FIRE MANAGEMENT NOTES

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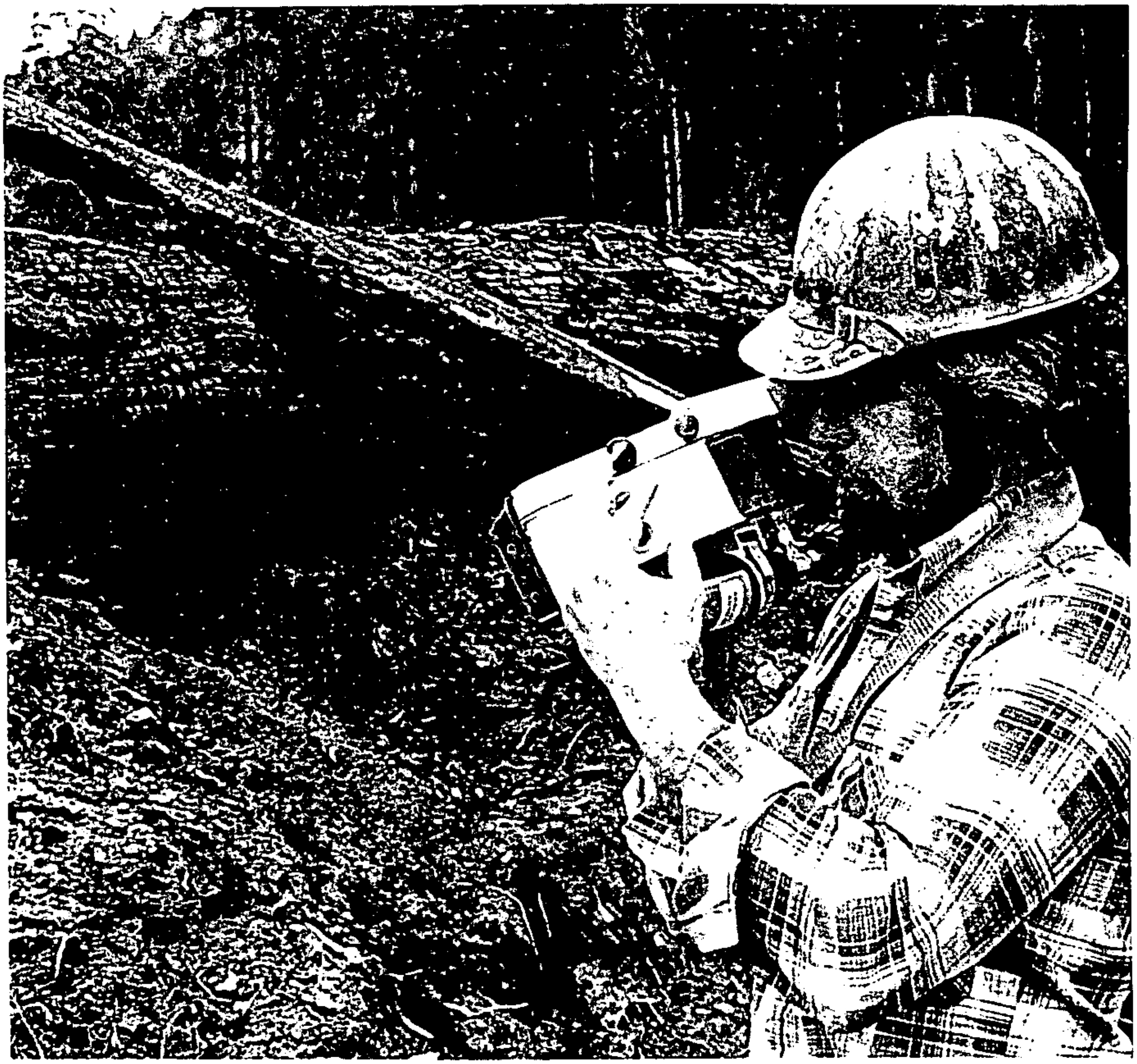

FIRE MANAGEMENT NOTES

An international quarterly periodical devoted to forest fire management

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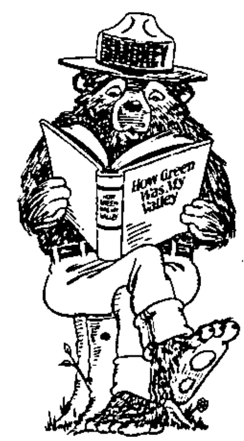
The Cover

An easy to use hand held instrument is often needed by the fire manager to determine the mopup job to be done. Our lead article explains how fire managers in Western Oregon have used a portable infrared viewer to do this.



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Probeye and Polavision in Fire Management

Ed Barney, Ron Kintzley, and Steve Heath

Two recently developed products show great promise in fire control applications. The first of these is the Probeye infrared viewer produced by Hughes Aircraft. The Lowell Ranger District of the Willamette National Forest purchased a Probeye in July 1977, and has since used it to find approximately 350 holdover fires, most of which have been found after mopup of slash burns. However, the unit has also been used on wildfires, including the 8,000-acre Lost Fire on the Fremont National Forest in 1977; the 250-acre Wigmosta Fire on the Gifford Pinchot National Forest in 1978; and the Black Creek Fire on the Willamette National Forest in 1978.

The second product is the Polavision system manufactured by Polaroid, which has been in use on the Lowell District since July 1978. Despite its recent acquisition, several applications have already been developed.

Probeye Operation

The Probeye is a portable, self-contained, infrared viewer. Through the eyepiece the operator sees a thermal picture of the scene within the field of view (7.5° vertical, 18° horizontal). All objects emit infrared radiation, commonly known as heat, at levels roughly proportional to their temperatures. The Probeye converts this radiation into visible light. Varying temperatures show as different shades of red. Small hot spots show as bright red dots. The exact location of these hot spots can readily be determined, because all objects surrounding the spot are seen as well.

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Thermal Image

The ability of the Probeye to detect hot spots far exceeds that of other used methods. For example, the Probeye can spot a hot spot as small as 2 inches in diameter from distances up to 300 feet. Furthermore, the Probeye is capable of rendering a thermal image through smoke, dust, or haze, which would restrict the visibility of ground crews. Since the Probeye detects radiated heat, a hot spot can be located even if it is not visibly smoking. A burning clearcut unit that has reached the no-visible-smoke stage may actually have more than 60 holdovers left in it.

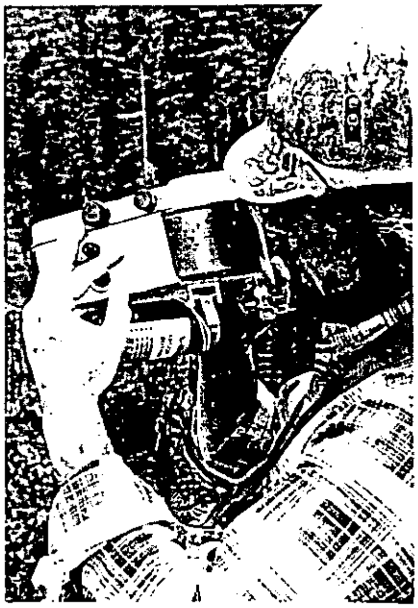

Figure 1.—Probeye in operation.

Applications

The most obvious application, and the most frequent use of the Probeye, is in mopup. Used in conjunction with mopup operations, the Probeye can locate virtually all hot spots in a fire at one time, saving ground crews the trouble of walking over and over the same area as new smokes appear. Holdovers thus can be detected and extinguished while crews and equipment are still on hand. The likelihood of having undiscovered hot spots show up several days later is decreased.

Examples

One example of this is in the Probeye's use on the Wigmosta Fire. Working directly with suppression crews, approximately 95 holdover fires were detected with the Probeye

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and extinguished. In another instance, the Probeye detected 10 holdovers in a ¼-acre industrial fire in the bottom of a felled and bucked unit. These holdovers were found the night after all hot spots with visible smoke had been mopped up.

Similar results have been obtained on many burned units in various stages of mopup and after mopup was considered completed. Fires have also been located in machine piles and landings. Because of the high efficiency of the Probeye, a "Fire Out" status can be more readily secured on any fire.

Using Probeye

When using the Probeye, it is generally best first to grid a burn on the ground. A helper marks hot spots, and guides the Probeye operator. The operator is thus freed from distraction. When a hot spot is found, it is marked with a small flag. If the flags are widely separated, or in obscure locations, it may be wise to run string between flags to make sure that the ground crews will be able to find them all. The flags may be numbered, and a map prepared for reference.

Limitations

One limitation of the Probeye is that it operates strictly on a line of sight. The Probeye cannot "see" around stumps or through logs. This requires that the viewer go around obstructions from several angles to obtain a complete picture of heat sources. Although the Probeye detects heat, the heat generated by a deeply buried hot spot may show up no better than the solar heat reflected by surrounding objects. Night use of the Probeye is ideal.

Aerial Use

The Probeye also has been used effectively from aircraft. A helicopter is generally most suitable because of its ability to move in relatively close to the fire from different directions. The high fast passes of a fixed-wing craft make it more difficult to determine the situation on the ground. When using the Probeye from an air-

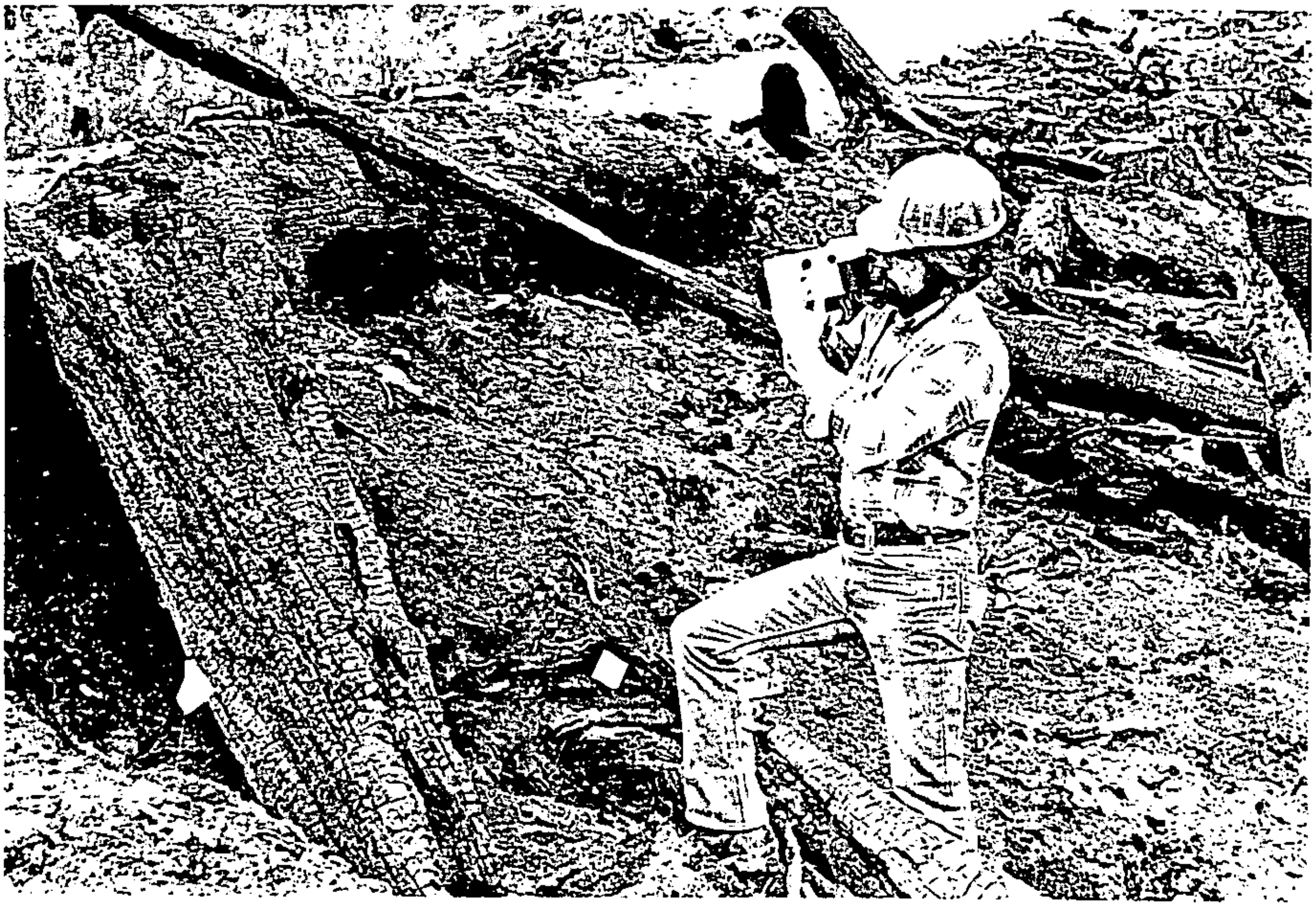

Figure 2.—Using Probeye employee is checking a recently completed prescribed burn. Flag markers indicate where hotspots were discovered.

craft, the door or window must be removed because the Probeye cannot see through plexiglass.

On the Lost Fire, the Probeye was used both on the ground and from a Lama helicopter. A section of line was scanned from the helicopter, then from the ground. Two to three times more holdovers were discovered in the ground search than were found from the helicopter. However, the use of the helicopter was considered effective, especially in locating burning snags. In a helicopter check of two burned clearcuts on the Willamette National Forest, 20 holdovers were detected. After gridding both units on the ground, only one additional fire was detected.

Greatest Challenge

Perhaps the greatest challenge to the Probeye operator is that of communicating the location of hot spots to crews mopping up a fire, especially if the operator happens to be airborne at the time. Whether on the ground or in the air, it has been necessary to have a helper with the Probeye operator.

In covering a unit from the air, an SX-70 picture of the entire unit is taken, then the helicopter begins gridding the unit from about 300 feet. When a holdover is discovered, a more detailed picture of the area is taken and the holdover is marked and numbered on both photographs. This process is repeated until the entire unit or fire has been covered. Use of a helper to take and mark pictures allows the operator to devote his full attention to scanning the burn. After scanning has been completed, the photographs are dropped to the ground crew.

Future Potential

Potential applications of the Probeye seem limited only by the imagination of the user. During the uncontrolled stage of a fire, the Probeye could be used from the air or the ground to determine the hottest sectors of the fire, to detect spot fires, to spot burning snags, and to map the fire perimeter even if the entire area is covered by smoke.

This information would obviously be helpful for efficient allocation of crews and equipment, locations of firelines, and other control strategy. It could also be used to determine those sectors where mopup activities should be concentrated.

The Probeye could also lend itself quite well to fire detection. For example, areas which have been hard hit by lightning could be combed almost immediately by aircraft. The Probeye could detect lightning or human-caused smokes that have died down and are no longer visible.

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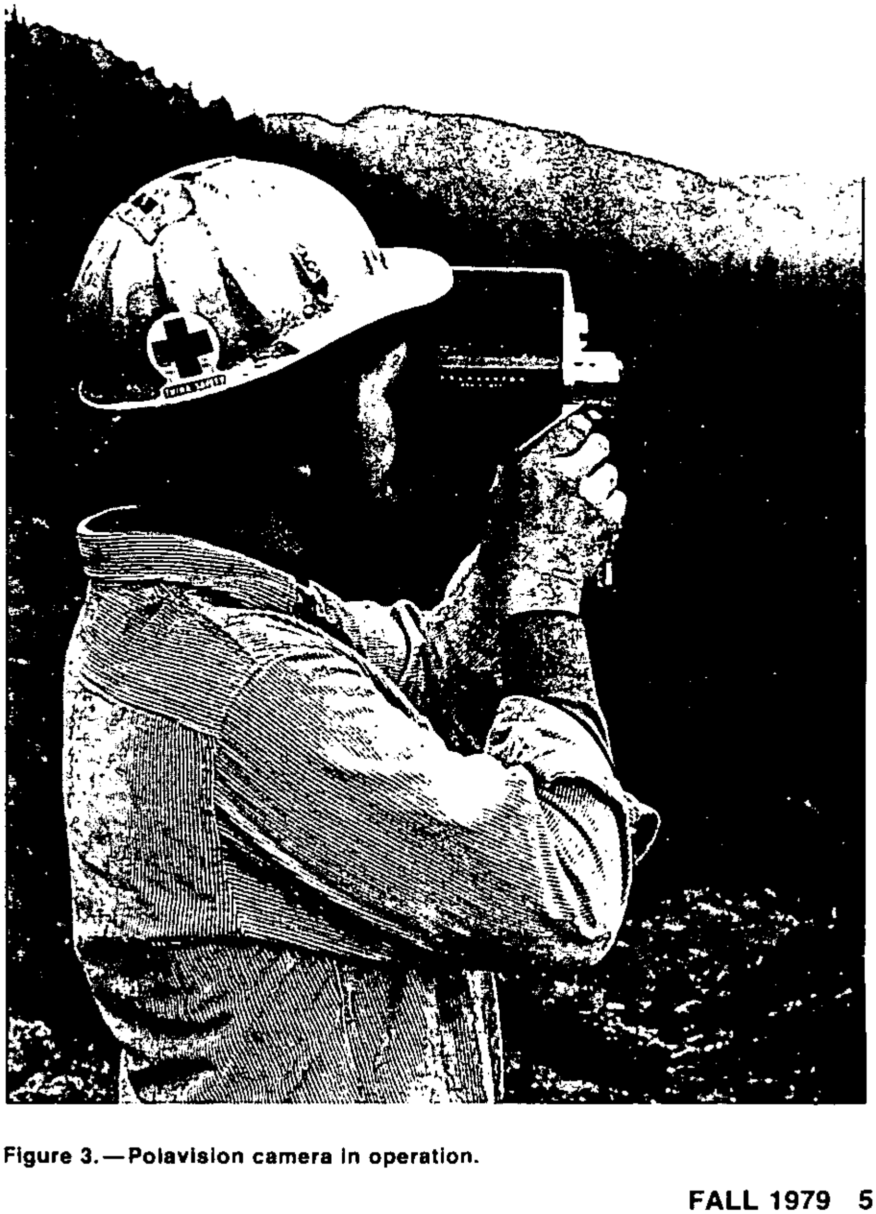

Figure 3.—Polavision camera in operation.

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Conceivable nonfire uses include game counts, search and rescue, and seedling dormancy determination. For improving energy conservation, the Probeye can be used to detect heat losses in buildings and electrical systems.

Lowell Fire Management personnel have been most pleased with the contribution of the Probeye. With each holdover detected, the potential of escaped fires or reburns is reduced, and many hours are saved in mopup operations.

Polavision System

The Polavision system is one of Polaroid's latest innovations in self-developing photography. It consists of a lightweight movie camera and a compact, portable viewing unit. The camera uses color film cassettes, and is equipped with a zoom lens. The cassettes are developed in the viewer within 90 seconds, and have a running time of 2½ minutes. Access to an AC outlet is presently required for use of the viewer. After the film has been developed, the cassette can be opened, the film extracted, and then run on a conventional movie projector.

Training Use

Polavision is being used in the training of Forest Service personnel. It is often difficult for new employees to visualize fire situations accurately in the traditional classroom situation. Selected cassettes from previous fires provide graphic illustration of the specific elements of fire behavior. Aerial observers can be taught, with the help of cassettes, the local landmarks, examples of terrain, and the effects of winds. Aerial footage of previous fires can also provide practical training in assessing manpower needs. Fuels Management departments also find Polavision helpful in training new burning bosses. Actual examples of fire spread, hazard areas, smoke drift, and the effects of thermal inversions can be viewed and studied.

Active Fire Use

The system also lends itself to use in control of going fires. Aerial observers can take pictures of potentially troublesome fires, then drop the cassettes to the dispatch center for analysis. Use of Polavision to supplement radio descriptions gives the dispatcher a more complete basis for understanding control strategy. Smokechasing teams can examine their fires before they are dispatched, noting fire size, intensity, possible spread, terrain, and access routes.

On human-caused fires, vehicles in the area can be filmed for subsequent investigation. When AC generators are available on project fires, the Polavision unit can be used in fire camp to assist in formulating fire plans and in briefing personnel before they are sent on the fireline. Used in conjunction with the Probeye, the Polavision can provide a comprehensive look at hot spots, spot fires, and troublesome sectors that may need special attention. This can be done quite easily if the Probeye helper also operates the Polavision camera.

Other Uses

Use of Polavision for the production of short training films is not limited to Fire Control. The system could conceivably be used in almost any job situation in which visual aids to specialized training are desirable. In addition, Fuels Management personnel have found it helpful to film timber sales before harvest, after harvest, and after treatment, in order to compare fuel loading in each phase of operation. Polavision has also proven useful to Timber Management in evaluating the potential visual impact from timber harvesting, and in studying different logging systems.

In the few months that the Lowell District has used the Polavision system, it has already proven its value as a training tool and in sizing up work situations. As more experience is acquired, additional applications will undoubtedly be perfected.

Recent Fire Publications

Alexander, Martin E., and David V. Sandberg.
1979. Fire ecology and historical fire occurrence in the forest and range ecosystems of Colorado: a bibliography. Supp. 1, Dep. For. Wood Sci., Colorado State Univ., Fort Collins. 4 p.

Barnard, R. James, Ph.D.
1979. Heart disease in firefighters. Part 1., UCLA Sch. Med., Los Angeles, Calif., Nat'l Fire Prot. Assoc., Fire Command 46(8): 52-55.

Barney, Richard J.
1979. Proceedings of fire working group Society of American Foresters National Convention (Albuquerque, New Mexico, October 4, 1977). U.S. Dep. Agric. For. Serv. Intermtn. For. and Range Exp. Stn. Ogden, Utah. In co-op. with Soc. Amer. For., Gen. Tech. Rep. INT-49, 20 p.

Bruner, Allen D., and Donald A. Klebenow.
1979. Predicting success of prescribed fires in pinyon-juniper woodland in Nevada. U.S. Dep. Agric. For. Serv. Res. Pap. INT-219, 12 p.

Davis, James B.
1979. Building professionalism into forest fire suppression. Soc. Amer. For., J. For. 77(7): 425-427.

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Forest Fire Problems in Germany

Johannes Georg Goldammer

In the Federal Republic of Germany, forests cover an area of about 7.22 million hectares, comprising nearly 29 percent of the country. Fifty-six percent of the forests are publicly owned, particularly by the states and the communities. The remaining 44 percent is privately owned. In German forestry, both organization and management policies are largely governed by state regulations. Multiple use and sustained yield have been emphasized for many years. Even today, the forests produce about 50 percent of the German timber needs.

Forest Fires In Germany

The danger of forest fires in Central Europe is restricted to only a few forest types, depending mainly on the site conditions and tree species. The forest fire statistics show that stands of Scots pine *(Pinus silvestris)* are the most susceptible. Compared with other commercial timber species grown in Central Europe (Norway spruce, European beech, European larch, European white oak, Douglas-fir), the Scots pine has the lowest flashing point and the highest heating power (Missbach 1973).

Most endangered are forest stands on poor and dry soils, particularly those on pure and coarsely granulated podsolic sands without clay. Here, the waterholding capacity is very low. Since Scots pine is commonly planted on such sites, both lack of moisture and high combustibility of Scots pine present a combination of two unfavorable factors that lead to increased fire danger. Such conditions prevail within a broad belt in Central Europe, which reaches from the Netherlands to Poland. Forest fires are most frequent here.

A forest fire statistic for the period 1967–77 shows an average annual loss of forest stands on about 3,200 hectares (table 1).

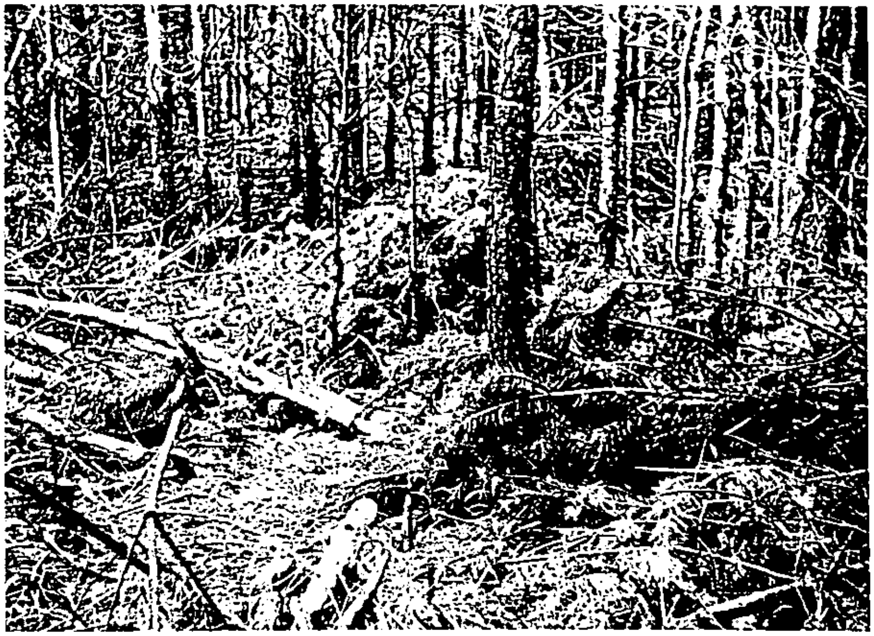

Figure 1.—Selective precommercial thinnings lead to a fuel accumulation in many stands of Scots pine.

1967	**1,063 ha**	**1973**	**2,872 ha**
1968	**2,159 ha**	**1974**	**1,835 ha**
1969	**1,546 ha**	**1975**	**8,768 ha**
1970	**754 ha**	**1976**	**4,750 ha**
1971	**4,431 ha**	**1977**	**613 ha**
1972	**3,380 ha**		

Table 1. - Total annual loss of forest area caused by fire 1967-1977

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Most forest fires are caused by accident, some by arson or other causes. Only 1 percent of the fires are due to lightning.

Change of Forest Structure

Socio-economic changes during the past years have also caused fundamental alterations of the forest structure. Heavy fuel accumulation occurs now in many forests, though forest practice does require a so-called "clean forestry practice." Two reasons are responsible for this situation:

- the extensive utilization of fuel accumulations as firewood has diminished because more convenient sources of energy are readily available;
- precommercial thinnings are no longer economical because of high labor costs.

Mechanical treatment or removal of forest residues is usually not possible in the commonly used systems of selective cutting and precommercial thinnings (by the future-tree-selection method); thus, forests appear as shown in figure 1.

Organization of Fire Protection

The responsibility for fighting forest fires has been delegated by some states to the local fire department or other civilian boards. Most state and private forests are not equipped with any heavy firefighting equipment. Therefore, the forest service has to depend on the cooperation of civilian and military staffs. Regulations provide joint exercises in forest fire suppression to be carried out every year (fig. 2).

In general, sufficient firefighting equipment is available because every small community has a fire department. The conditions for using fire trucks are favorable. The road system, the prerequisite for intensive forest management and forest protection, amounts presently to 25 meters per hectare (average for the entire country). This provides an access of 400-m-strips between two roads. Most of the state-owned forests have more than 35 meters per hectare, which seems to be optimum. The road systems provide practically all-weather access and are complemented by additional "machine roads" (suitable for skidding with tractors). Public roads, which are paved and found even in remote areas, allow fast concentration of firefighting forces. Therefore, no provisions are made for smokejumpers and helitack crews.

These circumstances had led the authorities to neglect the possibility of fire attack by air. The destructive forest fires of 1975, however, have forced a reconsideration of application of airborne firefighting systems.

Helicopter Operations

Two versions of water tanks were developed for use with a helicopter. The capacity of the buckets range between 1,350 up to 5,000 liters. The pilots may trigger a concentrated release or a release as drizzle. Spotfires may be extinguished easily. The buckets are filled at nearby dipping sites or by pumps. The helicopters may also be used in efforts to rescue crews trapped by the fire.

The Firefighting Aircraft TRANSALL

The C-160 TRANSALL is an aircraft that is widely used within the German armed forces. It has excellent slowflying qualities. Any TRANSALL can be easily converted into an effective firefighting aircraft at relatively low cost (figs. 3, 4, & 5). The firefighting kit is a 12,000-liter tank. It can be installed within 20 minutes. Aircrafts thus equipped may be concentrated for concerted action within a short time. The tanks are filled by hoses within 5 minutes. This system is similar to the MAFFS (Modular Airborne Firefighting System) in the Lockheed C-130 airplane.

Because the TRANSALL can oper-

Figure 2.—Joint forest fire suppression exercise with state forest service and fire department.

ate even from small airstrips, any forest fire might not be farther than 60 kilometers away from the nearest airstrip. The example in table 2 demonstrates the effectiveness of such operations.

Other Equipment

Fire retardants are not yet available in Germany because air tankers were not used in operations until recently.

Since 1975, wireless communication has intensified. A special communication line was established exclusively for forest management. The frequency band (69.95 MHz) with a code system is uniform for the entire Country.

Prescribed Burning

Prescribed burning for reducing fire hazard as an integrated part of fire management is presently not applied in Germany. Although ecosystems in Central Europe are not influenced and/or formed directly by natural fire, the use of controlled fire as a substitute measure seems possible (Goldammer 1978).

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Single Aircraft	
Time at ground (landing - fill up - take off)	10 min.
Flight time (airstrip - fire location - airstrip)	18 min.
On task (orientation and drop)	2 min.
Time required for one air attack	30 min.
Firefighting capacity of a 10-hour operation with 10 TRANSALL	
Total number of runs per hour	20
Sequence of runs (min)	3
Total number of runs	200
Total charge dropped (tons)	2,400

Table 2. - Example of aerial delivery potential based on 60 kilometers between airstrip and fire

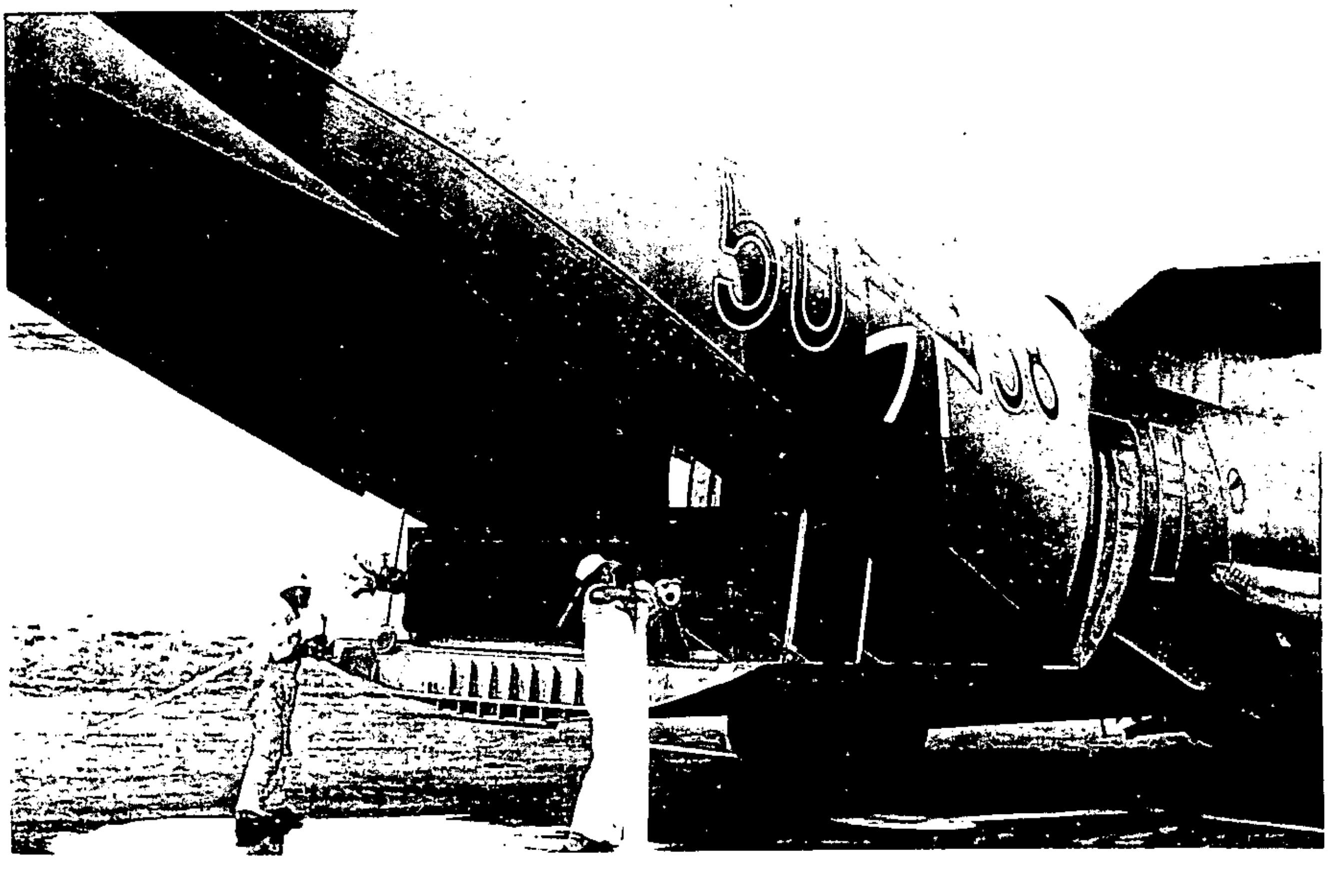

Figure 3.—Installation of MBB-firefighting-kit in C-160 Transall.

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Under discussion now is the use of fire in range management to keep certain landscapes open (Riess 1975). Also in pure pine stands, prescribed burning could reduce wildfire hazard. Pilot tests in Germany (Goldammer 1979) show pure stands of Scots pine (without hardwood understory) may be effectively treated with fire.

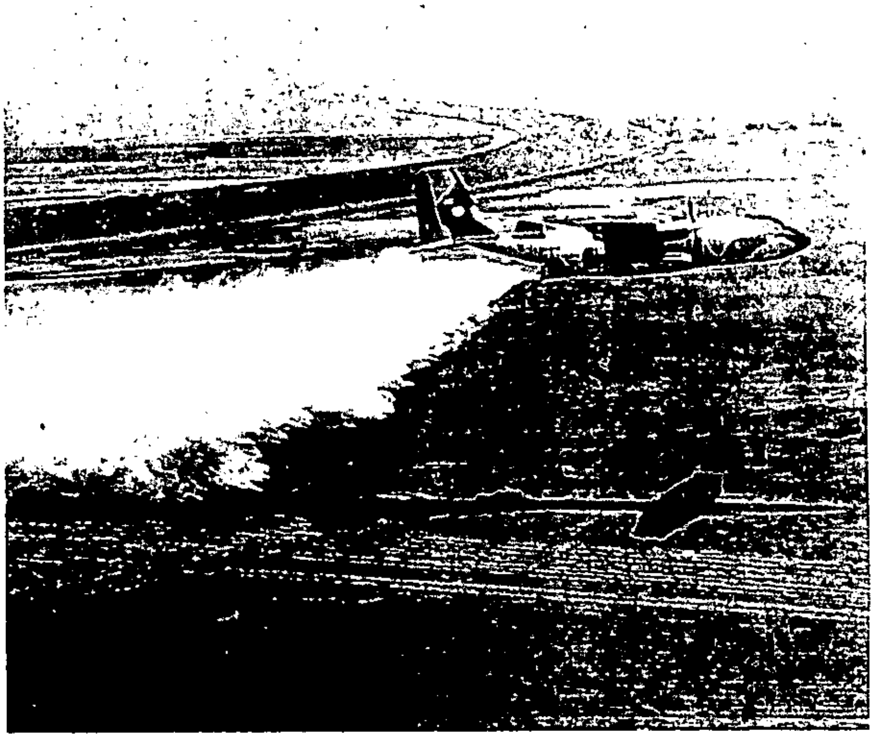

Figure 5.—MBB-firefighting-kit in C-160 Transall in use.

Conclusions and Perspectives

The forest fires of the past years in Germany have lead to new considerations in fire management. The development of forest firefighting systems by aircraft and helicopters has been adapted to the conditions of a densely settled country like Germany. Forest fire control responsibilities and cooperation have been regulated for more efficiency and radio communications have been improved.

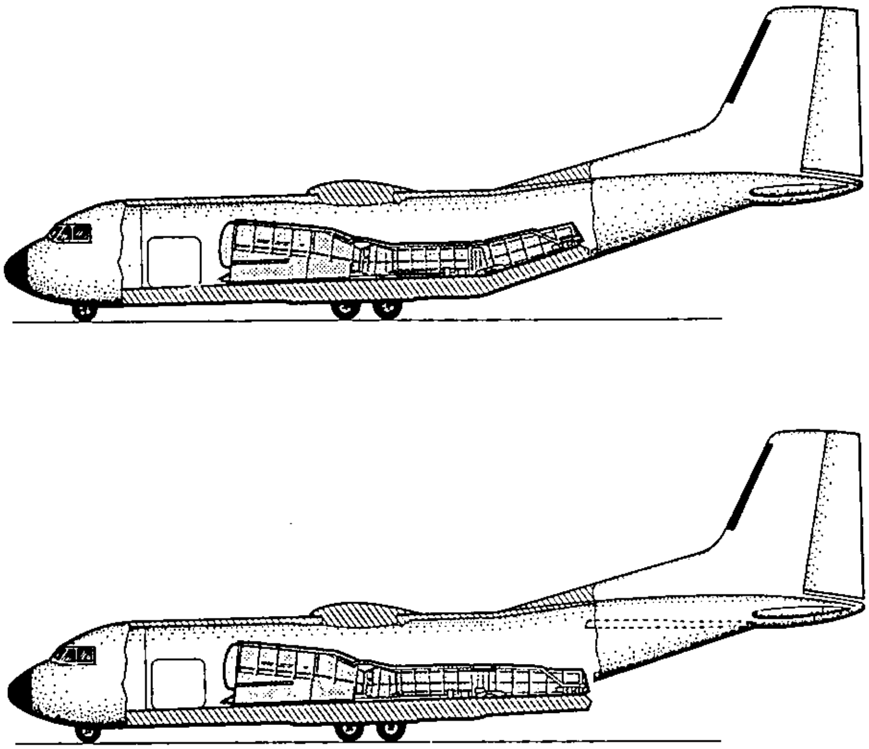

Figure 4.—Schematic of MBB-firefighting-kit installed.

Considerations should be made about the use of fire retardants as well as about the testing of forest fire danger index systems. The use of prescribed fire should be integrated into the fire management system.

Literature Cited

Goldammer, J.G.
1978. Feuerökologie und Feuer-Management. Freiburger Waldschutz-Abh. 1(2). Forstzool. Inst. Univ. Freiburg. 150 p.

Goldammer, J.G.
1979. Der Einsatz von kontrolliertem Feur im Forstschutz. Allg. Forst- u.J.-Ztg. *150*, 41-44.

Missback, K.
1973. Waldbrand - Verhütung und Bekämpfung. VEB Dtsch. Landwirtschaftsverlag, Berlin. 136 p.

Riess, W.
1975. Kontrolliertes Brennen - eine Methode der Lanschaftspflege. Mitt.flor.soz. Arbeitsgem. *18*, 265-271.

Cold Winter and Spring Extended Fire Season in the Pocosins

W. Henry McNab, Ragner W. Johansen, and William B. Flanner

Abnormal weather can be more than an inconvenience; it can drastically change forest management and protection scheduling. We all know how droughts influence fire danger, but many fire managers do not know that cold weather can also have serious effects.

The temperatures recorded in the Eastern United States in early 1977 were among the lowest on record. Coupled with a cold and dry spring, they prompted the managers of the North Carolina Department of Forest Resources (NCDFR) to reassess wildfire potentials in the pocosins and to modify their fire presuppression plans.

Pocosin Fuels

Large wildfires are common in the more than 2 million acres of pocosins in North Carolina. Every 3 to 4 years, single or multiple fires exceeding 10,000 acres have occurred in this fuel type (fig. 1). Part of the problem is poor access into pocosin areas caused by a limited road system, a network of drainage canals, and boggy organic soils. The problem is increased by the typical fuel complex—a dense thicket of head-high, shrubby, evergreen vegetation with a pond pine (*Pinus serotina* Michx.) Overstory and fuel loadings averaging 12 to 15 tons per acre (fig. 2).

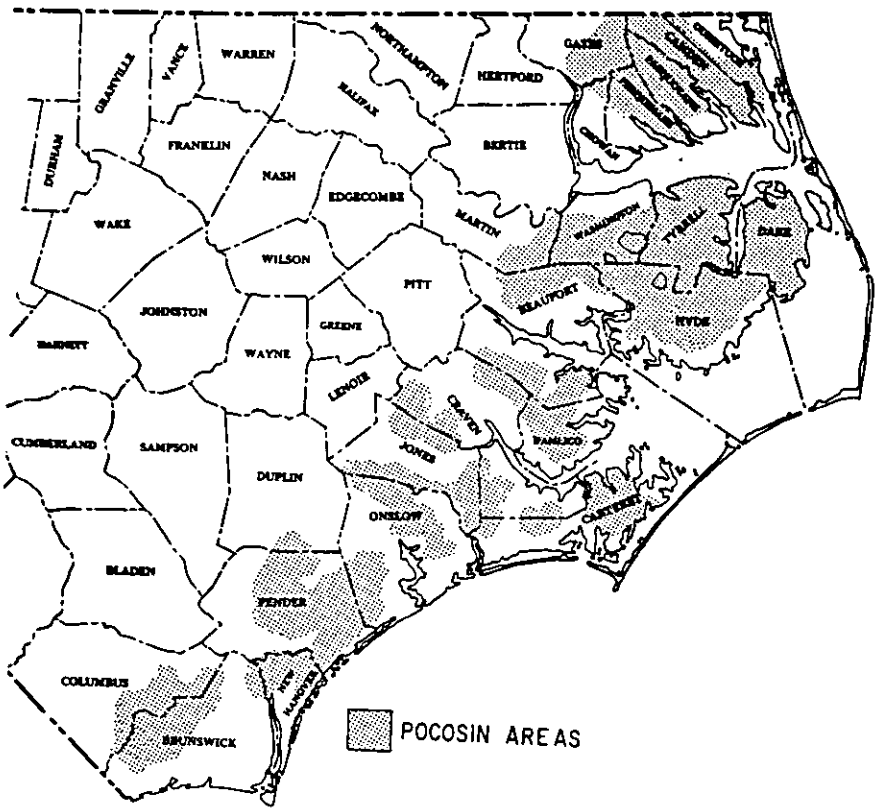

Figure 1.—Locations of principal pocosin areas in eastern North Carolina.

Fire danger normally peaks in early spring when seasonal fuel moistures are lowest and when brief droughts lower water tables in the combustible organic soils. As fuel moistures increase with the flush of spring vegetative growth, fire danger gradually subsides. The normal period of critical danger has passed by May 20.

But by mid-May 1977, fire spread in the pocosin fuels continued to be rapid. Therefore, the Director of the

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NCDFR asked personnel from the Southern Forest Fire Laboratory to assist in a survey of the pocosin fuels to explain why fire danger was so different in that year (USDA 1977).

Frost Kill

Field examination revealed that most of the previous year's foliage was dead on such species as lowbush gallberry (*Ilex glabra* (L.) Gray), an evergreen species that made up 70 percent of the volume on some sites. This adhering, dead foliage added to the usual heavy load of flashy, dead fuels. Another serious problem was that all of the new, succulent spring growth on many of the plant species had been killed, particularly where the pine overstory was thin or absent.

Examination of local weather records revealed several record low temperatures during the previous winter. Also, the last killing frost normally occurs about March 30, but weather stations at two fire towers near Hofmann Forest reported four frosts between April 10 and May 11, 1977. These late frosts were undoubtedly responsible for the death of the new tissue.

The roadside ditches in mid-May are usually over half full of water and the upper soil moisture is near field capacity. The survey team found the level to be at least 18 inches below normal. The top 6-inch layer of soil, where most of the roots develop, was found to be dry.

Because of the low water table, dry soil, and dead foliage adhering to the standing brush, the overall recovery of the pocosin vegetation was severely retarded, and fire danger was expected to remain abnormally high well beyond May 20. The North Carolina Department of Forest Resources Director decided to extend an air tanker service contract beyond the usual termination date of May 20, until sufficient rainfall occurred to aid in the recovery of the vegetation. The possible timber-value losses coupled with the hazards and possible costs of fighting large wildfires without air tankers far outweighed the costs of contract extension.

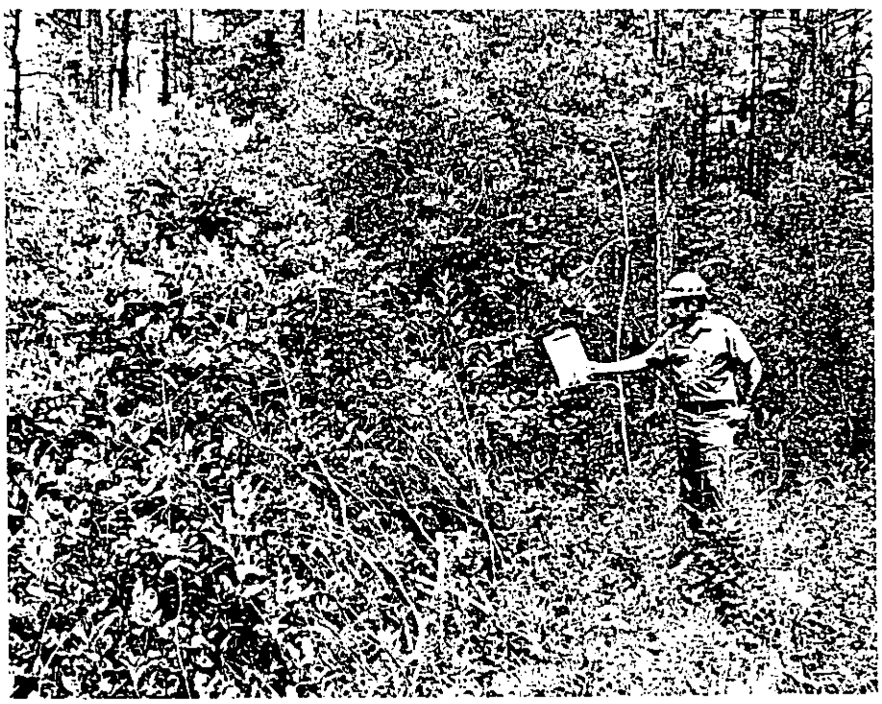

Figure 2.—Typical pocosin fuel complex of dense brushy shrubs with a pond pine overstory.

Deaths in Colorado

Another example of cold weather increasing fire danger occurred in Colorado in the spring of 1976. A late frost killed the newly developed leaves on 4- to 6-foot-tall Gambel oaks (*Quercus gambelii* Nutt.). Although the leaves had dried, they continued to adhere to the tree branches. The abnormal wildfire behavior in this flashy fuel was reported to have been the major factor resulting in the entrapment and death of three crewmen on the Battlement Creek Fire (USDI 1976). Recognition of the added fire potential of the adhering, frost-killed fuel might have resulted in the decision to keep crews out of such areas, or at least to caution them to stay close to escape routes.

Summary

Unusually cold weather often kills vegetation, and the arrangement of this dead fuel may be very hazardous. The fire manager must be alert to such conditions.

Literature Cited

U.S. Department of Agriculture, Forest Service.
1977. Office report, on file at the Southern Forest Fire Laboratory, Macon, Ga.

U.S. Department of the Interior.
1976. Accident Report, Battlement Creek Fire. U.S. Dep. Inter. Bureau of Land Manage., Northwest Colorado.

The Interagency Idea: The Forest Protection Board

Steve Pyne

Federal fire protection began as interagency fire protection. Cooperative agreements and mutual assistance pacts actually preceded the development of strong fire control forces by individual agencies.

Originally no one agency was strong enough to cope with fire entirely by itself. All agencies tended to draft firefighters from the same pools of unemployed laborers and all were dedicated to a simple policy of fire control. In 1886 when the U.S. Army took over the administration of Yellowstone National Park — in part because of civilian failure to handle fire—it not only involved the Federal Government in fire protection, but set a pattern of mutual assistance that continued for decades.

As interagency assistance evolved, the story became more complex, the product of two competing tendencies — one towards autonomy and fragmentation, the other towards cooperation. On the one hand, as agencies acquired individual identities, they felt the need for fire control and research organizations solely responsive to their particular policies. On the other, the similarity of most fire problems and the sheer cost of fire suppression and presuppression pushed Federal land bureaus into forms of interagency cooperation.

Steve Pyne has worked for 13 seasons as a firefighter and crew foreman for the National Park Service. He is presently under a co-op agreement with the Forest Service to write a history of rural fire protection.

The 1920's

The decade beginning in 1920 was perhaps the first great era of interagency experimentation on a national scale. In 1920, the National Association of State Foresters was formed. A series of conferences promoted expansion of the Weeks Act, which provided for Federal funds to State forestry bureaus for fire protection, into the Clarke-McNary Act of 1924. Two years later, after prodding from the Western Forestry and Conservation Association and the Forest Service, the Fire Weather Service of the Weather Bureau received Congressional funding. As part of the campaign for the Clarke-McNary Act, a National Forestry Program Committee was established within the Forest Service. William Greeley was a prominent member of the Committee, and he instilled in it the same cooperative spirit that he brought to the Forest Service during his tenure as Chief (1920–28). In 1926 the Committee proposed that the interests of government efficiency demanded better coordination among the Federal land agencies. The Office of the Chief Coordinator agreed, and in January 1927, the Forest Protection Board was created.

Protection Board

The Board was purely advisory. Its purpose was to ensure a "coordination of effort through a central agency to facilitate cooperation among these Federal agencies as well as with State and private protection services." The National Board assembled three agencies from Interior—the National Park Service, General Land Office, and Indian Service—and five from Agriculture—the Forest Service, Weather Bureau, Biological Survey, Bureau of Entomology, and Bureau of Plant Industry. Seven regional boards made up of representatives from these agencies were established in the West and in the Lake States in an effort to extend the cooperative endeavor to local issues. For some time the national board convened weekly. It was chaired by Greeley and, after his resignation, by Robert Stuart, his successor as Chief Forester. Though it purported to examine all aspects of forest destruction, its overwhelming concern was fire.

Eleven Accomplishments

The Board existed for a little over 5 years before it was swept away by the coming of the New Deal. In a concluding summary of its history,

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the Board listed 11 accomplishments. It had, for example, eliminated much senseless duplication of services and facilities. It had prepared comprehensive forest protection plans that helped secure Congressional appropriations, pooled resources, and which, with the New Deal, would largely serve as a blueprint for expansion. It helped rebuild a National Park Service fire organization after the discouraging 1928 fire season. It created a mechanism for shared logistics, based on the central purchasing of equipment and on central warehousing. In the Northern Rockies, for example, nearly all the agencies purchased supplies through the Forest Service warehouse at Missoula, Montana. The member agencies strengthened mutual aid agreements, extended support during large fires (including overhead), organized interagency Boards of Review, and coordinated training—at least at the local level. Wherever possible, facilities (notably lookouts) were situated so as to serve the needs of more than one agency.

Among its early assignments, the Board even constructed financial plans for all of its members. This concluded in 1929, but the plans projected budgets through 1932. By 1933 the Federal land agencies were well advanced on a program of fire cooperation; practically all of the concepts embodied in the 1970's by the Boise Interagency Fire Center (BIFC) and the National Wildfire Coordinating Group (NWCG) were present in the programs of the Forest Protection Board.

Ideas Disappeared

Early in its career the Board concluded that, while it existed to promote consistency of policy and efficiency of operation, "it is agreed that coordination of forest protection policies means consistency rather than uniformity. The major objectives of the responsible agencies differ and such differences will be reflected in differences of policy." Out of logic rather than coercion, the agencies tended to adopt as a standard the existing policy of the Forest Service, as embodied in Greeley's 1927 memo, a "General Plan for Protection of the National Forests from Fire" and subsequent amendments to the *National Forest Manual*.

Forest Service fire plans became a model for other Federal agencies. In fact, virtually all the cooperative fire programs of the 1920's were promoted, in some fundamental way, by the Forest Service.

Consistency vs. Uniformity

Yet the Board and its programs sank without a trace. The concepts it embodied had to be reinvented decades later.

Arrival of CCC's

The reason was the advent of New Deal Emergency Conservation Work money and the Civilian Conservation Corps. The Forest Service controlled most of the CCC camps, and with emergency funds it was able to draw on new sources of organized manpower and to create within a few years a physical plant for fire protection that would have taken decades of normal evolution.

But the "gift" of the New Deal was both a blessing and a curse. Previously, policy and protection programs had evolved in close association, guided largely by economic considerations. With the ECW money, however, the debate between policy and programs was destroyed. Results were demanded commensurate with the means available to accomplish them. One result was the 10 AM Policy and the creation of an emergency presuppression account—an "experiment on a continental scale," as the Chief expressed it. But the first segregated the Forest Service from other Federal agencies in policy; the second eliminated the economic rationale for cooperation. The major forum for interagency programs, the Forest Protection Board, was eliminated by executive order. Instead ECW and the CCC became the new medium for interagency cooperation.

Post WW II

After World War II, the Forest Service expanded its investment in fire control. It created a Division of Fire Research and equipment development centers; it was given responsibility for rural fire defense, and later the Rural Community Fire Protection program. It provided a focus for wildland and rural fire protection on nearly all levels of national life. But as other agencies created separate research units and upgraded their control forces (through emergency presuppression accounts of their own), and as costs escalated and agency policies were redefined, Forest Service predominant leadership was challenged.

The need for interagency cooperation resurfaced, leading to the numerous cooperative organizations and programs familiar to fire managers today. Ironically, the wealth of New Deal money and manpower had resulted in a certain spiritual poverty, a failure of administrative imagination; conversely, renewed economic constraints and a restoration of policy debates helped revive an almost forgotten political ingenuity.

Between the creation of the Forest Protection Board and the National Wildfire Coordinating Group (Wilson 1978), half a century had passed.

Literature Cited

Wilson, Jack.
1978. History of NWCG. U.S. Dep. Agric. For. Serv. Fire Manage. Notes 39(2):13-16.

Fitness Trails; What's Being Done

Kurt Austermann

Part of the steadily increasing interest in physical fitness in the United States has resulted in the adaptation of an exercise form originally conceived by the Swiss.

And thanks to a couple of U.S. Department of Agriculture, Forest Service, employees who made the adaptation, thousands of people are using the so-called Fitness Trail for their daily exercise regimen.

Idea Spreads

In the Forest Service's Pacific Northwest Region (Region 6), the growing interest in the Fitness Trail may mean establishment of the Trail on all but the most remote National Forests within the next 2 to 3 years.

Dee Dutton, equipment specialist in the Region 6 Aviation and Fire Management office, made this prediction after seeing 12 Trails constructed in the Region in little more than 2 years, 10 of them the first year.

When the concept first was put into being only a handful of people and Forests expressed interest in having their own Fitness Trails built. Now interest in the Trail can be found on every Forest.

Kurt Austermann is Information Specialist for the U.S. Department of Agriculture, Forest Service, Pacific Northwest Region in Portland, Oregon.

Interest Needed

Not every Forest can build a Trail, however. The main deterrent to construction of Fitness Trails is lack of funds to do the job. And those Forests without both funds and a little help from nearby townspeople often are the Forests in remote corners of the Region.

In the Forest Service's Regional Office in Portland, Oregon, information is available should any Forest want to take a look at the Fitness Trail idea. Other information is contained in a November 1977 publication, "Fitness Trail," by Dr. Brian J. Sharkey, Exercise Physiologist at the University of Montana.

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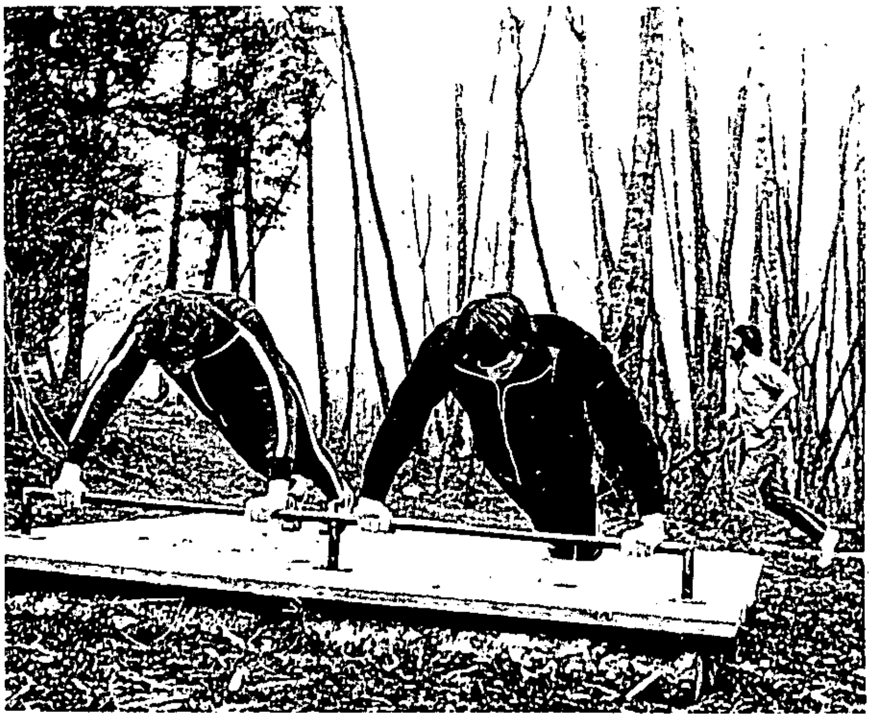

Figure 1.—Employees perform push-ups at exercise station on Mt. Hood National Forest's Fitness Trail, while another employee jogs past.

FITNESS TRAILS
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Trail Provides Variety

"Keeping in shape" is an expression interpreted in as many different ways as numbers of people are asked to define it. Whether the person be a runner or weight-lifter, the individual may swear by his or her form of exercise as ideal. Some may even try to convince others of their exercise forms's universal application.

In most any regular form of exercise, participants strive constantly for variety, and that's what the Fitness Trail is all about. Just about anyone who has tried the Trail agrees it has considerably more variety than ordinary running and weight-lifting combined. Unfortunately, not everyone lives in an area with convenient access to a Trail.

Existing Trails

If you're assigned to the Bly Ranger District of the Fremont National Forest in southwestern Oregon, you'll have to find your own exercise facility. But if you work on any one of three ranger districts of the Wenatchee National Forest in eastern Washington—the Chelan, Leavenworth, or Lake Wenatchee districts—each has a Trail.

The Mt. Hood National Forest in Oregon also has three Fitness Trails—on the Clackamas and Columbia Gorge Ranger Districts and at the Timber Lake Job Corps Center—and Trails are planned for five other districts.

Figure 2.—User makes way along the balance bar.

More Planned

The increase in the number of Trails from last year to this year is not all that startling when compared to the number of Trails planned. Where there were 10 Trails in planning stages last year, there are 18 this year, including one that is about 50 percent completed.

The number of Trails on the drawing board is an indication of the commitment people are making not only to keeping fit, but also to the Fitness Trail program itself.

Examples

In some cases townspeople and Forest Service employees have shared in establishing a Trail. Employees with the Bend and Fort Rock Ranger Districts of the Deschutes National Forest in central Oregon, as well as those in the Forest Supervisor's Office, share a Trail in Bend with the townspeople who were responsible for its creation. On the Columbia Gorge District, employees were responsible for that Trail's construction and share it with residents of nearby communities.

Employees on the Fremont, Malheur, Ochoco, Umatilla, and Wallowa-Whitman National Forests of eastern Oregon may have a long wait for a Fitness Trail. There are no Trails in existence in the area and none is planned for any of the five Forests where remoteness has become a way of life.

The Mt. Hood National Forest has been blessed with help from both willing employees and some highly motivated young people. What the project lacked in funds was made up for with an eager Young Adult Conservation Corps crew and members of a Job Corps Center.

Future

All Region 6 Trails have most of the features originally conceived of by their reinventors, Forest Service employees, Andy Arvish and John Burton.

Fitness Trails, as originally conceived, however, were exercise trails in Switzerland. They were designed by the Swiss to provide an exercise program that could fit on 2 acres of land and could be constructed for a few hundred dollars in materials.

The idea of Fitness Trails in the Pacific Northwest Region has caught on. Employees and local towns people are enjoying better health through a small expenditure of time and money. The trend is expected to continue.

Figure 3.—The ladder crawl develops upper body strength.

RECENT FIRE PUBLICATIONS

from page 6

DeBenedetti, Steven H. and David J. Parsons.
1979. Natural Fire in subalpine meadows: a case description from the Sierra Nevada. Soc. Amer. For., J. For. 77 (8): 477-479.

Environment Canada Forestry Service.
1979. Forest fire research in Ontario. Great Lakes For. Res. Cent., Sault Ste. Marie, Ont., Forestry Research Newsletter (Summer 1979), 8 p.

Folkman, William S.
1979. Urban users of wildland areas. U.S. Dep. Agric. For. Serv., Pac. Northwest For. and Range Exp. Stn., Res. Pap. PSW-137, 22 p.

Fuquay, Donald M., Robert G. Baughman and Don J. Latham.
1979. A model for predicting lightning - fire ignitions in wildland fuels. U.S. Dept. Agric. For. Serv. Res. Pap. INT-217, 21 p.

Gorte, Julie K. and Ross W. Gorte
1979. Application of economics techniques to fire management — a status review and evaluation. U.S. Dept. Agric. For. Serv. Intermtn. For. and Range Exp. Stn. Gen. Tech. Rep. INT-53, 26 p.

Hancock, Lee
1979. Training by objectives—classroom involvement. Nat. Fire Prot. Assoc. Fire Command. 46(6):58.

Huckins, Doug.
1979. Controlling forest fires—a new hose-carry and release system. Firehouse Magazine Associates, Firehouse 4(7):54-55.

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Northeastern Area
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RECENT FIRE PUBLICATIONS

from page 17

Kilgore, Bruce M. and Dan Taylor.
1979. Fire history of a sequoia-mixed conifer forest. Ecol. Soc. Amer. Ecology 60(1):129-142.

McRay, Douglas J., Martin E. Alexander and Brian J. Stocks.
1979. Measurement and description of fuels and fire behavior on prescribed burns: a handbook. Great Lakes For. Res. Cent. Canadian For. Serv., Ontario. Canada Dept. Environ. Rep. 0-X-287, 44 p.

National Research Council Canada.
1979. Directory of forest fire control personnel. Can. Comm. on For. Fire Control, Ottawa., 93 p.

National Wildfire Coordinating Group.
1979. Media for wildfire management. Nat. Wildfire Coord. Group, 17 p.

Pietrzak, Lawrence M.
1979. The effect of fire engine road performance on alarm response travel time. Mission Res. Corp. Santa Barbara, Calif., Nat. Fire Prot. Assoc., Fire Technology 15(2): p. 114-121.

Quakkelaar, P.E., Arnold J.
1979. Firesafety symbols for worldwide communications. Nat. Fire Prot. Assoc., Fire Journal 73(4): 45-47.

Stockstad, Dwight S.
1979. Spontaneous and piloted ignition of rotten wood. U.S. Dep. Agric. For. Serv. Intermtn. For. and Range Exp. Stn., Ogden, Utah. Res. Note INT-267, 12 p.

Taylor, Heyward T.
1979. Slash warms Walla Walla. U.S. Dep. Agric. For. Serv. Missoula Equip. Dev. Center. Field Notes 11(6): 19-21.

U.S. Department of Agriculture, Forest Service
1979. Effects of fire on soil: a state-of-knowledge review. National Fire Effects Workshop., Denver, Colo. (April 10-14, 1978), U.S. Dep. Agric. For. Serv. Gen. Tech. Rep. WO-7, 34 p.

U.S. Department of Interior.
1979. Fire management in the northern environment: symposium (October 19-21, 1976). Anchorage, Alaska, U.S. Dep. Int., Bur. Land Mange. 102 p.

U.S. Fire Administration.
1978. Fire technology abstracts. U.S. Fire Admin. Fed. Emergency Manage. Agency, Fire Tech. Abstracts 2(6): 35 p.

U.S. Department of Agriculture, Forest Service.
1979. Fugitive-colored fire retardants. U.S. Dep. Agric., San Dimas Equip. Dev. Center. Forest Fire News (July 1979). p. 6

U.S. Department of Agriculture, Forest Service.
1979. Planning for initial attack. U.S. Dep.. Agric. For. Serv. Southeast Area State and Private For., For. Rep. SA-FR2, 41 p.

U.S. Department of Agriculture, Forest Service.
1979. 1977 Wildfire Statistics. U.S. Dep. Agric. For. Serv. Coop. Fire Prot. State and Private For., 53 p.

Wilson, Carl C.
1979. Roadside—corridors with high hazard and risk. Soc. Amer. For., J. For. 77(9):576, 577, and 580.

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