a helitorch are maintained at JEFFCO. Plans trailers, large generators, and other wheeled equipment are maintained in Fort Collins and

can be dispatched through JEFFCO upon request.

What JEFFCO Includes

JEFFCO is the designated base of one helicopter and a supporting five-person helitack crew. An air tanker with a 2,200-gallon capacity is based at JEFFCO. A fully equipped radio repair shop is also part of the JEFFCO complex. Space is available for three radio technicians to do bench work. Mobile repair vehicles are available for electronic site maintenance.

JEFFCO provides office space for the Forest Service south zone aviation officer and one project pilot. In addition, hanger space is provided for two Forest Service aircraft with adequate tiedown space for visiting aircraft on the ramp.

Outlook

JEFFCO is an accomplishment in its own right. In an era of declining budgets and reductions in services, JEFFCO is an outstanding example of doing more with less. Those of us who have participated in its planning and development are proud of what JEFFCO can do to assist managers of the public lands. The next time you are in the Denver area, please plan to stop at JEFFCO and visit. The coffee is always hot. ■

The National Wildlife Coordinating Group's Publication Management System Unit

Jim Whitson

Staff Specialist, USDA Forest Service, Boise Inter-agency Fire Center, Boise, ID.



In early 1982, the National Wild-fire Coordinating Group (NWCG) recognized that material must be readily available to support the newly adopted National Interagency Incident Management System (NIIMS). Consequently, a Publication Management System Unit (PMS) was chartered to publish, stock, and distribute all supporting documents for NIIMS. This unit is now in place, and the material is available to all users.

The original mission of PMS was to provide support in the management and control of all operational manuals, forms, training courses, and other related publications and documents produced in support of NIIMS. At its May 1984 meeting, NWCG expanded the PMS charter to include all NWCG publications. In the near future, users will have easy access to a variety of fire-related material.

The PMS unit has several functions:

- Maintain an inventory and publish an index of all current publications approved by NWCG. PMS is publishing, on approximately a quarterly basis, a list of material, where the material

can be obtained, catalog numbers, and cost. This list is distributed to the member agencies and to selected individuals.

- Assign publication and form numbers. Nine major subject categories have been established within which specific publications can be cataloged:

Indexes and Glossaries	000-099
Operational System Description and Planning	100-199
System Organization, Function, and Procedures	200-299
Qualifications	300-399
Operations	400-499
Public Relations	700-799
Research and Development	800-899
Administration	900-999

Training: I-ICS

Courses; S-Skill Courses; T-Transition Courses, etc.

For example, the new Fireline Handbook is numbered 410-1, under "Operations."

- Provide initial masters to designated distribution points. Currently, there are three approved

distribution points each with different material. The International Fire Service Training Association distributes several operational documents. The National Audiovisual Center distributes some training packages, and the Boise Interagency Fire Center Warehouse distributes forms and some training packages.

- Make recommendations to NWCG on minimal format and publication standards. Generally, the previously established NWCG publication standards will continue to be followed.

Membership in the PMS unit is by appointment from NWCG. The unit is under the immediate direction of the NWCG Chairman. Currently, the unit is composed of an interagency group located at the Boise Interagency Fire Center.

Unit meetings are called by the Publication Management System Chairman as needed, usually prior to distribution of the quarterly publication listing. Each year the unit will submit an annual accomplishment report and a work plan to NWCG. ■

Fire Suppression for College Credit

John E. Roberts

*Forester—Fire Management, USDA Forest Service,
Dry River Ranger District, George Washington
National Forest, Bridgewater, VA.*

As the number of permanent and temporary USDA Forest Service personnel shrinks, the demand for reserve firefighters increases. However, even in large population areas, coordinating a successful recruiting and training program can be difficult. In Virginia, one solution has been a cooperative program with local universities. These universities have included firefighting training as a course for college credit. The training material seemed to fit best into the biology department: "BIO 155: WILDFIRE SUPPRESSION. 1 credit. Forest fire behavior, basic forest firefighting activities, and organization and management of the Forest Service. Includes field exercises and physical testing."

The listing above is from the 1983-84 catalog for James Madison University, located in Harrisonburg, VA. The university supplied the facilities, printing, and advertisement. The Dry River Ranger District, George Washington National Forest, provided the instructors and materials.

A similar course was featured at nearby Bridgewater College in Bridgewater, VA. At both schools the course was presented during the fall semester because the need for firefighters is greatest in spring. The course was given in the evenings to minimize conflicts. Forest Service employees were able to maintain their normal workday and not create congestion for the university. At James Madison University, the

firefighting class was held twice a week for 2 hours. At Bridgewater College, the class was held only once a week for 2 hours, but the classes extended over a longer period of time.

Enrollment for the two sessions in 1983-84 totaled 38 students; 34 completed the training. Of the 34 graduates, 12 students failed to pass the physical requirements or did not wish to participate in the physical testing.

The composition of the classes was approximately 50 percent male and 50 percent female. The enrollment at one institution was almost 60 percent female. One class had more female finishers on the 1½-mile run than male finishers.

The net result of the cooperative program was that the Dry River Ranger District and George Washington National Forest gained a potential 22 firefighters. Although students are not always available for fire duty, an additional 22 names to draw from is a substantial benefit.

Course Description

The course and its contents are based on the requirements for firefighters in the Forest Service Manual. Graduates of the course qualify for an interagency fire job qualification card. When they are given the card, students are told they can be eligible for fire duty and fire standby if they so desire.

The course is divided into six phases:

Phase 1. At the beginning, a general picture of the Forest Service and its mission for natural resource protection is given. Two films are viewed during this phase, "Commonground" and "Man Against Fire." Also a part of this phase is the series Basic Fire Orientation and Basic Firefighting, including a glossary of fire suppression terminology.

Phase 2. This phase of the training begins with the film "Introduction to Fire Behavior." Homework and testing are taken from the standard National Wildfire Coordinating Group Workbook.

The instruction continues through the S-190 "Introduction to Fire Behavior" workbook, introducing the use of water in fire suppression. Also included is the film "Water on the Fire" and information on current technology, such as the use of floating pumps and helitankers.

Phase 3. This phase, Fire Weather, is one of the more difficult parts of the course.

In addition to films "Fire Weather" and "Atmosphere Stability and Instability," local weather trends are reviewed. Discussion of national trends such as the Santa Anna winds is also included. A qualified Fire Behavior Officer participates in these sessions.

Phase 4. The handtools used on wildfires are reviewed during this phase. The film "Handtools for Wildfire" introduces the students to the major handtools used on wild-

fires. Specialized tools such as the mist-blower are also discussed. This phase is highlighted by actual line building in a field exercise, utilizing Fuel Model 9. The students are organized into squads and are able to use the tools they have studied.

Phase 5. This phase consists of physical testing, primarily the 1½-mile run. The Forest Service coordinates the run with the university, using the university track. The Forest Service provides a pacesetter for the run to aid the students in completing the run in 11 minutes and 40 seconds or less. Because of the large number of students, the run is preferred to the standard step test. Students who do not participate in the run or who fail cannot receive a "red card" qualifying them for a fire job, but they may still receive a passing grade. If students who do not pass the run are sincerely interested in employment, they are given the standard step test.

Phase 6. During this final phase the emphasis is on safety. The "10 Standard Firefighting Orders" workbook is covered as well as "Thirteen Situations that Shout Watch Out." The film "Standards for Survival" reinforces the text. Stickers and cards for reference are passed out. This wrap-up includes discussion of personal protective equipment such as shirts, pants, and hardhats. The film "Your Way Out" helps explain fire shelters; then a short field exercise is included to provide students with the

opportunity to put their knowledge to use. After a general review, the final exam is given.

Results of Course

During the course, four or five tests are given, graded, and then reviewed. The most interested students are offered the chance to act as "coordinators," rounding up the other students in times of high fire danger. The opportunity to be on fire standby, especially on weekends, gives the students an avenue for further experience as well as allowing them to earn some income as AD-1 Firefighters.

Benefits to the Forest Service from this program are both tangible and intangible. Obviously the most important tangible benefit is the increased number of trained persons available. The intangible benefits are just as real and important. In working with local universities, valuable contacts are made. The learning institutions also benefit from the fees paid for the courses. An unexpected benefit was that the Forest Service gained a channel of communication with the college students. Because of this channel, local problems connected with parties, vandalism, and lack of information flow have been eased. For example, signs stolen from the George Washington National Forest were turned in to college officials and then returned to the Forest Service. An awareness of fire prevention, which may spread to other students, is also accomplished.

At this point, the future of the program is solid. Yearly updating of course material will assure incorporation of the latest technology. Planning is now under way to incorporate the National Interagency Incident Management System (NIIMS) into the presentation for the 1986-87 school year. The basic courses I-120 and I-220 will provide the groundwork. Additional planning is being done for conversion training of recent graduates. Some graduates are already local residents or become residents upon completion of college and want to remain fire qualified.

Although this program is not a complete solution and cannot be applied in all areas, there may be opportunities for a similar program in other National Forests. The intangible benefits are a major consideration. Students gain a better understanding of fire management and behavior, which they can apply throughout their lives, whenever they build campfires, burn leaves, and so forth.

Since this program began in 1979, a total of 140 students have completed the training. Additionally, many Forest Service employees and high school teachers have audited the course. Forest Service Fire Management has succeeded not just in gaining qualified firefighters but in providing another service to the public. Through programs such as this, the reputation of the Forest Service for efficiency, credibility, and public service can be enhanced. ■

Building A Fire Prevention Trailer

Ed Eichner

*Fire Prevention Technician, USDA Forest Service,
Wind River Ranger District, Gifford Pinchot National
Forest, Vancouver, WA.*

An innovative fire prevention group at the Wind River Ranger District, Gifford Pinchot National Forest, worked with local fire prevention cooperatives to accomplish a long-sought-after goal—presenting the fire prevention message to the most people for the least cost. The Forest Service acquired and painted a trailer, and with help from the Southwest Washington Fire Prevention Council and the Mid Columbia Fire Prevention Co-op, designed the interior to display the fire prevention message. The trailer was inaugurated in the summer of 1983.

Ed Eichner, Fire Prevention Technician, spent a year searching for a suitable trailer. Finally he located an available Army Corps' trailer in Walla Walla, WA. With the help of Ray Currey, Fire Management Officer, and Ed North, Warehouseman, the Wind River Ranger District acquired a 30-foot, fifth-wheel trailer. The trailer was brought to the district in December 1982.

The Forest Service made the trailer available to the co-ops for use in their fire prevention programs. Together, members of the three organizations laid their plans, deciding who would do what and who would pay for each job. It was apparent that the first job would be to change the exterior painting from the Corps' design to a basic white.

Deciding just what should be painted on the outside of the trailer was a major job. All of the organi-

zations concerned wanted an eye-catching design that would give a comprehensive fire prevention message—something the public would notice when watching a parade or just driving along the highway. A lot of ideas were discussed and debated and finally a design was agreed upon. It illustrated both a forest fire and a home fire and cited the need for fire prevention (fig. 1). In May 1983, the trailer was moved indoors and painted. Vickie Vance, a local artist and schoolteacher, agreed to do the job for \$1,000. The mural painting of the outside design took approximately 60 hours.

In June, there was a joint meeting of the two co-ops and the Forest

Service. Representatives from the Northwest Interagency Fire Prevention Group were also invited. At this meeting the mural was shown for the first time and plans for finishing the interior of the trailer were presented. A steering committee was formed, including two members from each co-op, to coordinate plans. The Forest Service and the two fire prevention co-ops signed an agreement for the use of the trailer. In July, the joint group received a \$2,500 grant from the Northwest Interagency Fire Prevention Group and went to work on the inside of the trailer. Display cases were built, and the logos of both co-ops were painted on the outside of the trailer



Figure 1—Eye-catching mural on the side of the trailer conveys the fire prevention message.

(fig. 2). Everything was ready.

The trailer was first used by the Mid Columbia Co-op at the Hood River County Fair in July. Then in August it made appearances at the Cowlitz, Clark, and Skamania County Fairs and in September at the Klickitat County Fair.

The number of visitors to the trailer was not counted, but there was a very large turnout at all of the fairs and numerous favorable comments about the trailer displays. The

children especially seemed to like the exhibit and came back time after time. Maybe the free Smokey Bear handouts were a strong attraction.

One of the results of the displays has been increased requests for fire prevention material from the public. Requests for Smokey to visit schools have tripled. The trailer has been requested for fairs in Oregon and Washington next summer, and several northwest fire co-ops and local fire districts have asked to use it

for their fire prevention programs. The trailer, a rolling advertisement, is a successful cooperative venture between the Forest Service and local fire prevention groups. It fully accomplishes its creators' goal—getting the fire prevention message to a large number of people.

For further information contact Ed Eichner or Ray Currey at the Wind River Ranger District; telephone (509) 427-5645. ■



Figure 2—Rear view of the fire prevention trailer, showing logos of the two local fire prevention co-ops that participated in the project.

Burning Another Empire

James B. Davis

Research Forester, USDA Forest Service, Forest Fire and Atmospheric Sciences Research, Washington, DC.

The forest was parched from the longest, most severe drought the area had ever experienced. The fire didn't start in one place or at one time. It began with innumerable land-clearing operations started by settlers following in the footsteps of loggers (11). In the beginning, nobody cared much about the fire because of the vastness of the land and its remoteness from major towns and cities. Very little was done in the way of organized fire control. Huge clouds of smoke made it almost impossible to fully delineate the immense area that was on fire. For weeks the midday sun was merely a pale yellow disk. Witnesses recall hearing the crackle of distant burning until suddenly the fire came from all points of the compass at once.

After the fire had subsided, those who examined the site had little doubt that logging slash had supplied the initial fuel for the holocaust and that land-clearing fires were the primary source of ignition (1). These factors combined with a 2-year drought produced one of history's most devastating fires.

The fire in question must be the Peshtigo, the Hinckley, or one of the terrible Lake States fires of the last century, right? Wrong! This fire, one of the largest and most destructive in history, occurred less than 2 years ago in the tropical rain forest of southeastern Kalimantan, the Indonesian section of the island of Borneo (fig. 1).

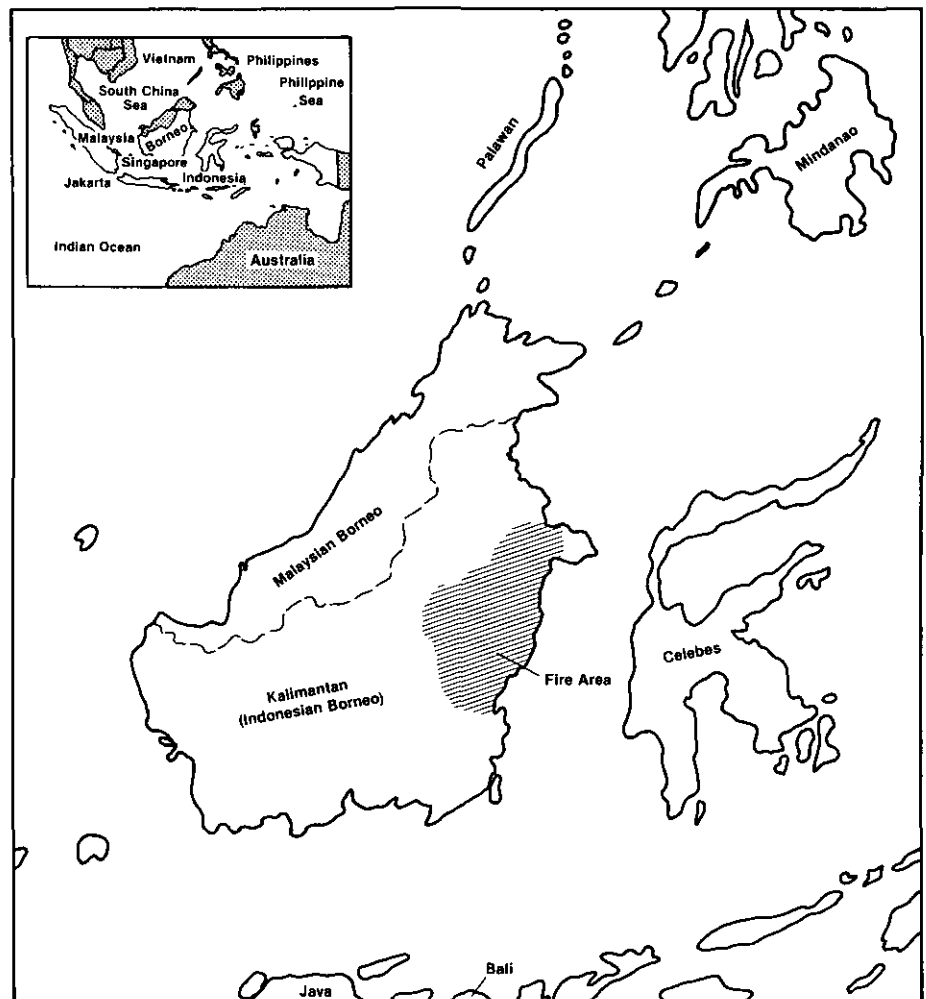


Figure 1—Map of fire area in Kalimantan with inset of Indonesia. Exact area of fire is uncertain but is estimated at 8 million acres. Total land area of Kalimantan is 212,000 square miles—about the size of California and Arizona combined. The island of Borneo is 82 percent forested.

The fire broke out in East Kalimantan Province in February 1983 and burned itself out, or was put out by rain, in July, after consuming an estimated 8 million

acres. Table 1 shows the striking similarity between the Kalimantan fire and the devastating forest fires that took place in the United States and Canada around the turn of the

century. These North American fires were given the designation "burning an empire" by Stewart Holbrook in his book of the same name (4). Drought, logging, and land-clearing fires are the common elements linking the two sets of disasters (10).

Normally, tropical rain forests don't burn (fig. 2). Slash and burn agriculture—felling small jungle plots and burning the slash prior to planting—has been carried on for centuries without causing serious fires (7). However, this agricultural practice was intensified in Kalimantan prior to the fire as part of Indonesia's "transmigration program," in which families are moved from crowded islands, such as Java and Bali, to new homes in less developed areas.

A fairly new factor was the use of a form of selective logging that takes only three or four highly valuable trees per acre but results in logging slash and opens up the canopy to sun and wind (8, 3). Crucially important was the 2-year drought that made parts of the tropical forest tinder dry. In addition, the ground was littered with dead leaves, a normal jungle response to drought. The drought was one of the occurrences associated with the El Niño-Southern Oscillation Event, the complex, little understood, cyclical change in Pacific area ocean and air currents. El Niño is a worldwide phenomenon that occurs about every 30 years. For most of the Asian



Figure 2—Tropical rain forest similar to that which burned in the Kalimantan fire. Trees grow to 150 feet or more.

tropics, it means exceptionally dry weather or drought.

All of these factors combined to cause a fire spread that was highly variable, creeping in many areas and exploding in others. Observers reported "towering infernos" and "fire storms" with flames reaching up to 150 feet or more above the tops of the 100- to 200-foot trees. Apparently topography was an important factor; the fire made major upslope runs, completely consuming large downed hardwood logs. In some places, shallow coal deposits were ignited (5).

Because the fire lasted so long, it frequently reburned areas that had been only scorched previously. Surprisingly, the fire was witnessed by relatively few people. The absence of roads limited ground travel, and the thick clouds of smoke made aerial surveying a risky business. Many airports were closed for weeks. Smoke was so thick that flights occasionally had to be canceled at Singapore Airport, more than 1,000 miles away. Much of the information about the spread of the fire is from satellite infrared imagery (fig. 3) (6).

Foresters who studied the devastated area estimated that in the logged area (40 percent of the fire area) tree mortality ranged from 50 to 60 percent. Most of the remaining forest was damaged badly enough to slow growth or degrade logs.

Timber loss has been estimated to be about 3/4 billion cubic feet in

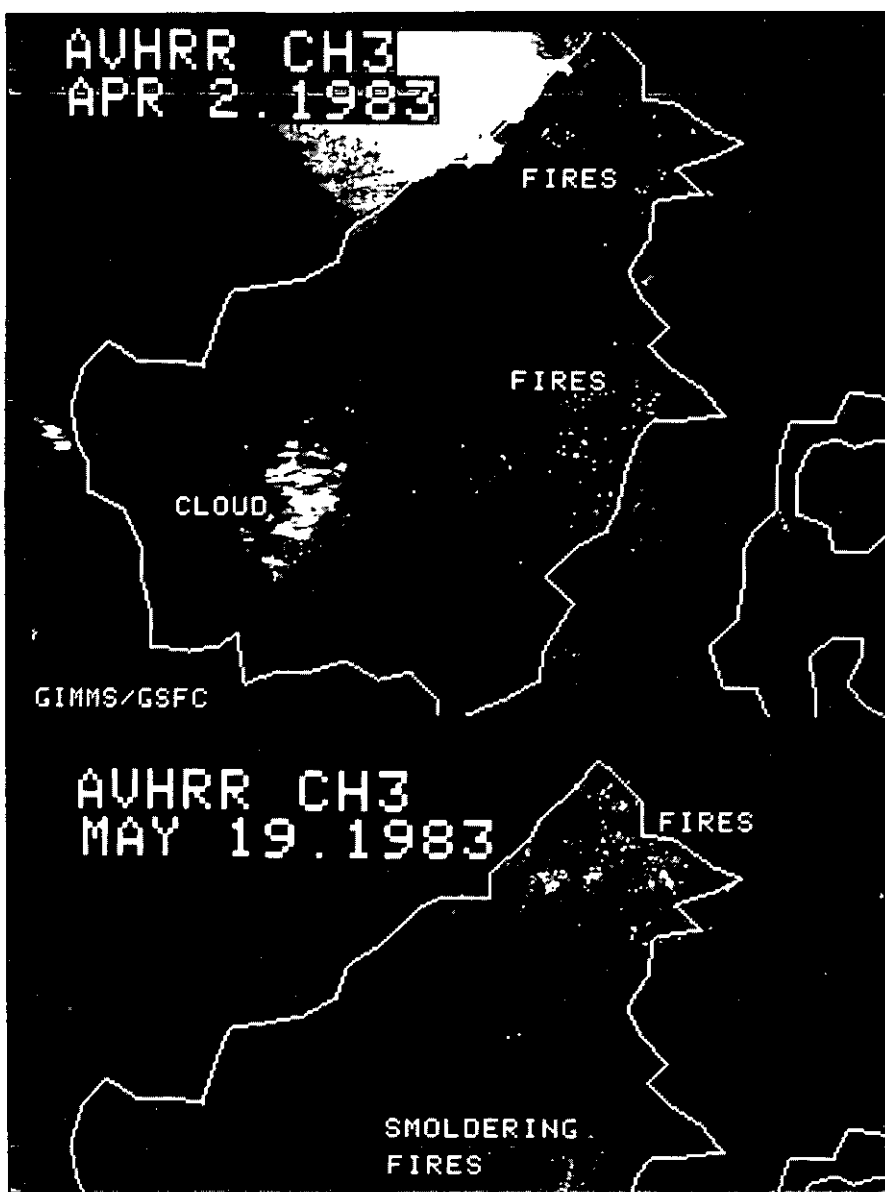


Figure 3—Satellite infrared imagery of the Kalimantan fire taken April 2, 1983, showing the island of Borneo and part of the Celebes (compare to fig. 1). As many as 56 individual fire occurrences are shown in East Kalimantan; the fire area consists of many "hot spots," some more than 1,000 acres in size.

mature crop trees and another 1-1/4 billion cubic feet of lost future harvest. The financial loss, conservatively estimated at \$1.6 billion, is potentially devastating to a developing nation—equalling East Kalimantan's annual budget for 37 years! It is estimated that the implications and effects of the fire on the logging industry will be felt for at least 70 years. Many of the immature trees that would have formed the next harvest under the Indonesian selective logging system (on a harvest cycle of 35 years) have been destroyed (9). To put it in our own perspective, the Kalimantan fire burned nearly as much as all of the major Lake State fires combined (table 1) (2).

One important difference between the Kalimantan fire and the early North American fires is that the loss of human life in the Kalimantan fire was little or possibly none. The exact figure may never be known because of the vastness of the fire, the remoteness of the area, and the lack of communications.

Loss to wildlife varied. Because the fire spread slowly much of the time, ground-dwelling animals had a chance to escape. Animals that looked to the trees for home and safety did not fare as well. The area's remaining 3,000 orangutans (a rare and endangered species once numbering in the millions) were hard hit; whole families climbed to the topmost branches and perished from flames and smoke. The most

important long-term effect is the loss of habitat and food source. Gone are the great variety of trees, especially wild figs, that were an important source of food for a wide variety of birds and mammals.

Perhaps most important of all is that the fire area is no longer a rain forest. The complex, highly diverse community of plants and animals that once existed has vanished, perhaps forever. Today, fragile tropical soils that had been protected by the forest canopy for thousands of years are alternately baked in the tropical sun and eroded by intense rain.

Watershed damage on the fire area may not be as important as the loss in transpiration. Tropical rain forests are great sponges that soak up the torrential rains and then transpire the moisture back into the atmosphere. Since the fire, water falling on the burned area runs off to the ocean. The new growth replacing the old is more susceptible to drought and fire and produces fewer of the necessities for wildlife. What will happen to the region in the future is largely unknown, because large, devastating fire is so rare in the tropics. Although salvage logging is under way, no one seems to know what to do about site rehabilitation.

Just as we had to learn the hard way in the United States and Canada, the Indonesian government is now realizing the importance of fire protection. In the short term, Indonesia is considering the estab-

lishment of strategic fire-suppression forces, including ground forces, air tankers, and bucket-equipped helicopters. The Indonesian government realizes that an adequate dispatch and communication system is essential and also plans to regulate the use of fire in land clearing. Long-term fire protection, however, can only be accomplished by improved logging practices, including slash disposal, and a change in the attitudes of local farmers.

Table 1—Representative large and destructive fires of the last two centuries

Name	Date	Location	Area burned (acres)	Lives lost	Ignition source	Weather	Fuel type
Kalimantan	Feb 1983	Southeast Kalimantan Province	8,000,000	Unknown	Many small land clearing fires	Record drought	Tropical rain forest/logging slash
Great Idaho	Aug 1910	Idaho and Montana	3,000,000	85 (5 towns destroyed)	Many small lightning, railroad, and logging fires	Drought and strong winds	Western conifer forest/logging slash
Miramichi and Maine	Oct 1825	New Brunswick and Maine	2,830,000	Unknown (5 towns destroyed)	Many small land clearing and logging fires	Record drought	Northeastern conifer forest/logging slash
Pontiac	May 1853	Quebec	1,600,000	None	Unknown	Unknown	Northeastern conifer forest
Manistuu	Oct 1871	Michigan	1,500,000	Unknown	Many small land clearing and logging fires	Drought	Lake States conifer forest/logging slash
Peshtigo	Oct 1871	Wisconsin	1,280,000	1,500 (1 town destroyed)	Many small land clearing and logging fires	Long severe drought and strong winds	Lake States conifer forest/logging slash
Lapeer County	Aug 1881	Michigan	1,014,000	169	Many small land clearing and logging fires	Drought, strong winds	Lake States conifer forest/logging slash
Yacoult	Sep 1902	Oregon and Washington	1,000,000	38	Many small settler and logging fires	Extremely dry, strong winds	Western conifer forest, mostly Douglas-fir
Holland	Oct 1871	Michigan	1,000,000	None (1 town destroyed)	Many small land clearing and logging fires	Drought	Lake States conifer forest/logging slash
Hinckley*	Sep 1894	Minnesota	160,000	418 (12 towns destroyed)	Many small land clearing and logging fires	Hot dry summer, moderate winds	Lake States conifer forest/logging slash

*Although small compared to many fires, the Hinckley is included because of the great loss in life.

Literature Cited

1. Ashton, P.S. Aide memoire on the state of rain forest research and its application in Indonesia. Cambridge, MA: The Arnold Arboretum of Harvard University; 1984. 14 p. Draft.
2. Brown, A.A.; Davis, K.P. Forest fire control and use. New York: McGraw Hill; 1973. 686 p.
3. Canadian International Development Agency. A profile of Indonesia's forestry sector. Vancouver, BC: Paul H. Jones and Associates Ltd.; 1950. 77 p.
4. Holbrook, S.H. Burning an empire. New York: Macmillan; 1943.
5. The Jakarta Post. Kalimantan forest fires keep aflame with controversy. 1983 May 1. On file with: Forest Fire and Atmosphere Sciences Research, 1204 RPE, Rosslyn, VA.
6. Malingreau, J.; Stevens, G.; Fellows, L. The Kalimantan forest fires of 1982-1983—Satellite observations for detection monitoring and damage assessment. Washington, DC: National Aeronautics and Space Administration; 1984. 10 p.
7. Rappaport, Roy A. The flow of energy in an agricultural society. *Scientific American*. 225(3): 117-132; 1971.
8. Republic of Indonesia Department of Forestry and Department of Industry. Wood-based industries in Indonesia. In: Proceedings, 1st consultation meeting on wood and wood products industry; 1983 September; Helsinki, Finland. Jakarta, Indonesia; [Publisher unknown]; 1983. 25 p.
9. Ross, M.S. A statement of concern—the forest fires in East Kalimantan. Republic of Indonesia Ministry of Transmigration; 1983. 5 p.
10. Storey, T.B.; Noel, S.M. Large fires in the world since 1825. Special report for Office of Civil Defense. Berkeley, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Forest and Range Experiment Station; 1966. 35 p.
11. Wound in the world. *Asiaweek* 34: 553; 1984 July 13. ■

How NIIMS Keeps Qualification Standards From Becoming a Barrier to Interagency Cooperation

Jim Whitson and Dave Hanson

Staff Specialist, USDA Forest Service, Boise
Interagency Fire Center, Boise, ID, and Battalion
Chief, Los Angeles County, CA.



The National Interagency Incident Management System (NIIMS) was designed so that cooperating emergency service agencies at all levels—local, regional, and national—could exchange resources. Each agency would have more resources and more kinds of resources available without a corresponding increase in the total emergency resource base in this country. NIIMS offers some solutions to what many wildland protection agencies perceived as overly rigid qualification standards under the National Interagency Fire Qualifications System (NIFQS).

Need For Cooperation

The rules for physical fitness, training, and other qualifications under the Large Fire Organizations system created barriers to exchanging resources among local, regional, and national agencies. Many wildland fire protection agencies did not participate in the system; in some cases they were excluded from participation by differences in agency rules. NIIMS is designed to allow participating agencies at the local level to jointly agree upon the training, experience, and physical fitness that is equivalent to the standards described in the "Qualification and Certification Guide." For instance, the Q&C Guide may call for successful completion of course I-420. At the local level, agencies may find that they

are currently teaching a course whose content equals or exceeds the material covered in I-420 and which would therefore be an acceptable equivalent to I-420. Also, the agencies may request the addition of material to I-420 which would meet a particular local need.

Setting Minimum Standards

Under NIIMS, any agency which commits personnel and resources at the national interagency level will be expected to meet certain minimum requirements for training, physical fitness, and experience. A participating agency will have the responsibility of evaluating its personnel to determine if they meet these minimum requirements before certifying them as qualified. Physical fitness will be determined by the sending agency based on guidelines provided under four fitness categories: arduous, moderate, light, and none.

For example, for the firefighter position, meeting the fitness requirement at the arduous level and completing training courses such as S-130 (Basic Firefighter), S-190 (Introduction to Fire Behavior), Standard First Aid, and specialty training, as needed, are basic requirements for most Federal agencies. Many State and local agencies have rigorous training courses which more than meet these minimum requirements and would qualify them to exchange resources. Of course, safety of the firefighter

must not be compromised when evaluating these criteria.

Standards relating to protective clothing and equipment should also be considered. Agencies exchanging resources on a regular basis should agree to accept the protective equipment policies and standards of their partner agencies or come to an agreement for providing agency-required equipment on an incident.

Future of NIIMS

As the various agencies come together in the NIIMS implementation process, problems dealing with qualifications and standards can be identified and solved if all parties recognize the advantage of working cooperatively. By using the nearest forces during an incident, emergency response capabilities can be increased, resources better protected, and lives and dollars saved. ■

Complementary Systems— IEMS and NIIMS

Marvin Newell and Jim Whitson

Project Leader and Staff Specialist, USDA Forest Service, FIRETIP Project, Boise Interagency Fire Center, Boise, ID.

Questions have arisen about the relation of the National Interagency Incident Management System (NIIMS) to the Federal Emergency Management Agency's (FEMA) planning system, called the Integrated Emergency Management System (IEMS). The following information should help to provide an understanding of IEMS and NIIMS and how the two systems mesh on a State or local basis. The writeup has been approved by two FEMA Regional Fire Representatives.

Integrated Emergency Management System

The Integrated Emergency Management System is the Federal Emergency Management Agency's long-term, all-hazard strategy to integrate and develop emergency management capabilities at the State and local level. IEMS is a basic foundation for planning for the response, recovery, and mitigation of hazards.

IEMS is a new concept developed by FEMA which is designed to achieve total integration of emer-

gency management activities and the development of capabilities needed to handle incidents. FEMA provides funds to States and local communities to support their planning efforts. Through IEMS, communities can identify deficiencies in emergency preparedness and plan how to correct them.

IEMS does not include any response mechanism or organization for managing emergencies.

National Interagency Incident Management System

The National Interagency Incident Management System is a total systems approach to incident management. NIIMS includes the Incident Command System, which is an onscene management organization. Its concepts and principles can be used for managing any type of incident.

While NIIMS emphasizes joint planning for incidents where more than one agency is involved, it is also designed for agency command where an incident is wholly within a single jurisdiction.

How Do The Systems Mesh?

NIIMS/ICS provides techniques for field command to handle emergency response problems onsite, including a mechanism for multijurisdictional management, if needed.

The NIIMS/ICS concept addresses problems associated with intergovernmental relationships through a comprehensive decision-making process. The decision-making process encourages planning for on-the-scene management of minor single-agency incidents as well as complex multiagency incidents.

IEMS focuses on the full spectrum of hazards, at all levels of government response. This planning process for mitigation preparedness and recovery, when combined with the NIIMS/ICS concept, makes a comprehensive emergency management system. This total system is a structure in which integration of effort, resources, agencies, and jurisdictions can be broadly applied. ■

Smokey's Birthday Celebrated Across the Nation

Gladys D. Daines

Smokey Bear Program Manager, USDA Forest Service, Cooperative Fire Protection, Washington, DC.

Have you seen a birthday cake as tall as Smokey Bear? We have.

Can you imagine celebrating Smokey's birthday almost every weekday for a year? We couldn't. But in 1984 there have been so many birthday parties held across the nation to celebrate Smokey's 40th Birthday that we've lost count of them.

Birthday parties have been held in baseball stadiums, in forests, in schoolrooms and libraries, at county and State fairs, and in office buildings and parks.

One of the first Smokey Bear birthday parties was held in April, at the Alabama Forest Festival in Montgomery, Alabama. People came from miles around to participate in a logrolling contest, chain saw competition, and footraces and to watch forestry conservation and firefighting equipment demonstrations. A giant birthday cake, created and baked in the shape of Smokey Bear, was served to more than 3,000 people (fig. 1).

In May, the San Dimas Equipment Development Center in California invited a class of third-grade children to join their birthday celebration. Smokey Bear was the star of the party, giving all of the children fire prevention handouts. A Smokey Bear sing-along got everyone singing. A high point of the party came when the excited children helped Smokey blow out the candles on his birthday cake (fig. 2).

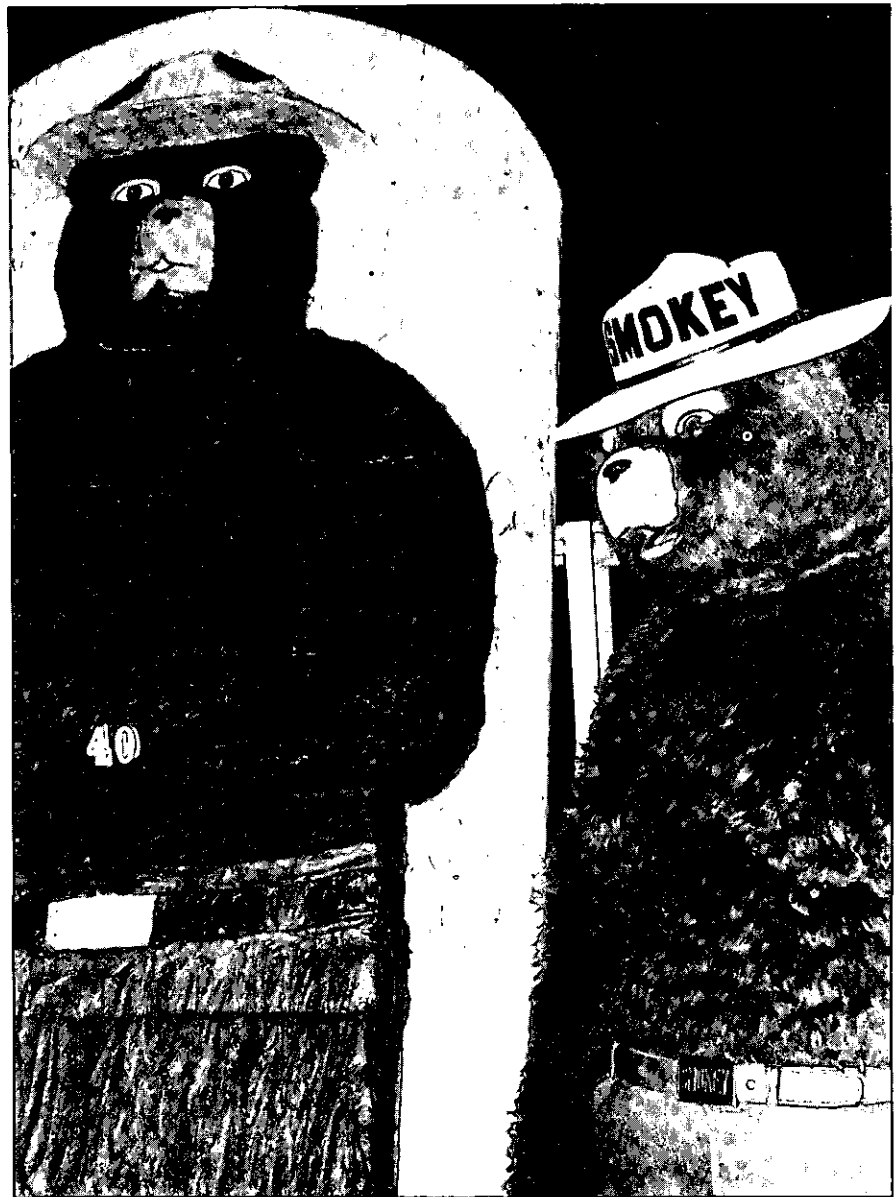


Figure 1—This giant Smokey Bear cake baked in Montgomery, AL fed more than 3,000 people.



Figure 2—Third-grade pupils help Smokey Bear blow out the birthday candles at a party in San Dimas, CA.

An art exhibit honoring Rudy Wendelin, retired Forest Service artist, opened in May at Grey Towers, a Forest Service facility in Milford, PA. The exhibit included watercolors of Smokey Bear and other Forest Service scenes produced by Wendelin over the years. Smokey attended the opening day as an honored guest and was presented with a large birthday cake (fig. 3).

In July, Smokey appeared at the Mendenhall Mall in Juneau, Alaska, where he selected the winner of a children's coloring contest. The festivities included the presentation of a large birthday cake to Smokey, which he graciously shared with all of the mall visitors.

In August, employees at the Willamette National Forest in Oregon invited Smokey Bear's friends to a birthday party in his honor. A display of forest fire prevention exhibits, firefighting tools and equipment, and a movie about Smokey Bear's life were all part of the day's activities. Yet another birthday cake was presented to Smokey and then served to the guests at the party.

In Milwaukee, Wisconsin, Forest Service employees and their families, as well as other Federal agency personnel, were invited to a party and open house at the Eastern Regional Office in August. A ceremony marking the release of the Smokey Bear commemorative stamp was held in cooperation with the Milwaukee office of the U.S. Postal



Figure 3—A birthday cake covered with candles shaped like pine trees is presented to Smokey Bear at Grey Towers, PA.

Service. Third-grade school-children presented a short play about Smokey Bear, and refreshments were served. Of course, Smokey Bear himself attended the celebration. After the party, the staff provided a brief tour of their working area.

The birthday parties held for Smokey Bear this year have involved thousands of people, both young and old. Smokey's message has been reinforced in a new and striking way, and many people have been reminded, once again, of the need to prevent wildfires. ■

Recent Fire Publications

Alexander, M. E. Prescribed fire behavior and impact in an eastern spruce-fir slash fuel complex. Can. For. Serv. Res. Notes 4(1); 3-7, 25; 1984.

Gabriel, Herman W. and Tande, Gerald F. A regional approach to fire history in Alaska. BLM/AK/Tech. Rep. 83-09. Anchorage, AK: U.S. Department of the Interior; 1983. 32 p.

Matson, M.; Schneider, S.R.; Aldridge, B.; and Satchwell, B. Fire detection using the National Oceanic and Atmospheric Administration Series Satellites. Washington, DC: National Environmental Satellite, Data and Information Service; 1984. 41 p.

Pyne, Stephen J. Introduction to wildland fire management in the United States. New York, NY: John Wiley and Sons; 1984.

Sackett, Stephen S. Observations on natural regeneration in ponderosa pine following a prescribed fire in Arizona. Res. Note RM-435. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station; 1984. 7 p.

Steele, Robert W. and Barney, Richard J. Bulldozers in fire management: current designs and uses. Res. Note INT-328. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station; 1983. 4 p. ■

The Forest Service

The Forest Service of the U.S. Department of Agriculture is dedicated to the principle of multiple-use management of the Nation's forest resources for sustained yields of wood, water, forage, wildlife, and recreation. Through forestry research, cooperation with the States and private forest owners, and management of the National Forests and National Grasslands, it strives—as directed by Congress—to provide increasingly greater service to a growing Nation.

The Forest Service:

Conducts forest and range research at more than 75 locations from Puerto Rico to Alaska and Hawaii.

Participates with all State forestry agencies in cooperative programs to protect and improve the Nation's 395 million acres of State, local, and private forest lands.

Manages and protects the 187-million-acre National Forest System for sustained yields of its many products and services.

The U.S. Department of Agriculture is an Equal Opportunity Employer. Applicants for all Department programs will be given equal consideration without regard to age, race, color, sex, religion, or national origin.

Using Weather Data

Fire is an economical and effective tool for wildlife habitat en-

hancement, removal of hazardous accumulations of fuels, disease control, seedbed preparation, and species management. Timing of a burn, firing technique, manpower and equipment, placement of fire lines, and weather are elements forest managers must consider before a successful burn. All of these elements, except weather, can be partly or wholly controlled by the forester. Weather is usually the limiting factor in a prescribed burning program.

A new research paper presents data that describe spatial and diurnal variability of the weather elements important for prescribed burning, the frequency of major weather systems that are responsible for rapid change of these variables, and the application of data in the Forestry Weather Interpretation System to the prescribed burning problem.

Free copies of Weather Conditions Associated with Understory Prescribed Burning in South Georgia, Forest Research Paper 46, are available from the Georgia Forestry Commission, Attention: Forest Research, P.O. Box 819, Macon, GA 31298.

New Helicopter Training Guide

The new Interagency Helicopter Training Guide has been completed and is available from the BIFC Warehouse. The guide can be purchased as a complete package or individual components can be ordered separately:

#1261 Course (Complete IHTG Package)	\$51.00
#9808 Contents (IHTG Text Only)	\$10.00
#9809 Binders, 1"	\$ 2.72
#9810 Slide Set	\$23.91
#9811 Slide Trays (Order 2)	\$ 6.00 Each
#9802 Plastic Sheet Protectors (Order 6)	\$ 0.19 Each

The course number should be specified even if component parts are ordered; the number is part of the warehouse computer system and is essential for prompt delivery. Please include a personal contact and telephone number on your requisition.

Requisitions should be sent to the National Interagency Fire Center, BIFC Warehouse, Bureau of Land Management, 3905 Vista Avenue, Boise, ID 83705.

This very useful interagency guide has been revised to incorporate the latest information, procedures, and technological advancements common to the helicopter industry. We encourage you to replace outdated training materials with this new training guide as soon as possible. The BIFC Catalog will include this training guide in future issues.

Guide to Identification and Postfire Management of Five California Oaks

Oak trees are found on at least 20 million acres in California—in open woodlands, mixed with other species in the mountains, and in the chaparral lands. Although their current value as a timber resource is limited, oak trees play significant roles in stabilizing soil for watersheds, in providing wildfire habitat and mast (nuts), and for recreation and esthetic values.

Currently, there is a growing effort in southern California to use prescribed burning to reduce fuel

buildup and fire hazard in chaparral and other wildlands where oaks are found. Because all oaks are subject to some damage by fire, with the extent and effects of that damage frequently varying by species, land managers need information to help them correctly identify species and evaluate their susceptibility to fire damage before they can select effective management plans for the oaks.

The Pacific Southwest Station has recently published a General Technical Report that provides guidelines for identifying five prominent species of southern California oaks—

coast live oak, interior live oak, California black oak, canyon live oak, and California scrub oak.

The publication provides specific information for the identification of each of the five species; describes ways to assess fire damage for the trees on the basis of species, diameter, and degree of trunk or bark charring; and outlines postfire management alternatives for fire-damaged trees.

Write for: Five Southern California Oaks: Identification and Postfire Management, General Technical Report PSW-71. ■

"Fire Lookouts of the Northwest"

A 412-page hardbound book by Ray Kresek, "Fire Lookouts of the Northwest" is an overdue tribute to those solitary guardians who were the backbone of the forest protection system.

Thirty years of research enabled the author to blend 586 rare photographs with a comprehensive inventory of the 3,040 lookout sites in Oregon, Washington, Idaho, and Montana. The book's 29 chapters are full of interesting stories about the people who stood watch in the towers and cabins that once perched atop America's remote peaks and formidable volcanos.

Numerous colorful anecdotes tell of unusual characters, loneliness, encounters with wildlife; the wartime enemy watch; summers spent atop tall crow's-nests and lofty spires; tormenting winds and splendid views; the trauma of being struck by lightning. Firsthand recollections of historic fires are vividly recounted.

There are stories about the origin of names such as Bad Luck Lookout, Lion Hill, Three Fingers, Lava Butte, and Mount St. Helens and tales of back-country transportation—from mules to airplanes. Information on the effects of geologic

events is included, and the Civilian Conservation Corps is given credit for its many contributions.

"Fire Lookouts of the Northwest" is sure to be appreciated by former lookouts, foresters, historians, lovers of the outdoors, mountaineers, and armchair explorers alike. The publisher is Historic Lookout Project, W. 123 Westview, Spokane, WA 99218. ■

FY 1985 SCHEDULE

National Advanced Resource Technology Center

COURSE	DATE OF PRESENTATION
Forest and State Level Fire Management Analysis	December 10-14, 1984
Aviation Management and Safety	January 7-18, 1985
Advanced Incident Management I-520	February 4-15, 1985
Area Command I-620	February 7-15, 1985
National Fire Danger Rating System	March 4-8, 1985
Fire Behavior Analyst S-590	March 25-April 5, 1985
Fire and Resource Management for Line Officers and Program Managers	April 22-May 3, 1985
Advanced Smoke Management	May 20-24, 1985

All courses will be held at the National Advanced Resource Technology Center, Pinal Air Park, Marana, Arizona, except as noted.



For information contact:
Director
National Advanced Resource
Technology Center
Pinal Air Park, Marana, AZ 85238
Tel. FTS 762-6414/602 629-6414

OFFICIAL BUSINESS
Penalty for Private Use, \$300



Postage and Fees Paid
United States
Department of Agriculture
AGR-101

ORDER FORM To: Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402

Enclosed is \$ _____ ☐ check,
☐ money order, or charge to my...
 Deposit Account No.

**Credit Card Orders Only**

Total charges \$_____ Fill in the boxes below.

[illegible]

Expiration Date

--	--	--	--

Month/Year

Order No. _____



Please enter my subscription to Fire Management Notes at \$13.00 domestic, \$16.25 foreign.
(Prices are subject to change without notice.)
Make checks payable to Superintendent of Documents.

Company or personal name

Additional address/attention line

Street address

City

State

ZIP Code

(or Country)

PLEASE PRINT OR TYPE

For Office Use Only.

Quantity	Charges
----------	---------

Enclosed

To be mailed

Subscriptions

Postage

Foreign handling

MMOB

OPNR

UPNS

Discount

Refund