

# **FIRE CONTROL NOTES**

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U.S. DEPARTMENT OF AGRICULTURE ● FOREST SERVICE

## **Boise Interagency Fire Center**





# FIRE CONTROL NOTES

*A quarterly periodical devoted to forest fire control*

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## Three Agencies Tighten Fire Control

# Dedication Ceremony Officially Opens Fire Center

The July 25th dedication of the Boise Interagency Fire Center marked the virtual completion of the unique triagency facility. The Bureau of Land Management, USDA Forest Service, and ESSA Weather Bureau operate the Center, which has a mission to more effectively control forest and range wildfires in the Western United States and Alaska.

### Dedication Activities

At the ceremony, local residents were entertained by the Idaho National Guard band from Caldwell prior to the 10:00 a.m. flag raising. Governor Don Samuelson and Mayor Jay Amyx officially welcomed those attending. Following the ceremony, an informal "open house" was held.

Visitors toured the weather instrument area, the training building, the crew building, the warehouse, and the smoke-jumper loft. They also saw on-base aircraft and the air tanker base. Exhibits and displays were located along the tour route.

Construction of a hangar-avionics shop complex and a physical conditioning area for smokejumpers and suppression crews is planned for a later phase of construction.

### Three Chiefs Speak

Paying tribute to the joint operation, agency chiefs from Washington, D.C. spoke. Edward P. Cliff, chief, Forest Service; Dr. George P. Cressman, director, ESSA Weather Bureau; and Boyd L. Rasmussen, director, Bureau of Land Management agreed that opportunities for the three agencies to work

together effectively are greatly enhanced when men, equipment, and a modern airport facility are brought together.

The speeches, which outlined each agency's part at the Center, are excerpted below.

Edward P. Cliff, chief, USDA Forest Service:

The Boise Interagency Fire Center brings into reality a need, long recognized by Federal, State, and local fire control agencies. The Center will facilitate early action on the forest and range fires that occur in the Intermountain area. We were pleased to join with the Bureau of Land Management in the development of a joint center that will serve the needs of both agencies and through its joint nature provide strength through unity. We are also pleased that the Weather Bureau could join with the land management agen-

cies in this cooperative venture. The Weather Bureau, by making Boise its "hub of fire weather activities" in the West, will greatly strengthen the decision-making process by fire control personnel at the Center.

The Forest Service has other fire centers throughout its western Regions, where smokejumpers, aerial tankers, firefighting supplies, and transport aircraft are centralized for sharing by several National Forests. This new Center at Boise will serve the Forest Service chiefly in its Intermountain Region, comprising Utah, Nevada, southern Idaho, and western Wyoming. Smokejumpers and aerial tankers from this Center will take initial action within a radius of approximately 150 miles of Boise. Tools and equipment will be dispatched as back-up for larger fires in the entire Region. The Center, however, will not be expected to supply all of the equipment for the largest fires or for all large fires in the Region, since the various fire centers of the Forest Service provide backup for one another. This flexibility among Regions gives us strength. Now, by combining forces with the Bureau of Land Management at Boise, our fire support capability not only in the Intermountain Re-



Fire fighters dispatched through BIFC.



Firefighters are fed in the new mess hall-barracks building prior to leaving for fire fighting duty in Alaska.

gion but throughout the West will be further strengthened.

#### Site Selection

Boise was selected as the site for this Interagency Fire Center because it is centrally situated to vast areas of Federal lands in the Western United States that experience high fire occurrence and therefore require intensive fire protection. Most of these lands are isolated by poor access, thus requiring effective aerial attack and support operations to help keep fire losses within tolerable limits.

The same favorable locations led to the selection of this Center not only as a base for initial attack on adjacent National Forests, but also as a Forest Service base of operations for some key national fire support units.

#### Specialized Forest Service Facilities at the Center

The Forest Service infrared mapper unit is based here. This highly sophisticated unit has been operational since 1966 and has been used to map numerous large wildfires throughout the Western United States and in

Alaska for the Forest Service and Bureau of Land Management. Intelligence thus obtained has provided current information to fire managers and is making an important contribution to effective resource protection.

The Forest Service national radio cache is also based at BIFC, where radio units can be quickly dispatched to fire problem areas throughout the western Regions. These radio units are used to provide effective communications to fire managers on large fires and are available to the Bureau of Land Management and other cooperators.

Several Forest Service inter-regional aircraft are based at the Center, where they are used to transport men and supplies to fires. Future plans call for construction of an aircraft hangar at the Center so that our aircraft can be maintained and repaired to keep them operational during critical periods.

This is the newest and one of the best fire centers in the nation. We believe that through interagency training and fire cooperation with the Bureau of Land Management and with close support by the Weather

Bureau we can do a better job of protecting our valuable forest and range resources from fire at less cost to the taxpayer.

George P. Cressman, director of the Weather Bureau:

The Weather Bureau is pleased to participate in this Boise Interagency Fire Center venture. Here our fire weather specialists are in "eye-to-eye contact" with Forest Service and Bureau of Land Management fire dispatchers. Here we have an ideal arrangement to enable meteorologists to bring expected "weather influences on fire" directly into the decision-making process with respect to control of forest and range fires.

Fire Weather Meteorology is a specialization that has advanced very significantly during the past 10 years, and particularly so in the West. In the area west of the Great Plains, the Weather Bureau has 24 offices from which we provide fire weather service to the control agencies. Forecasts from all of these offices are received here at BIFC. Here the information is consolidated, condensed, por-



Snake River Valley Crews load their gear aboard the Electra prior to boarding the plane for the State of Washington to fight forest fires.

trayed, and displayed for use by the fire dispatchers.

#### Center is a Hub

With the development of Boise Interagency Fire Center, the Weather Bureau has made Boise its "hub of fire weather activities" in the West. Our Western Fire Weather Coordinator is located here. We expect to do development work in fire weather operations at Boise Interagency Fire Center. We expect to train our Western Region fire weather meteorologists here by periodic detail. And we expect our fire weather program throughout the West to be strengthened by virtue of practices developed here and transplanted to the other fire weather offices in the West.

The Weather Bureau's physical plant at BIFC is one of the finest in the Nation. Its communications facilities bring the very latest of weather information to Boise from throughout the northern hemisphere. By means of facsimile, the latest computerized current and prognostic weather charts are received directly from Suitland, Md., the home of the National Meteorological Center. By radar

and facsimile the office here will receive hourly maps showing the location and areal extent of thunderstorm activity throughout the West. And, of course, the office has facilities and instrumentation for a complete weather observational program, including balloon soundings twice daily to measure temperature, air moisture, pressure, and wind direction as well as speed from the ground surface upward well into the stratosphere.

Boyd L. Rasmussen, director, of Bureau of Land Management:

The Boise Interagency Fire Center reflects the modern organizational trend towards centralization and specialization; it is a positive effort to hold the line on fire control costs in the face of rising prices for all goods and services. It is in the public interest that two fire control agencies and a mutual support agency — each from a different department of government — have pooled their resources for greater economy and effectiveness.

For the Bureau of Land Management this is indeed a happy day. It marks the culmination of 5 years' effort to develop a na-



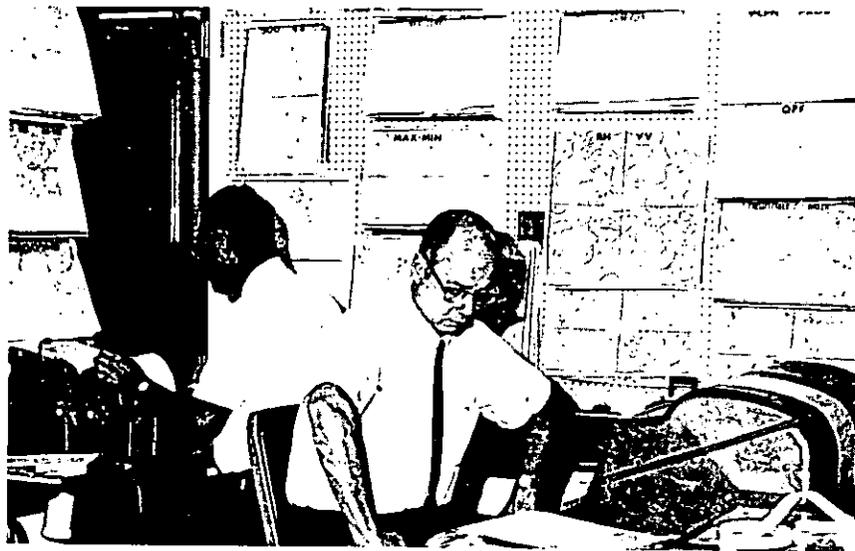
Boise Interagency Fire Center. The BLM dispatch office is nerve center of activity for dispatching manpower, equipment, and supplies to any fires on request.

tional center for support of the Bureau's fire control activities — which cover some 400 million acres of public domain lands throughout the Western States and Alaska.

#### BLM Centers

BIFC is a logistical support center for the Bureau of Land Management as well as for other Department of the Interior agencies with fire control responsibilities in the West — the National Park Service, the Bureau of Indian Affairs, and the Bureau of Sport Fisheries and Wildlife.

At BIFC the Bureau of Land Management also has its national fire coordination center. It develops standard basic training programs for use in all field offices and offers advanced courses for instruction. Training in firefighting techniques, in the use of specialized equipment, and in all phases of fire management is given. The Bureau's aircraft operations in the Western States are centered here, and its warehouse can equip 5,000 men.



Weather Bureau forecasters Hal Harvey, left, and Don Moran prepare State and zone forecasts in the Weather Bureau offices at the Boise Interagency Fire Center.

The centralized fire support dispatch office for BLM and other Interior agencies in the Western States and Alaska is in this building. All support services are channeled through it. The data gathered here daily from each State on going fires, relative fire danger, manpower availability, as well as current and predicted weather conditions, enable BIFC to better manage and coordinate BLM's

firefighting resources during all emergencies.

The agencies who have developed this Center look upon wild-fire as a national emergency—not any one agency's emergency. Thus, we have combined our forces to develop the Boise Interagency Fire Center and have defined its purpose as that of achieving—in the national interest—more effective control of forest and range wildfires.  $\Delta$

nel obtaining their experience locally, on smaller fires.

We wouldn't send members of our staffs out to make an accurate prism cruise or administer a large timber sale or survey a primary logging road location once every 3 to 5 years—and expect acceptable results. Therefore, why do we expect an efficient performance from upper-level fire overhead who do not have sufficient training and experience? It isn't good business for a fire organization and it isn't fair to the individuals when inexperienced personnel are assigned to fill responsible fire-line positions.

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## Elite Teams Fight Fires

W. J. VOGEL<sup>1</sup>

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*Editor's note: Mr. Vogel presents here his ideas for solving a common problem. Articles describing other possible approaches to maintaining available trained and competent fire overhead would be welcome.*

Each year we receive more inquiries and questions from our forestry personnel regarding details to large fires. The newer employees want experience; the more experienced want to maintain their levels of experience and qualification ratings and remain abreast of new fire control techniques. However, each year it becomes more apparent that if Federal forest fire protection agencies are going to maintain even a small nucleus of project fire-experienced personnel, they are going to have to limit fire details to a *select few*. Furthermore, adequate large-fire experience for even these men can be achieved only by detailing these individuals freely between Federal fire protection agencies.

Lots of People, Little Experience

We must all admit that the

<sup>1</sup> Fire control officer, Yakima Indian Reservation.

ideal condition of forestry personnel receiving large-fire experience or on-the-job fire training has become impossible and impractical—at least for any positions higher than a sector boss. There are three main reasons for this: (1) there just aren't enough large fires to "go around," even in high fire-occurrence years, (2) forestry staffs have been greatly expanded and (3) the higher fire-command positions have become specialized. The high value of timber and other resources, the use of advanced technical methods and specialized equipment, and the high cost of suppression have made it impossible for every staff member to receive the amount of training he needs.

By attempting to spread experience-training details to more than a small, select group, we are defeating our purpose—no one receives an adequate amount. The fire qualification standards require a great amount of large-fire experience, but this amount of experience is almost impossible to get. Efforts should be concentrated toward providing most of this experience for a select few, with the other staff person-

### Fire Trainee Program Inefficient

Our so-called "fire trainee" programs also need to be examined. With the conditions encountered and many demanding duties facing overhead personnel on large fires today, there either isn't time or it isn't taken to use trainees in a project fire organization. I have yet to be on a large fire where men were assigned and *functioning* in a "trainee" status as intended. Yet each year we establish lengthy rosters and make promises to ourselves and newer employees to detail men to fires as "trainees."

The "fire trainee" programs, impressive on paper and theoretically sound, have continued to fill training manuals and fire plans, which is as far as they have proven practical.

The only workable and financially sound program is one of *progressive training and experience for the few* who have the aptitude, potential ability, and desire, and who will *remain* in fire control during their entire career. It is of little benefit to the individuals or agencies to move personnel from fire control duties just when they are

becoming experienced enough to fill a higher level fire-command position.

With the concept of training a few men in firefighting, the major portion of large-fire upper-level command positions would be filled by people who would be experienced, confident, and able to perform their duties adequately and efficiently. Also, with only a small group trained for these positions, they would serve together more often, which would lead to a smoother functioning fire command. Finally, administration of an intensive program of this kind would be much easier and more efficient.

#### Elite Teams

It seems to me 10 or 12 elite overhead teams should staff any Federal project fire in the Nation. These teams would consist of the best fire control personnel from each Federal forest fire agency and any Federal agency with a developing project fire would call for a team from an inter-agency dispatcher. The teams would be dispatched on a rotating basis.

Seldom do Federal agencies experience 10 or 12 project fires at any one time, but to guard against the possibility, there could be several supplemental teams which would be used only in such extreme cases. With elite teams servicing all Federal project fires, the suppression efficiency and money saved would soon prove the worth of the system.

#### What's Holding Us Up?

There is a unique attitude which prevails towards fire control that is not found in any other phase of Federal forestry. The majority of forestry personnel consider themselves proficient fire overhead. If you are

inclined to disbelieve this, pause and try to remember the last time you heard a fellow forestry employee or administrator admit he knew little about fighting fires. Even Smokey Bear's image and campaign perpetuate the idea that forestry personnel are *all* seasoned firefighters.

This might have been true early in the history of Federal forestry when the major portion of time was devoted to fire control and the largest problem encountered was getting the number of men with shovels that were needed. As a result of this attitude, it seems to be disgraceful to ask for fire overhead if one's jurisdiction doesn't have someone capable. To go outside of the parent organization for more capable overhead is practically unheard of.

Yet, when problems are encountered in other phases of forestry, we don't hesitate to ask for the help of specialists from any available source. Possibly it's because of tradition or the so-called glamor and excitement which may be connected with fire fighting, but whatever the reasons for this attitude, it impedes rather than strengthens the progress of efficient fire control.

This same attitude has been the stumbling block to the establishment of *inter-agency teams* of fire experts. Unless we change, this attitude will continue to block a more efficient method of providing overhead fire teams. It is time we accept the idea that everyone in forestry is *not* proficient in fire control. It is time administrators admit they and their staffs aren't all fire control experts. It is time administrators accept trained fire overhead teams as they accept help in the other phases of forestry. Once we all realize fire control is a very complex and specialized phase of forestry, the establish-

ment of expert, inter-agency fire overhead teams will follow shortly.

The Federal forest fire organizations should meet together now and begin laying the groundwork for the establishment of this more efficient method of staffing project fires.  $\Delta$

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## Fire Control Notes Offers Its Services

This article<sup>1</sup> began the first issue of *Fire Control Notes*, December, 1936. Though the words were spoken by the Fire Control Division Chief 34 years ago, they are still true. *Fire Control Notes* is YOUR magazine; support it with your knowledge and ideas.

ROY HEADLEY

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The Fire Control Meeting at Spokane, Wash., in February, 1936, gave the Forest Service Division of Fire Control in Washington, D.C., a mandate to issue from time to time a publication which would serve as a medium for exchange of information and ideas between all the groups and individuals who are doing creative work in forest fire control. On the assumption that readers will respond with ideas and information to publish, the mandate is accepted.

Over a period of 30 years since the inception of organized effort to stop the fire waste of American natural resources, impressive advances have been

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<sup>1</sup> This article is reprinted in part.

made. A considerable body of knowledge of the arts and sciences involved has accumulated. Systems of organizing and managing human forces and mechanical aids have in some instances attained dramatic efficiency. Fire research has won the respect of owners and managers of wildland. The advancement to date in technique entitles fire control to a place among the amazing technologies which have grown up in recent decades.

#### *Technology Advancing*

The advance of the technology of forest fire control is not, however, a completed thing. Its forward march has not even begun to slow down. On the contrary, there is good reason to anticipate a period of broader and more rapid growth. Fire control has won a large measure of public interest. Its relation to conservation of wildland resources is better understood. Financial support is increasing. A growing number of men are making technical contributions from a wider range of ability and training. More men know more about how to climb to new plateaus of efficiency in stopping this fire waste.

Future advances will come not from the work of small groups, but from the experience, thinking, and experiments of the large number of men now engaged in pushing back the frontiers of fire control. The integrated experience and study of such a body of interested men may easily yield results overshadowing all that has been gained so far.

#### *Advances Now Published*

*Fire Control Notes* will seek to act as a channel through which useful or suggestive in-

formation may flow to each man in this field, whether he be a fire research worker attacking some fundamental of combustion, or a firefighter facing the flame and smoke, who discovers some new device for organizing a crew of laborers. These pages will also hope to be used as a mouthpiece for every man, whatever his job, who discovers something which would be useful to others, or who has a criticism to make, a question to raise, or an unusual fire experience to relate.

As implied by the name, *Fire Control Notes*, it matters not how long or how short a contribution may be nor what angle of fire control is presented. The man who discovers some new device which can be presented in four lines owes it to himself and others to report it. Likewise, the fire research man who needs ten pages for a worthwhile presentation of his subject should share what he has learned with others who need his help or who may be needed to supply the intelligent interest required to sustain the inquiry.

#### *The Only Requirement:*

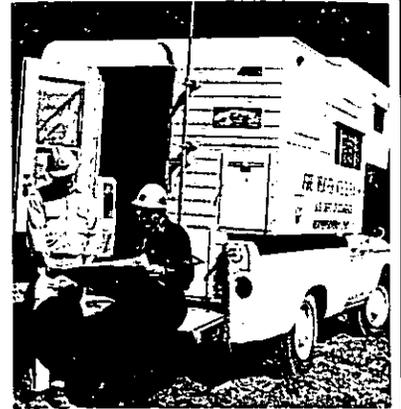
The only requirement imposed upon contributions to *Fire Control Notes* is that they be interesting or helpful to some group of people concerned with some phase of fire control.

Distribution will not be limited to members of the Forest Service, but will include all who are cooperating with it in stopping forest fire waste. Copies will be sent to State forest organizations, cooperative protection associations, forest schools, Federal bureaus interested in fire control, and Canadian and other foreign organizations dealing with fire problems. Within reasonable limits, any individual who is not included in the or-

ganizations mentioned may be placed upon the mailing list by agreeing to constitute himself or herself a committee of one to discuss with friends the need for habits of care in the use of fire.

△

## COMMENTS INVITED



Charles E. (Chuck) Syverson, right, Fire Weather Meteorologist at Boise Interagency Fire Center provides on-the-spot weather information to District Ranger Bill Paller near the fire camp. Fire Control managers base their suppression action on expected fire behavior which is influenced by weather factors.

In this issue of *Fire Control Notes* are three articles about interagency cooperation: Dedication Ceremony Officially Opens Fire Center, p. 3; Elite Teams Fight Fires, p. 6; and Teletype Maps Display Predicted Burning Index Using Overlay, p. 12.

Your comments on any of these articles or on anything you read in *Fire Control Notes* is invited. Address letters to *Fire Control Notes*, Editorial Branch, FS I&E, RP-E 1001, U.S. Department of Agriculture, Washington, D.C. 20250.

△

# Prescribed Nighttime Burns Bring Benefits<sup>1</sup>

STEPHEN S. SACKETT AND DALE D. WADE<sup>2</sup>

*A nighttime prescribed fire successfully reduced the wildfire hazard created by slash left in a recently thinned plantation of 20-year-old slash pines. Weather, fuels, and fire behavior are briefly described.*

Prescribed burning, if properly applied, is the most economical means of eliminating the wildfire hazard created by slash left in pine plantations after a commercial thinning. One such burn designed to reduce slash, although originally scheduled for the daytime, was successfully

carried out at night on the Southlands Experiment Forest, International Paper Company, near Bainbridge, Ga. If these prescribed burns can be conducted at night, the number of hours available for burning are increased. The project was part of a cooperative study by the Southern and Southeastern Forest Experiment Stations.

The area was a 20-year-old plantation of slash pine (*Pinus Elliottii Engelm.*) to which prescribed fire had previously been applied in the fall of 1966 and

in the spring of 1967. These fires had reduced the litter on the area from 16 to 4 tons per acre. In December 1967, the plantation was thinned to one-half its original density; approximately 200 8-inch trees were removed per acre. Total ground fuel was increased to 10 tons per acre by the resulting slash (fig. 1).

The time scheduled for this prescribed burn was the daylight hours of March 19, 1968, based on predicted weather conditions. By that afternoon, however, the air temperature had risen to 82° F., and the wind-speed was 4 m.p.h. The relative humidity had dropped to 21 percent, creating a relatively low, fine-fuel moisture of about 8 percent. According to the nearest Fire Danger Rating Station 7 miles away, the buildup index (a measure of cumulative moisture deficiency in fuels beneath the surface layer) was 28 and the spread index (a measure of the relative rate of forward movement of surface fires) was 20. These indexes indicated a high fire-danger condition. Burn-

<sup>1</sup> Reprinted with permission from *Forest Farmer* 29(5): 11, 18 February 1970. (Official Publication of the Forest Farmers Association)

<sup>2</sup> The authors are associate fire behavior scientists of the Southeastern Forest Experiment Station, USDA Forest Service, Southern Forest Fire Laboratory, Macon, Ga.



Figure 1.—Total fuel after thinning was approximately 10 tons per acre.

ing under this combination of fuel moisture and weather would probably damage crop trees.

By 9:00 that evening, conditions were more favorable for burning: the air temperature had dropped to 63° F., and the relative humidity had risen to 66 percent. As a result of this increase in relative humidity, fuel moisture had risen to 14 percent. The windspeed recorded 4 feet above ground level in the plantation was 1 to 2 m.p.h.—enough to give direction to the fire and dissipate some of its convective heat. Because of this improvement in conditions, a decision was made to go ahead with the burn.

#### Fire Begun

The relatively light winds dic-

tated the use of a head fire (fire set to spread with the wind) for slash reduction. A backfire was used to widen the downwind control line by reducing the fuel along its inner edge. The head fire progressed at a rate of 265 to 345 feet per hour. Flames varied in height from 2 feet in the litter to 5 to 8 feet in heavy concentrations of slash, and higher flames were occasionally observed. Some glowing embers landed outside the control lines; but, because of the high humidity and increased fuel moisture, no spot fires developed.

All slash less than 0.5 inch in diameter was consumed. Litter was reduced by 74 percent, leaving 1 ton per acre and virtually eliminating any threat from

wildfire (fig. 2). Crowns were scorched on 12 percent of the trees, but less than 2 percent of the trees died. Most of those killed were suppressed trees too small to cut during the thinning operation. Greater windspeeds would probably have prevented crown scorch and shortened burnout time without aggravating the problems of control.

These results demonstrate the suitability of prescribed burning at night as a management tool for the prevention of wildfire hazards. Not only did the decision to burn at night increase the time available for burning, but it also provided an additional means of regulating the prescribed fire's intensity.  $\Delta$



Figure 2.—Fine fuels were virtually eliminated by the prescribed fire.

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## Excess-Flow Check Valves Prevent Propane Accidents

LAWRENCE L. DOWNEY<sup>1</sup>

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Portable pressurized propane tanks equipped with a torch are used extensively for a variety of burning projects. These burners are carried by hand or mounted on a packboard so that the operator can use both hands.

A pressure regulator is attached to the propane container by a POL (pressure overload) connector. The body of the regulator contains a pressure gauge mounted near the outlet side of the regulator. The purpose of the gauge is to provide the operator with a visual reading of the pressure being applied to the torch. The torch assembly is mounted at the outlet side of the regulator.

### Fire!

In November 1969, a regulator failed while a burner was being used on a project. Mounted on a packboard, the burner was being carried by the operator. He had ignited one slash pile and was turning to walk to the next. As he turned, he heard gas escaping. The escaping gas was quickly ignited by the burning slash. The operator dropped the packboard and burner to the ground and ran a safe distance away. Flames kept the operator from shutting off the main valve on the can. The uncontrolled, escaping propane burned for about 40 minutes.

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<sup>1</sup> Forester, Bass Lake District, Sierra National Forest.

Later examination revealed that a failure had occurred in the regulator at the stem of the pressure gauge.

### Review Conducted

A fault-finding review of the entire assembly indicated two locations subject to stress and possible failure. The first is the connection between the propane container and the regulator. The second is the pressure gauge stem. It is recommended that the POL connector used to attach the regulator to the propane container be equipped with an integral excess flow check valve. The check valve will automatically shut off the flow of gas in the event of a break between the container and the regulator. It is further recommended that the pressure gauge be removed and the hole plugged. Most operators adjust the regulator pressure to produce the amount of flame they want. They use the pressure indicator very little. Removal of the pressure indicator eliminates the most likely area of failure in the regulator.

### The Answer

Incorporation of a POL connector with an integral excess flow check valve and removal of the pressure gauge from the regulators will minimize the likelihood of a mishap while using the propane burners. △

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## MASS FIRE PHENOMENON IN SUNDANCE FIRE

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Researchers have conducted an intensive study of the Sundance Fire which occurred in northern Idaho in 1967. Five features of a mass fire system were identified: (1) simultaneous ignitions caused by flying firebrands, (2) high energy output, (3) strong fire-induced winds, (4) violent firewhirls and erratic wind behavior, and (5) strong vortex action downstream from the burning area. Calculations showed a high probability that firebrands traveled more than 12 miles. Fire intensity reached 470 million b.t.u./sec., and induced winds exceeded 80 miles per hour. The conditions necessary for a mass fire in a coniferous forest include continuous fine fuels, sustaining drying conditions, relative humidity less than 30 percent, and ambient winds greater than 20 m.p.h. △

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## FIRE REPORTS SYSTEM

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It is only through a uniform system of fire reporting that a dependable body of facts bearing on the fire protection problem can be developed. . . . It is through such a system that we can obtain the data necessary for a knowledgeable and economic attack on the problem. . . .

By using a uniform code, it will be possible to pinpoint the trouble areas and hazards, and then concentrate our efforts in those areas and hazards.

. . . from the Introduction to *Coding System for Fire Reporting* (NFPA No. 901) National Fire Protection Association. △

# Teletype Maps Display Predicted Burning Index Using Overlay

ROBERT E. LYNOTT AND HOWARD E. GRAHAM<sup>1</sup>

*A new display of predicted Burning Indexes is part of the 1970 advances in the program for improving fire danger data management in the Pacific Northwest Region of the Forest Service.*

Beginning in late summer 1969, predicted BIs for designated areas, called weather zones, were computed centrally at the Forest Service Regional Office by Automatic Data Pro-

AREAL DISTRIBUTION OF PREDICTED BI USE WITH TRANSPARENT OVERLAY.  
ISSUED 1990 PDT 08-05-70 VERIFY 1400 PDT 08-06-70.

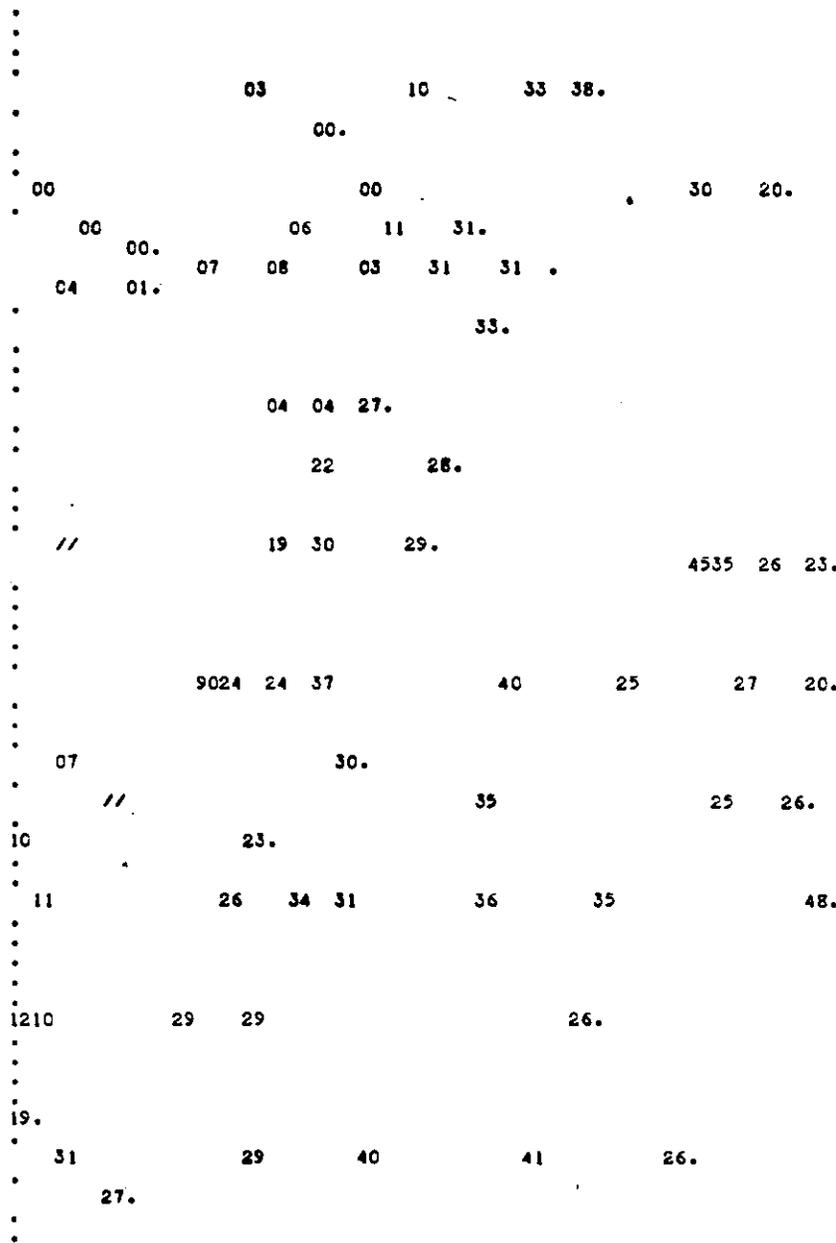


Figure 1.—Teletype page data printed after being automatically sorted by district. The four-digit numbers represent districts too small to be printed on the overlay. They should be read as follows: 9024—The BI for District 90 is 24. // means no data were available.

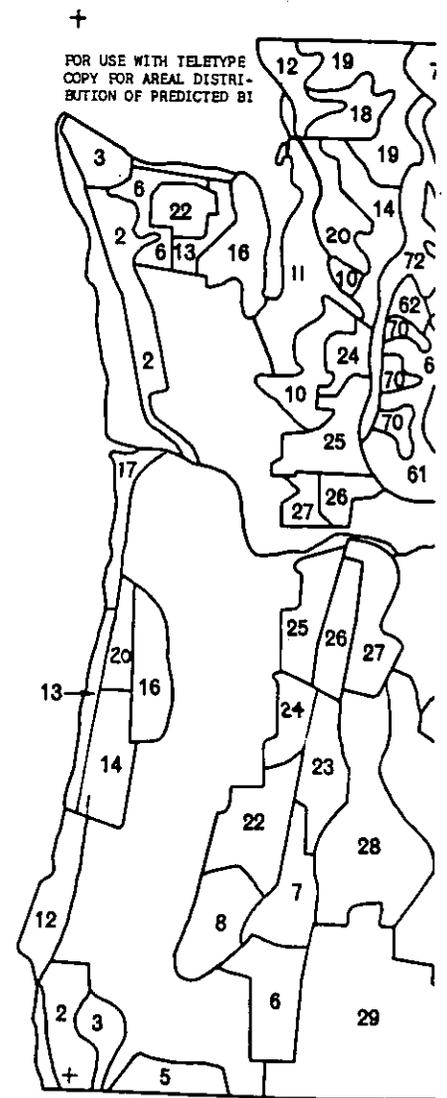


Figure 2.—Part of map overlay of districts.

cessing (ADP). The values then were distributed by teletype to the nineteen National Forests. The tabulation was simply a numerical listing like the example below:

322 - 32	463 - 29
323 - 38	464 - 27
324 - 26	470 - 28

The figure on the left of each column was the zone. The figure on the right of each column was the Burning Index (BI).

Unless the data were plotted on a map, it was difficult to visualize the areal distribution of predicted values.

Automation now does that map plotting on the teletype. The computer calculates the predicted BI for each zone from weather values provided by the fire-weather forecaster. Each BI value is automatically sorted to its proper position on a grid and transferred to the teletype.

In each Supervisor's and Co-operator's Office, the data alone on the teletype page seem to have been arranged at random as shown in figure 1. They are meaningless until a transparent map overlay showing districts (fig. 2) is placed over the page. Presto (fig. 3)! The areal distribution of values is clearly displayed.

The predicted BIs for weather zones are visible for comparison. Such easy comparison is important for several reasons. First, the forest supervisor can quickly

inspect the data for continuity. There should always be continuity in values from zone to zone. That is, the transition in predicted values should be consistent with differences in terrain and expected weather patterns. Second, other cooperating forest protection agencies, including the Weather Bureau, have access

to this teletype map and inter-agency coordination is facilitated. Third, offices with overall responsibility, such as the Regional Office, can quickly locate trouble spots.

The days of enforced "tunnel vision" are no more. Each forest can watch what is happening to its neighbors, as well as to itself.

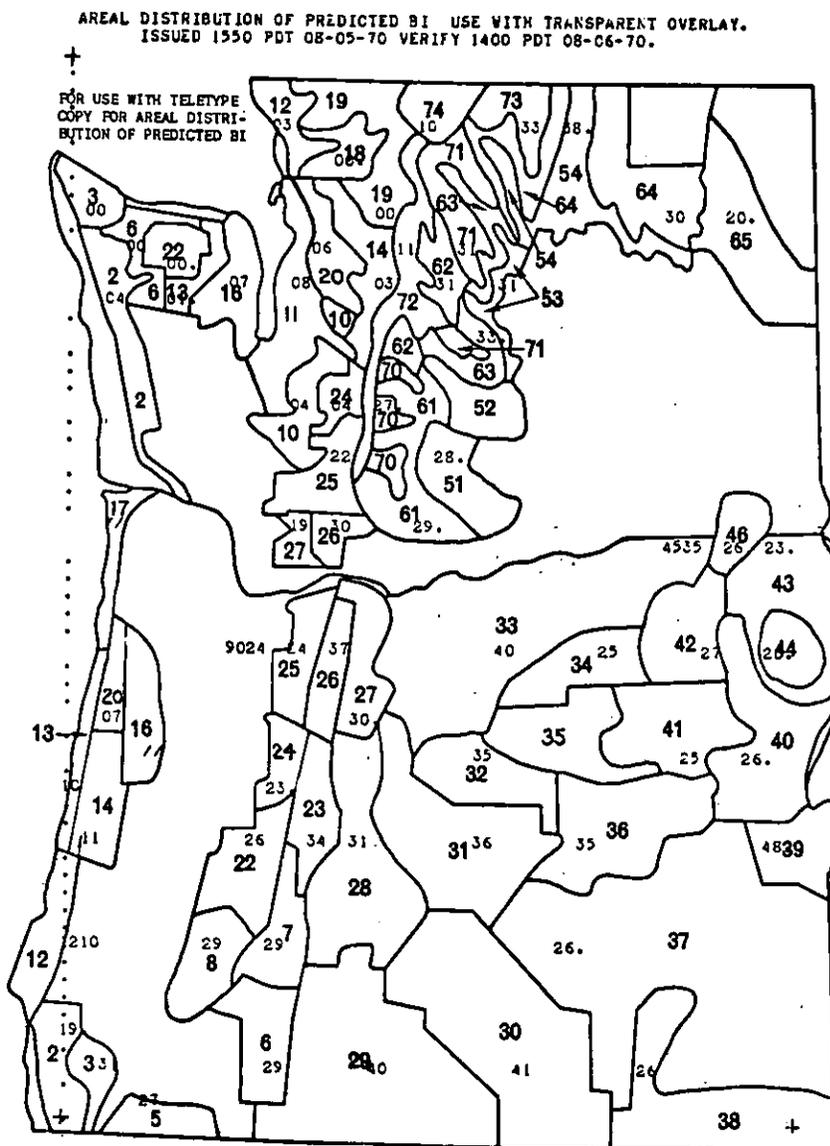


Figure 3.—Map overlay in place on teletype sheet. BI for each district is clearly indicated.

<sup>1</sup> Meteorologists, Division of Fire Control, USDA Forest Service, Portland, Ore.

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## Testing Service Rates Wetting Agents

R. W. JOHANSEN AND J. E. DEEMING<sup>1</sup>

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*Wetting agents used in forest fire control are evaluated for wetting ability.*

A comparative testing service has been instituted at the Southern Forest Fire Laboratory, Macon, Ga., for those interested in using wetting agents in their forest fire control activity. This service was initiated at the request of National Forest Systems to enable District Rangers throughout the country to determine if they were using effective products—at reasonable concentrations and reasonable costs.

### Parameters Determined

Before the testing program began, it was decided that worthwhile comparisons of products could be made by evaluating the following parameters: (1) solubility in water, (2) solubility in phosphate solutions, (3) foamability, (4) foam breakdown rate, (5) surface tension, and (6) wetting action (Skein Test, ASTM D2281-64T). The manufacturers were asked to supply data on cost, corrosion, and toxicity. Verifying corrosion tests are planned on the more promising wetting agents

and will be conducted at the Equipment Development Center at San Dimas using a system established for corrosion tests of fire retardants. While selecting these parameters, it was also decided that only liquid concentrates (as opposed to powders and pastes) would be considered because of the ease with which they can be handled.

The perfect wetting agent was visualized as a liquid concentrate that would give good wetting action at less than 1 percent concentration. The solution should also be nontoxic, noncorrosive, highly soluble, and low foaming. The foam that does appear should break down rapidly.

As of January 1, 1970, we had tested 74 products. These included some new products, as well as some that were being used by fire control agencies throughout the United States. They were all tested for effectiveness in both water and a solution of 15-percent diammonium phosphate and water. The phosphate solution was used because of considerable local interest in using the low-viscosity phosphate retardant together with a wetting agent for mopping up after fires in heavy duff or an organic soil.

### Which Ones Passed?

Those agents that meet minimum wetting standards are entered on a list of products "Approved for USDA Forest Service Use." Every chemical is rated for each of the test parameters mentioned. Also included is an estimated cost of chemicals per 1,000 gallons of solution at our recommended minimum concentration. Thus, an economic comparison of all rated products can be made. A subscriber to the list can then make an easy decision as to what product will be used in his operation.

We noted that, for a number of products, the manufacturers' recommended concentration failed to meet our minimum wetting standards. Those minimum concentrations recommended in the list approved for Forest Service use are believed to be realistic.

The list of "approved" wetting agents can be obtained by sending inquiries to:

Division of Fire Control  
Forest Service, U.S.  
Department of Agriculture,  
South Building, 12th &  
Independence Avenue, SW.,  
Washington, D.C. 20250

Or:

Southern Forest Fire  
Laboratory,  
Southeastern Forest  
Experiment Station,  
Post Office Box 185,  
Macon, Ga. 2 31202

### Test Procedures Available

Anyone interested in knowing what test procedures were used to measure the rated parameters can send inquiries to the authors at the Southern Forest Fire Laboratory.

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<sup>1</sup> Fire systems analyst and associate fire control scientist, respectively, Southeastern Forest Experiment Station, Southern Forest Fire Laboratory, Macon, Ga.

### **TRACKER, from back page.**

large number of people were living. Although the District Ranger came to no conclusion as to which one, if indeed any, of the occupants was responsible for causing the fire, there were no further outbreaks.

### *Tracked Suspects Flee*

On May 25th, the dogmaster received a request to patrol an area in Hants County where several fires of incendiary origin had occurred earlier in the month. During the patrol, a fire started in woodland about one-half mile from the road. Taken to the fire's perimeter, the dog followed a track to another small fire and then to a house. Then he led the dogmaster to a second house, behind which two men were seated. The arrival of the dog and ranger surprised them, and the following day both men left for Central Canada. Fire troubles in that area ended for the season.

By mid-June, Rommel proved to have certain characteristics which limited his usefulness as a tracking dog for the Department. It was decided not to purchase him, and, consequently, he was returned to his owners in July.

### *Major*

Encouraged by the results of the trial use of a tracking dog to curb incendiary fires, a male German Shepherd pup was purchased for training to the Department's specific requirements. "Major" was placed centrally in the province with the same ranger who had handled Rommel, and training was begun.

The 1967 fire season was wet. Fewer than half the normal number of fires occurred, and no situation developed meriting the use of a tracking dog.

During the 1968 season, Major was used six times for fire control assignments. None resulted in convictions. Yet, it was ap-

parent that his use was a deterrent to incendiaries. On one occasion, a teenaged boy was tracked from a point near a fire perimeter through swamps and heavy brush to a house a mile away.

### *Game Law Enforcement*

During the late summer and fall of 1968, Major was used on no less than 15 occasions for game law enforcement. He was also involved in investigating a fatal hunting accident. He located seal beam lights, ammunition, hunting knives, rifles, and deer carcasses for use as evidence in court. He also successfully tracked game law violators through wooded areas at night. The courts accepted him as being "well trained and qualified for the purpose used."

### *Expanded Program*

Before the spring of 1969, fire control planners decided to acquire two additional pups for training for use in the western and eastern regions of the Province. Until this time, Major had been handled part-time by a District Ranger. Now, three full-time dogmasters were appointed. In June, a fourteen-week training course began using a training manual written by the origi-

nal dogmaster, who now became Chief Dogmaster.

In mid-July, Major took time out from the course to assist in apprehending a man suspected of setting a five-acre fire in slash. The man was consequently convicted under Part II of the Lands and Forests Act.

Sabre, one of the junior German Shepherds, distinguished himself in late September by finding a toddler lost in a wooded area of eastern Nova Scotia.

### *The Decade Ahead*

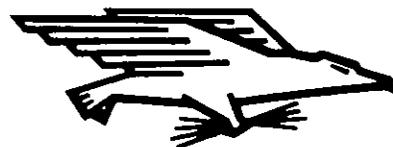
All three tracking dogs have been successfully transported in float-equipped Beaver aircraft. Because they are too large to carry inside a Bell G2, a "flying doghouse" has been constructed. It mounts on one of the floats of the helicopter, and will be tried in 1970. Hopefully, this innovation will make it possible quickly to transport both dog and dogmaster to the fire's perimeter. The incendiary will have to move with speed.

As we enter a new decade, our hopes are that we have found an effective way of reducing, to a minimum, fires of incendiary origin. One thing is certain. They can no longer be set with impunity. △

### **Fire Weather Handbook Is Available**

*Fire Weather, Agriculture Handbook #360*, has been published. Years in the making, it was coauthored by Charles C. Buck of the Forest Service and Mark J. Schroeder of the Weather Bureau. Culminating 45 years of fire research and fire weather forecasting experience. It is expected to become a classic reference and working tool for forest managers. Public and private foresters, rural fire departments, weather forecasters, defense officials, forestry schools, and others associated with the protection of forest lands from fire will find it indispensable.

*Fire Weather, Agriculture Handbook #360*, printed in color, containing 229 pages and numerous illustrations, can be purchased for \$3.75 from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402



## The Silent Tracker

D. B. BRADSHAW<sup>1</sup>

For the fourth consecutive season in Nova Scotia, a German Shepherd dog, Major, trained for tracking persons has been used to help curb forest fires started by incendiaries. Such fires have plagued fire control personnel throughout the Province's 40-year comprehensive fire prevention program.

### Aircraft Partially Successful

During the 20-year period following World War II, the use of aircraft, both fixed wing and helicopter, proved partially successful as a preventive measure. However, in some counties of the province, the determined incendiary continued to have his way, perhaps more wary, but still undaunted. Clearly, a more impressive method of linking him with his handiwork was required.

The successful experience of the Royal Canadian Mounted Police in using a tracking dog to apprehend criminals, to locate lost hunters, children, and so on, was noted by provincial fire control personnel. The use of such a dog to deter the incendiary seemed reasonable.

### Choosing a Dog

In early January of 1966, a Western Canadian firm, special-

<sup>1</sup> Forester i/c, Forest Protection, Nova Scotia Dept. of Lands and Forests.

*A trained dog has proven valuable for fire investigation work in Nova Scotia. The dog is also an effective deterrent to incendiaries, who fear they may be tracked down even after they leave the fire area.*

izing in raising and training dogs for activities associated with police and security types of work, was contacted. The firm was asked by the Supervisor of Forest Protection to express its views on the feasibility of using a dog to track a "fire-bug" in a woodland area. The company considered this to be feasible, and suggested the German Shepherd and Doberman Pinscher as good breeds for the purpose. They offered to train a dog owned by the Department of Lands and Forests or to sell the Department a suitably trained dog.

Further correspondence established the particulars needed to train a dog to track in wooded areas under possibly smoky conditions. This included the preferable sex and age of the animal to be trained and a mutually acceptable leasing fee for a 2 or 3 month trial period.

In mid-April of 1966, the company was requested to ship a trained male German Shepherd to Halifax under lease for an initial period, with the possibility of purchase later on. On May 2nd, "Rommel" arrived at the Halifax International Airport.

### Rommel

Within 2 weeks of his arrival in the province, Rommel was put to work in Halifax Coun-

ty. During the previous two months some 50 fires had occurred near a community in this county. When the dog arrived, two fires were in progress. Suppression action had started on one.

The dog was taken to the second fire where his initial attempt at tracking was unsuccessful due to confusion over an animal track. However, on being taken back to the fire, he followed a scent to a house in which a

See TRACKER, p. 15



Figure 1.—Commanded to "sit", Major awaits instruction from dogmaster. The four-year-old German Shepherd is used in forest protection and game law enforcement work in Nova Scotia. (N.S. Dept. of Lands & Forests)