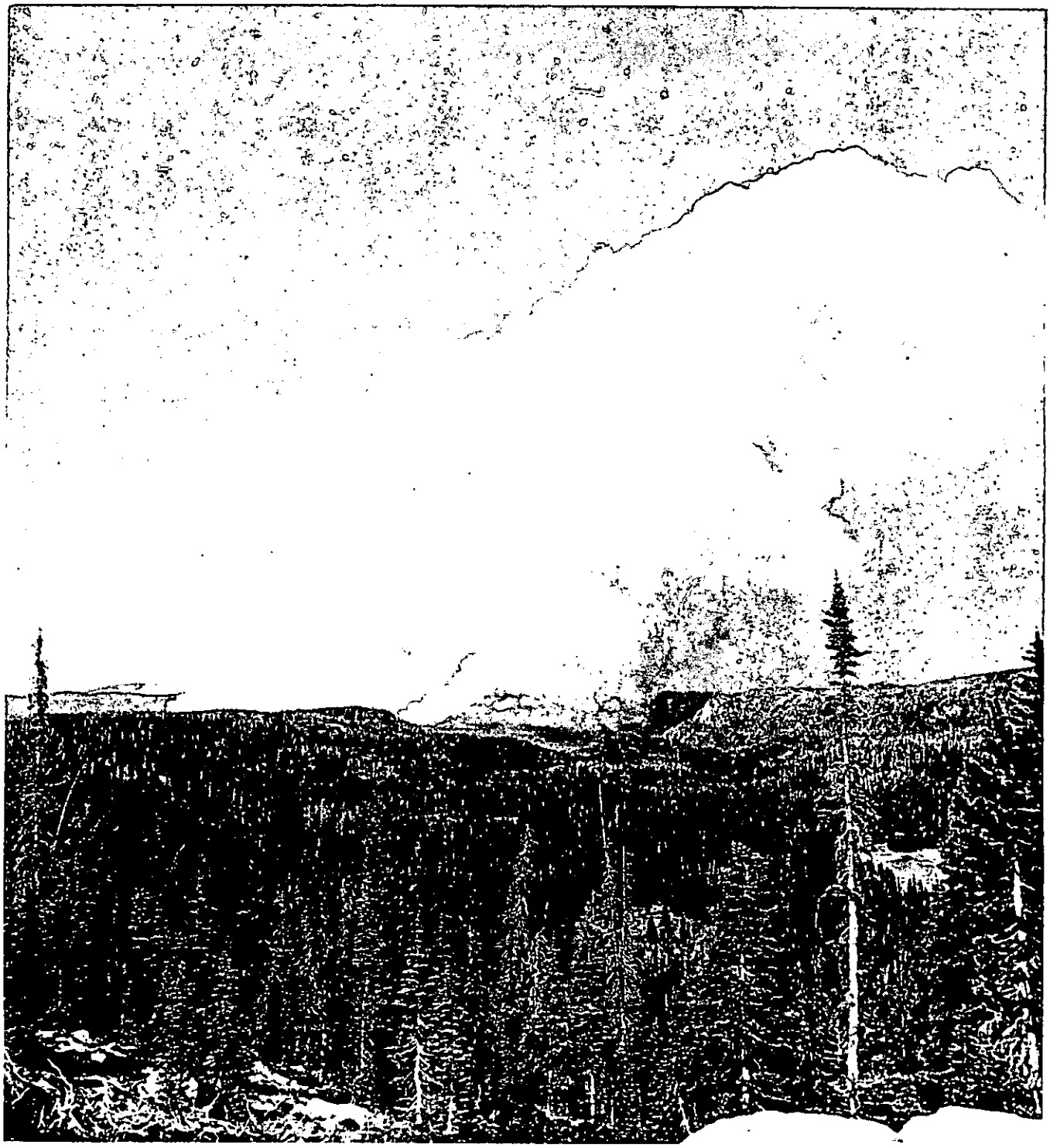
United States
Department of
Agriculture

Forest Service

Fire Management Notes

Fall 1980
Volume 41, No. 4



FIRE MANAGEMENT NOTES

An international quarterly periodical devoted to forest fire management

Table of Contents

The Cover

Fire on the USDA Forest Service's National Forest Lands created a controversy in 1979. Our lead story discusses the Northern Region's effort in the use of prescribed fire and the relationship of that effort to wildfires.

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

Single copy cost is $1.25 domestic and $1.60 foreign.

Subscriptions may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. The subscription rate is $5.00 per year domestic or $6.25 per year foreign. Postage stamps cannot be accepted in payment.

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1979—Test Year for Prescribed Fires in the Northern Region

David A. Thomas and Sandra J. Marshall[1]

It was the first week in August 1979, and the rumors about prescribed fires were growing daily, sometimes spreading faster than the fires themselves.

"Independence Fire has jumped the Selway River. They're dumping retardant to save Selway Lodge."

"Barefoot Fire has burned into Peach Fire. It's 10,000 acres and running."

Both the above statements were false, but that did not seem to matter. The press was attracted to these fires, and newspaper headlines from around the Northern Region spoke of "natural fires," "monster blazes," "management fires," and "let-burn fires." The rumors and headlines were all part of an unusual fire year and a major test for Northern Region fire management.

Early Warnings

Early in 1979 was a good time to speculate about forest fires. Fuel moistures were unseasonably low by the first of July, and they were expected to plunge lower as the fire season progressed. (As it turned out, 1979 was one of the driest years on record, with the 2-month period ending June 30 being the driest since 1918.)

Throughout the Region, dispatchers plotted the steady climb of the Burning Index (BI) and Energy Release Component (ERC) for National Fire Danger Rating System fuel models "C," "H," and "G." As one hot week gave way to another, the BI and ERC lines rose, approaching and sometimes exceeding the recent "worst case" fire years of 1961, 1967, and 1973.

A high fire danger was only one sign among many indicating that 1979 might be a tough fire year. Snag fires were escaping initial attack early in the season, and the sky was hazy with smoke not only from these fires, but from other large wildfires.

Prescribed Fire Program

But the Northern Region had survived hot fire seasons before. What would make 1979 special was that the Region had made plans to use prescribed fires within fire management areas approved by the Regional Forester.

A prescribed fire program was not unique, though, for the Northern Region has had areas under prescription since 1972 (Aldrich and Much 1972). What would separate 1979 from other fire years was the acres involved (table 1), the severity of the fire season, and the diversity of fire management plans that had been approved by the Regional Forester.

Fire Management Definitions

Prescribed Fire. A wildland fire burning under specified conditions which will accomplish certain planned objectives. The fire may result from either planned or unplanned ignitions. Plans for use of unplanned ignitions for this purpose must be approved by the Regional Forester.

Prescription. A predesignated set of criteria established to accomplish specific land and resource management objectives.

Wildfire. Any wildland fire that requires a suppression response.

Location of Fire Management Areas (FMA's)

Much of the 3 million acres of Northern Region land included in approved fire management plans was in wilderness areas in western Montana and northern Idaho. Sizable fire management areas existed, however, outside wilderness, specifically on the Bitterroot, Lolo, and Kootenai National Forests.

Prescription the Key

At the heart of all fire management plans are written fire prescriptions. Decision flow charts aid fire managers in determining whether a new fire start is designated a prescribed fire or if a prescribed fire that has continued to burn is still within prescription (fig. 1).

[1] Respectively, Assistant Fire Management Officer, Powell Ranger District, Clearwater National Forest, USDA Forest Service, Lolo, Mont.; and Program Assistant, Aviation and Fire Management, Northern Region, USDA Forest Service, Missoula, Mont.

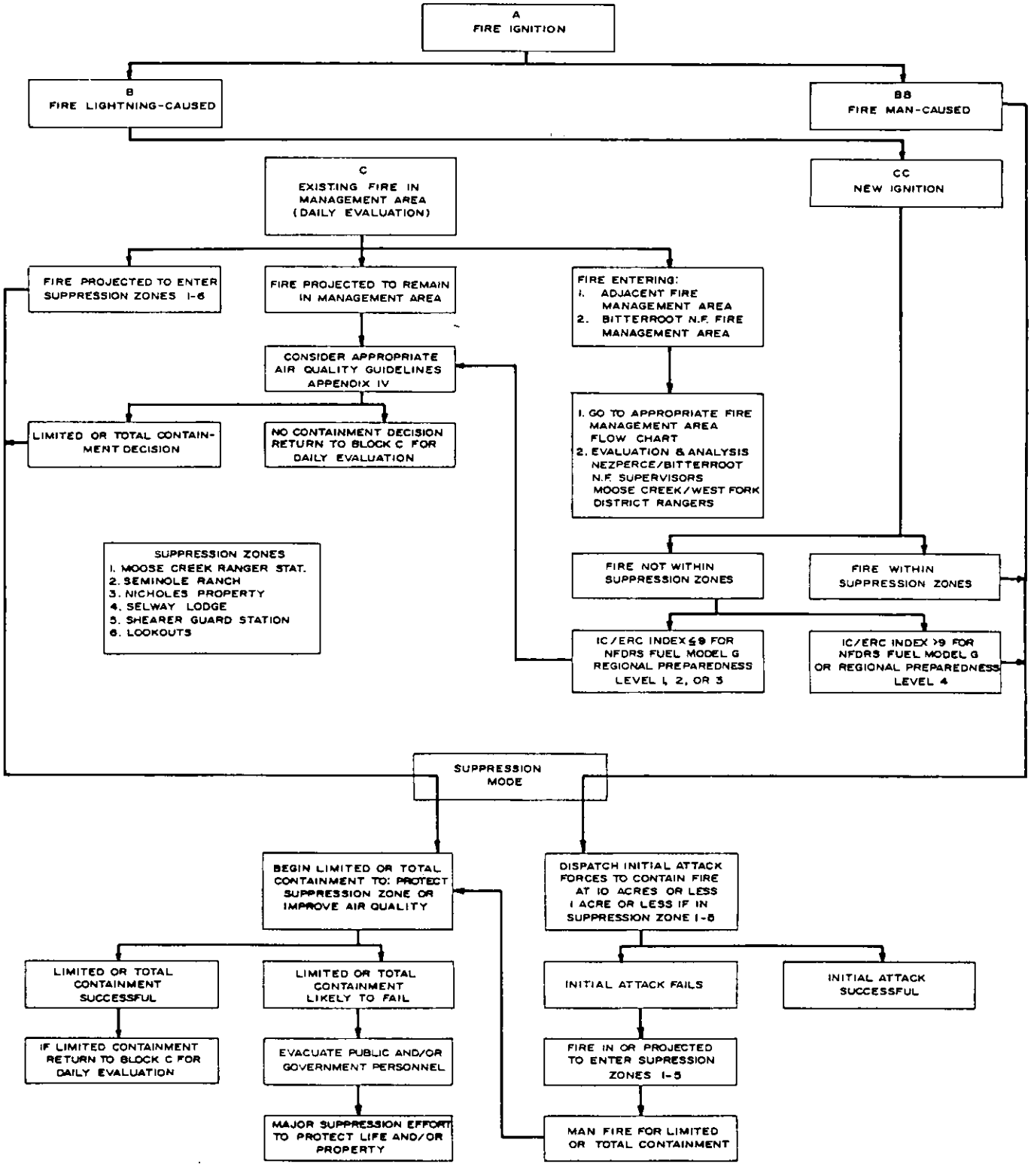

Figure 1.—This decision flow chart is from the Moose Creek Wilderness Fire Management Plan in the Selway-Bitterroot Wilderness.

Table 1.—Approved fire management areas, 1979

National Forest	Area	Acres		
		Wilderness	Nonwilderness	Total
Bitterroot	Selway-Bitterroot Wilderness	203,590	0	203,590
Bitterroot	High elevation, light fuels	68,960	8,840	77,800
Bitterroot	Intermingled ownership—high resource value zone	0	433,080	433,080
Bitterroot	Camp-Tolan	0	39,848	39,848
Clearwater	Selway-Bitterroot Wilderness	265,779	0	265,779
Deerlodge	Anaconda-Pintler	44,175	0	
Beaverhead	Wilderness	72,537	0	157,874
Bitterroot		41,162	0	
Kootenai	Troy Ranger District	15,365	309,272	324,637
Lolo		48,325	261,461	950,202
	Modified dispatch		640,416	
Nezperce	Selway-Bitterroot Wilderness	559,512	0	559,512
Total		1,319,405	1,692,917	3,012,322

Table 2.—Prescribed fire summary, 1979 fire season

National Forest	Fire starts	Fires suppressed	Fires Allowed to burn	Acres burned
		Number		
		Nonwilderness		
Bitterroot	4	4	0	0
Kootenai	19	18	1	542
Lolo	6	5	1	0
Nonwilderness subtotal	29	27	2	542
		Wilderness		
Bitterroot	16	7	9	14,940
Clearwater	11	7	4	75
Kootenai	2	0	2	5
Nezperce	61	49	12	16,315
Beaverhead	1	1	0	1
Bitterroot	1	1	0	0
Deerlodge (Anaconda Pintler)	0	0	0	0
Wilderness subtotal	92	65	27	31,336
Total	121	92	29	31,878

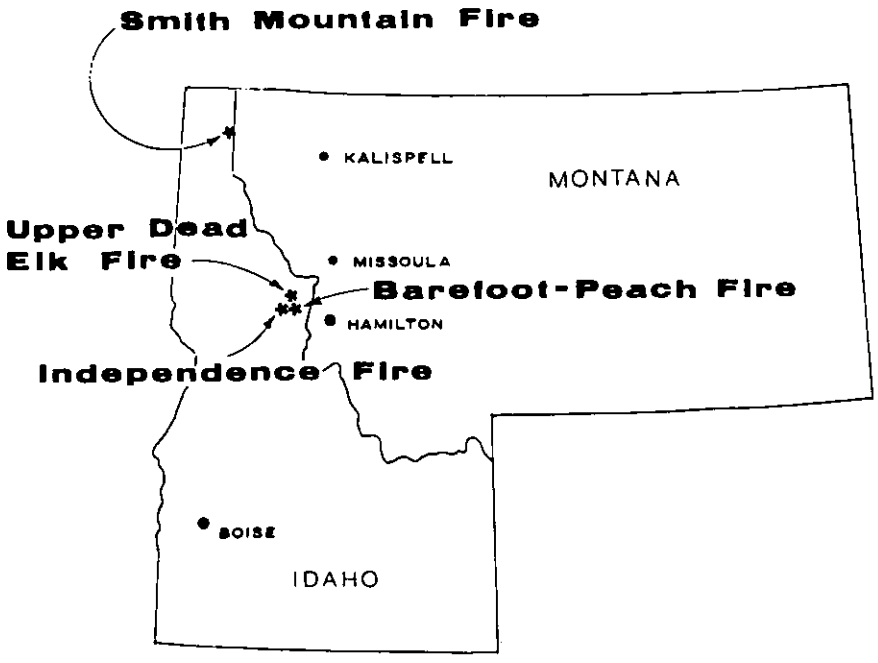

Figure 2.—Location of the four largest prescribed fires during the 1979 fire season.

Table 3.—Potential prescribed fires suppressed in Northern Region and primary reason for suppression.

		Reason for suppression							
National Forest	Fires suppressed	ERC outside prescription	Man-caused	Regional preparedness	RF's ban on new starts[1]	Smoke Management	Near Management boundary	Fire load within Management area	Property
Bitterroot	11	7					2		
Clearwater	7			1	1	1	2	1	1
Kootenai	18	18							
Lolo	5	5							
Nezperce	49		4		1		7	36	1
Beaverhead	1			1					
Bitterroot	1				1				
Deerlodge (Anaconda Pintler)									

[1] On August 10, 1979, the Regional Forester stated that "all new starts will be suppressed immediately." The main rationale for his decision was the limited and strained firefighting resources available in the West. This ban on new starts was lifted on August 27 after rain raised fuel moistures and lowered the fire danger.

Summary

Table 2 summarizes prescribed fire activity for the year, and figure 2 illustrates the location of the four largest prescribed fires in 1979. A fire ignition within an approved FMA did not immediately take on prescribed fire status. To the contrary, more fires were classified wildfires and suppressed within FMA's than were designated prescribed fires. Table 3 shows the primary reason each potential prescribed fire was suppressed. However, only the primary reasons are listed, and in most cases there was more than one reason for suppressing a fire.

Adding Print Capability to Your TI-59 Fire Behavior CROM

Roger L. Bradshaw and William A. Dean[1]

Development of the fire danger-fire behavior continuous read-only-memory (CROM) for the Texas Instruments TI-59 calculator (Cohen and Burgan 1979) provides new convenience in fire management decision-making (fig. 1). The TI-59 CROM unit has replaced manual calculation of National Fire Danger Rating System (NFDRS) indices (Deeming and others 1977, Burgan and others 1977) and the use of fire behavior nomograms (Albini 1976) in field computations. The widest application, however, is expected from the fire behavior portion of CROM in planning fire-related activities. A new program that adds print capabilities to the fire behavior program will make the TI-59 CROM unit more functional for planning.

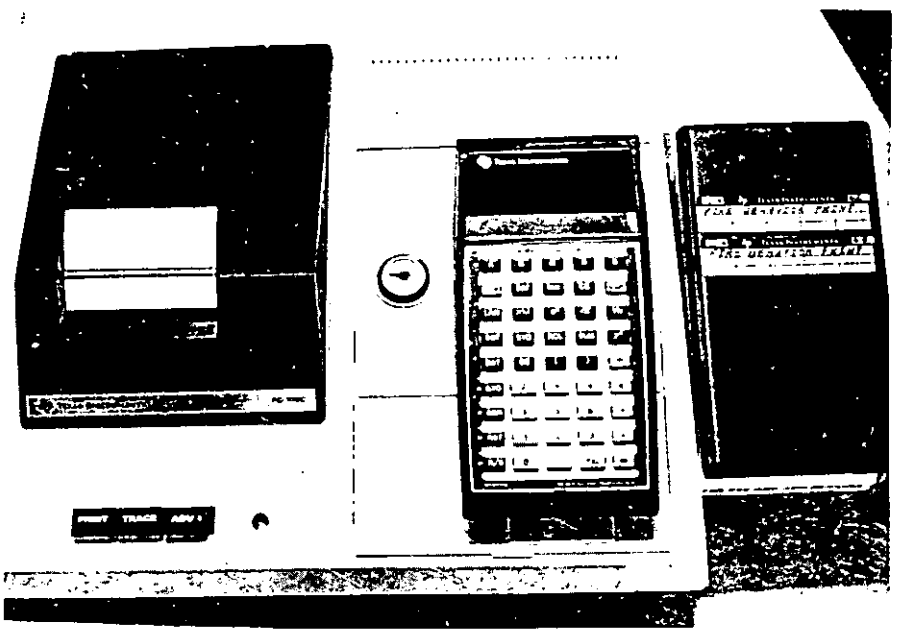

Figure 1.—Texas Instruments TI-59 CROM unit replaces manual calculation of fire behavior and fire-related planning activities. Texas Instruments PC-100 A or C print cradle provides fire management with a printout of TI-59 CROM input-output data.

Advantages

The fire danger-fire behavior CROM has no built-in print functions, so the user must maintain side records to document the inputs and results of fire behavior calculations. When the TI-59 CROM unit is used on a Texas Instruments PC-100 A or C print cradle, the print program automatically provides the operator with a printout of all input data and all output values. This feature removes the need for a separate form to record input and output information, in addition to full documentation of the fire behavior calculations.

Besides providing a hard-copy output record, the print program provides a quick and easy method of checking input values and, in several ways, reduces the chances for error. By prompting the operator for proper input, the print routine does not allow the operator to forget any variables. Because the routine performs all storage operations, entries cannot be stored in the wrong register. Also, the printer labels all outputs, so the operator cannot misidentify them and miskey during the output procedure. And, if the values must be copied onto another form, the availability of a hard copy speeds checking and further reduces the chances for error.

The print program also takes less time than handheld operation. The program reduces by nearly 50 percent the number of key strokes necessary to obtain fire behavior outputs. The print program also eliminates the tedium of writing data as they are displayed.

Disadvantages

The PC-100 A or C, required for the fire behavior print programs, is too large to be used easily in the

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field. But planning will benefit most from the print capabilities, and that activity is confined principally to offices.

Operation

The print program was designed for storage on two TI-59 magnetic cards. Once the program is placed in calculator memory, the user begins execution by pressing a single key. The program prompts the user for inputs, prints the values, asks if the user wishes to change any inputs, then lists and labels output values. The user can get additional copies of the output list by pressing one calculator key. The print program maintains the option of directly entering 1- and 10-hour timelag fuel moistures or of having them calculated by the CROM routines.

The planner can determine the effects of vegetation management strategies on fire behavior by running the fire behavior program several times with different fuel models. Various burning conditions can also be compared by altering weather and fuel moisture inputs. The print program quickly documents changes and allows easy comparison of outputs.

Copies of the fire behavior print program may be obtained from:

National Advanced Resource Technology Center,
Marana Air Park,
Marana, AZ 85238
FTS: 762-6414
(602) 792-6414

Literature Cited

Albini, Frank A. 1976. Estimating wildfire behavior and effects. U.S. Dep. Agric. For. Serv. Gen. Tech. Rep. INT-30, 92 p. Intermt. For. and Range Exp. Stn., Ogden, Utah.

Burgan, Robert W., Jack D. Cohen, and John E. Deeming. 1977. Manually calculating fire-danger ratings—1978 National Fire-Danger Rating System. U.S. Dep. Agric. For. Serv. Gen. Tech. Rep. INT-40, 49 p. Intermt. For. and Range Exp. Stn., Ogden, Utah.

Cohen, Jack D., and Robert E. Burgan. 1979. Hand-held calculator for fire danger/fire behavior. Fire Manage. Notes 40(1):8–9.

Deeming, John E., Robert E. Burgan, and Jack D. Cohen. 1977. The national fire-danger rating system—1978. U.S. Dep. Agric. For. Serv. Gen. Tech. Rep. INT-39, 63 p. Intermt. For. and Range Exp. Stn., Ogden, Utah.

Firebreaks for Railroad Rights-of-way

C.R. Crandall[1]

Since the introduction of the diesel-electric locomotive to the railroads in the early 1950's, incandescent particles from the exhaust have been a serious fire hazard to the woodlands adjacent to railroad rights-of-way. One defective diesel can ignite miles of fires on one trip. This potential emphasizes the need for safe economical means of fire prevention. One means is the use of firebreaks.

This paper discusses a simple process to determine where best to locate firebreaks along railroad rights-of-way. With this method, locating the firebreaks requires only two people, an 18-foot pole, and a 25½-foot cord. The firebreak itself is 4 feet wide.

Theory Behind the Method

Our system for locating firebreaks is based on several observations we have made of railroad-caused fires.

1. On a right-of-way with level adjacent terrain, most carbon fires start no farther out than 15 feet from the outside rail. So, any emission particle that lands outside this "fire radius" will probably not be hot enough to ignite the fuel. So, if we pick a point 18 feet from the outside rail on the level, this point would represent a safe distance since any particle would be cool enough when it landed so that it would not set a fire.

2. Locomotives average about 15 feet in height. Particles are probably not thrown out over 3 feet above the locomotive, so we can presume that particles reach an apex of about 18 feet.

Now we have three points that form a right triangle: The apex of the trajectory, the outside rail, and the point 18 feet out from the rail (fig. 1). The straight line from the apex to the 18-foot point is the hypotenuse of the triangle, which is about 25½ feet. This 25½ feet is the straight line distance to a safe zone.

Using the apex as a center, strike a radius of 25½ feet. This forms an arc which at any point is at a safe distance.

Locating the Firebreak

To locate the firebreak on a right-of-way, we used a telescoping pole that extends to 18 feet (fig. 2). At the top of the pole a 25½-foot cord is attached. The pole is placed perpendicular to the ground on the outside rail.

While one person holds the pole erect, the other person extends the cord and lowers the end of the cord until it touches the ground. Where the cord touches the ground, that point is flagged. This method of flagging is done at intervals according to the changing degree of slope along the track. Generally the interval is no more than 15 feet, but sometimes is as close as 5 feet. The firebreak will be 4 feet wide with the outside located at the flagging points.

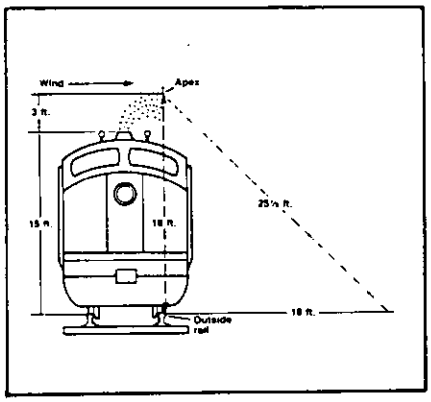

Figure 1—This triangle determines a reasonably safe distance from the tracks.

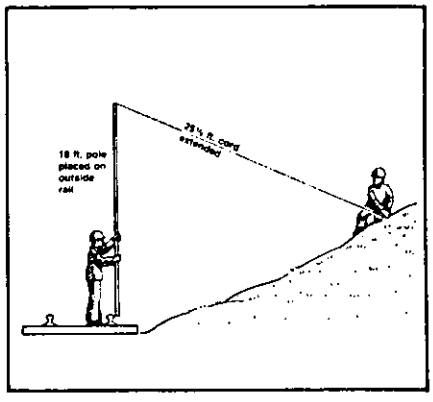

Figure 2—Locating the outside edge of the firebreak.

[1] Fire Management Training Officer, New York State Department of Environmental Conservation, Albany, N.Y.

Constructing the Firebreak

Several methods can be used to create the firebreak. Burning when the grasses are in cured condition is fairly inexpensive, but there are dangers of polluting the air or allowing the fire to escape. Bulldozing or plowing of firebreaks is effective when equipment is available and access to the area is possible. The method is expensive, however. Herbicides can also be used. In creating strips for our firebreak tests, we applied herbicides in early spring and then burned the strips about 3 months later. By this time, the grasses in the firebreak were top-killed for easy burning and the rest of the area was green, making the fire easy to control. The herbicide effect should last for about 3 years. After 3 years, the firebreak should be treated again with a herbicide, but no further burning should be needed.

NOAA Weather Radio—A New Service Opportunity for Forestry Officials

Earl W. Estelle [1]

A newly completed weather radio network (fig. 1) can help forestry officials save lives and property. Put together by the National Weather Service (NWS) of the U.S. Department of Commerce's National Oceanic and Atmospheric Administration (NOAA), the 350-station NOAA Weather Radio (NWR) network provides continuous weather information from NWS offices throughout the 50 States (Smith and Strauss 1979). Many stations are located near National and State forests (check the list on page 13 for specific transmitter locations). Weather information from NWR should serve well both forestry management personnel and the public on a day-to-day basis and, more importantly, provide a source of weather and flood information for the users of the forest during potentially life-threatening situations.

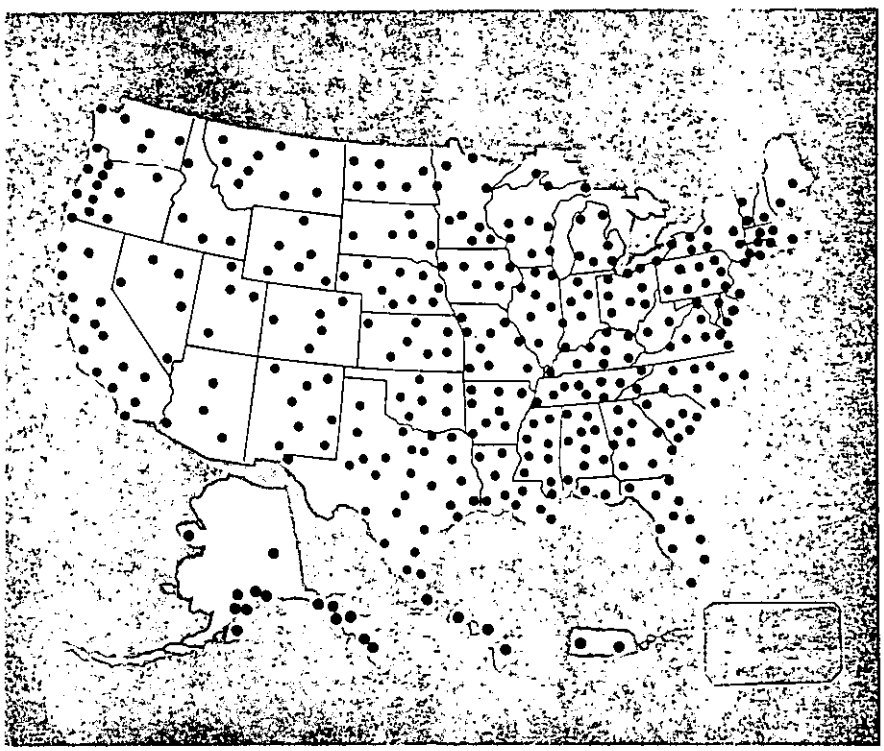

Figure 1.—Location of NOAA Weather Radio stations.

How NWR Works

During good weather, the latest observations and forecasts are tape-recorded by local NWS offices in messages that last from 3 to 5 minutes. These messages are replayed continuously, providing reception day or night at the push of a button or the twist of a dial. They are revised every few hours, or more frequently if needed. Although the broadcast material is directed primarily at the public, almost every broadcast contains weather information that should be directly useful in fire management activities. Most stations operate 24 hours daily.

Severe Weather Advisories

When severe weather threatens, NWS forecasters can interrupt the routine weather broadcasts and substitute special warning messages for severe weather or other disasters, such as a toxic gas spill. Forecasters can get the listeners' attention by sending a 10-second alert tone that activates specially designed warning receivers. These receivers silently monitor the NWR broadcast and respond to the warning tone. They are of two types. One sounds an alarm indicating that a warning is being issued—the volume must then be turned up manually. The other not only sounds an alarm but also automatically turns up the volume.

Warning-alarm receivers have proved especially valuable for schools, hospitals, nursing homes, factories, mobile-home communities, and other places where many people are gathered. They also have proved

[1]Chief, Public Services Branch, National Weather Service, Silver Spring, Md.

vitally important to radio and TV stations and public safety officials. Because of its unique warning capability, the NWR was designated in January 1975 by the White House Office of Telecommunications Policy as the sole federally operated radio system for providing warnings directly into people's homes.

NWR broadcasts can usually be heard as far as 40 miles from the antenna site, sometimes more. The effective range depends on many factors, particularly height of the transmitting antenna, terrain, quality of the receiver, and type of receiving antenna. As a general rule, listeners close to or perhaps beyond the 40-mile range should have a good receiver if they expect reliable reception. Also, an outside antenna may be required in these fringe areas.

Installations Appropriate for Wildlands

Two types of NWR installations might be appropriate for National and State forests. One is very simple, consisting of a receiver placed on a desk or counter. This approach is good for a forester's private office or for other forestry personnel.

The second type of installation is a permanent one, which can be used in either a manned or unmanned facility. If the installation is to serve the general public, particularly in an area that is not always manned, a permanent installation is recommended. For a few hundred dollars, including the cost of the receiver, a relatively vandal-proof installation can be made in a typical structure, such as a campground restroom or visitor center. Typically, one or more speakers are mounted in walls or ceilings with the radio out of sight in a storage room or other secure location. The radio is activated by a push button in the wall.

Permanent NWR installations are being set up in various types of public facilities, for example, in some State parks. But the biggest single effort to install NWR receivers in public places has just started to blossom along Federal highways. Several States already have installed NWR receivers at highway rest stops and information centers. Over the next year or two, more than 25 States will be joining the highway program.

Texas was the first State to use NWR in its highway tourist centers. The availability of NWR information at the Wichita Falls, Tex., Tourist Bureau on April 10, 1979, may have saved many lives in a devastating tornado outbreak that claimed 56 lives and injured 1,916. To quote from a memo from NOAA's Southern Region Headquarters at Fort Worth, Texas: "We've heard that the travelers listening to NWR at the Tourist Bureau in Wichita Falls last April 10, hearing of the tornado at Vernon and later tornado reports, advised some other motorists not to travel Highway 287 to the north and northwest, but take alternate routes. Quite likely, NWR and this advice saved lives during that fateful day." Similar pay-offs could occur if NWR installations were made in our National and State forests.

Receivers Appropriate for Wildlands

What kind of receiver is needed? One that will receive very high frequency FM broadcasts—considerably above commercial FM broadcasts, which end at 108 megahertz. The frequencies used for NWR nationwide are 162.40, 162.475, and 162.55 megahertz. Cheap receivers can be bought for as little as $15. However, a better quality receiver, costing $45 to $50 or more is recommended. Such receivers will provide much more satisfactory service and normally will be equipped with the warning alarm feature. Several articles have appeared in popular magazines on the program and receivers available. A list of references follows.

Selected Recent References

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- *Consumer Reports Magazine*, August 1978, "Weather Radio."
- *Consumer Reports Magazine*, December 1978, "Best Buys for Christmas."
- *Consumer Reports Magazine Annual Buyers Guide*, January 1979, "Weather Radios."
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- *Popular Electronics Communications Handbook*, May 1979, "NOAA Weather Radio—The Expanding Giant."
- *Popular Mechanics*, August 1977, "Weather Radio: Keep One Jump Ahead of Disasters."
- *Popular Science*, July 1979, "Weather-Alert Radios—They Could Save Your Life."
- *Today's Farmer*, May 1979, "Pushbutton Weather News."
- *U.S. News & World Report*, July 17, 1978, pp. 78, "Radio Network July for Weather, Storm Warnings."
- *Yachting Magazine*, October 1978, pp. 90, "Weather Radio Update."

Further Information

Advice on how to make an installation can be obtained from your nearest NWS office or one of the following NWS regional contacts:

Contact	States Managed
NWS/NOAA Eastern Region Hdqtrs. 585 Stewart Ave. Garden City, NY 11530 FTS—665-3712 Commercial—516-222-2109	ME, NH, VT, MA, NY, CT, OH, PA, NJ, DE, MD, VA, WV, NC, SC, RI
NWS/NOAA Central Region Hdqtrs. 601 E. 12th St. Room 1736 Kansas City, MO 64106 FTS—758-3239 Commercial—816-374-3239	MI, IN, KY, IL, WI, MN, ND, MO, SD, NE, WY, CO, IO, KS
NWS/NOAA Southern Region Hdqtrs. 819 Taylor Street Room 10E09 Fort Worth, TX 76102 FTS—334-2653 Commercial—817-334-2653	NM, TX, OK, AR, LA, MS, AL, GA, FL, TN Commonwealth of Puerto Rico
NWS/NOAA Western Region Hdqtrs. Box 11188 Federal Bldg. 125 S. State St. Salt Lake City, UT 84147 FTS—588-4000 Commercial—801-524-4000	AZ, UT, NV, CA, OR, MT, ID, WA
NWS/NOAA Alaska Region Box 23, 701 C Street Anchorage, AK 99513 FTS Operator—399-0150, give commercial number Commercial—907-271-5130	AK
NWS/NOAA Pacific Region P.O. Box 50027 Honolulu, HI 96850 FTS Operator—556-0220, give commercial number Commercial—808-546-5689	HI

LOCATIONS OF NOAA

WEATHER RADIO STATIONS

Alabama
- Anniston
- Birmingham
- Dozier
- Florence
- Huntsville
- Louisville
- Mobile
- Montgomery
- Tuscaloosa
- Demopolis

Alaska
- Anchorage
- Cordova
- Fairbanks
- Homer
- Juneau
- Ketchikan
- Kodiak
- Nome
- Petersburg
- Seward
- Sitka
- Valdez
- Wrangell
- Yakutat

Arizona
- Flagstaff
- Phoenix
- Tucson
- Yuma (P)

Arkansas
- Ash Flat
- Fayetteville
- Fort Smith
- Gurdon
- Jonesboro
- Little Rock
- Star City
- Texarkana

California
- Bakersfield (P)
- **Barstow
- Coachella (P)
- Eureka
- Fresno
- Los Angeles
- Merced
- Monterey
- Point Arena
- Redding (P)
- Sacramento
- San Diego
- San Francisco
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- Mead
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- Sterling

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- New London

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- Gainesville
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- Key West
- Melbourne
- Miami
- Orlando
- Panama City
- Pensacola
- Tallahassee
- Tampa
- West Palm Beach

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- Athens
- Atlanta
- Augusta
- Chatsworth
- Columbus
- Macon
- Savannah
- Waycross

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- Honolulu
- Kokee
- Mt. Haleakala
- Waimanalo (R)

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- Lewiston (P)
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- Des Moines
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- Waterloo

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- Louisville
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- Somerset
- Elizabethtown (R)
- Pikeville (R)

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- Thief River Falls
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- Saint Cloud (P)

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- Sikeston

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- Glasgow
- Great Falls
- Havre (P)
- Helena
- Kalispell
- Miles City
- Missoula

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- Lincoln
- Norfolk
- North Platte
- Omaha
- Scottsbluff
- Merriman
- Bassett
- Holdrege

Nevada
- Elko
- Ely
- Las Vegas
- Reno
- Winnemucca

New Hamsphire
- Concord

New Jersey
- Atlantic City

New Mexico
- Albuquerque
- Clovis
- Farmington
- Hobbs
- Ruidoso
- Santa Fe
- Las Cruces
- Des Moines

New York
- Albany
- Binghamton
- Buffalo
- New York City
- Kingston
- Rochester
- Syracuse
- Elmira

North Carolina
- Asheville
- Cape Hatteras
- Charlotte
- Fayetteville
- New Bern
- Raleigh/Durham
- Rocky Mount
- Wilmington
- Winston-Salem

North Dakota
- Bismarck
- Dickinson
- Fargo
- Jamestown
- Minot
- Petersburg
- Williston

Ohio
- Akron
- Caldwell
- Cleveland
- Columbus
- Dayton
- Lima
- Sandusky
- Toledo

Oklahoma
- Clinton
- Enid
- Lawton
- McAlester
- Oklahoma City
- Tulsa

Oregon
- Astoria
- Brookings
- Coos Bay
- Eugene
- Klamath Falls
- Medford
- Newport
- Pendleton
- Portland
- Roseburg
- Salem
- **Bend/Redmond

Pennsylvania
- Allentown
- Johnstown
- Erie
- Harrisburg
- Philadelphia
- Pittsburgh
- Clearfield
- Wilkes-Barre
- Williamsport (P)

Puerto Rico
- San Juan
- Maricao

Rhode Island
- Providence

South Carolina
- Beaufort
- Charleston
- Columbia
- Florence
- Greenville
- Myrtle Beach
- Sumter (R)

South Dakota
- Aberdeen
- Huron
- Pierre
- Rapid City
- Sioux Falls

Tennessee
- Bristol
- Chattanooga
- Cookville
- Jackson
- Knoxville
- Memphis
- Nashville
- Shelbyville
- Waverly

Texas
- Abilene
- Amarillo
- Austin
- Beaumont (P)
- Big Spring
- Brownsville
- Bryan
- Corpus Christi
- Dallas
- Del Rio
- El Paso
- Fort Worth
- Galveston
- Houston
- Laredo
- Lufkin
- Lubbock
- Midland
- Paris
- Pharr
- San Angelo
- San Antonio
- Sherman
- Tyler
- Victoria
- Waco
- Wichita Falls

Utah
- Logan
- Roosevelt
- Salt Lake City
- Milford

Vermont
- Burlington
- Windsor

Virginia
- Lynchburg
- Norfolk
- Richmond
- Roanoke
- Heathsville

Washington
- Neah Bay
- Seattle
- Spokane
- Yakima
- Wenatchee

West Virginia
- Charleston
- Clarksburg

Wisconsin
- Menomonie
- Green Bay
- La Crosse (P)
- Madison
- Milwaukee
- Wausau

Wyoming
- Casper
- Cheyenne
- Lander
- **Rawlins
- **Rock Springs
- Sheridan (P)

Notes:

1. As of April 1, 1980, 324 stations were on the air. By the end of 1980 all but five of the stations remaining to be installed should be operational. The five stations are marked with a double asterisk (**).

2. Stations marked (R) are low-powered experimental repeater stations serving a very limited local area.

3. Stations marked (P) operate fewer than 24 hours per day; however, hours are extended during severe weather, when possible.

Helitorch Use in California

Denny Bungarz[1]

A new system for igniting wildland fuels should prove a help both for prescribed burns and for backfiring and burnout in wildfires. This system is slung under a helicopter (fig. 1) and is called a helitorch.

The helitorch is an aluminum frame that holds a 55-gallon drum, a small electric motor that drives a small positive displacement pump, and an ignition device. The fuel is gasoline mixed with aluma-gel that has the consistency of runny gelatin.

Use in Prescribed Burns

In March 1979, the USDA Forest Service's Missoula Equipment Development Center and the Mendocino National Forest in northern California introduced the helitorch to land managers in California. The first use of the torch in brush-covered lands was as a prescribed burning tool (fig. 2) on the Mendocino National Forest. The Angeles and Cleveland National Forests in southern California soon followed with additional use of the torch in prescribed burning.

The objective of the test was to determine if the firing tool could improve the efficiency of present prescribed burning methods. Also, policies and procedures of use were to be developed. It soon became obvious that the helitorch has a place in prescribed burning. It also became apparent that the torch might have a place in backfiring and burnout in wildfire situations.

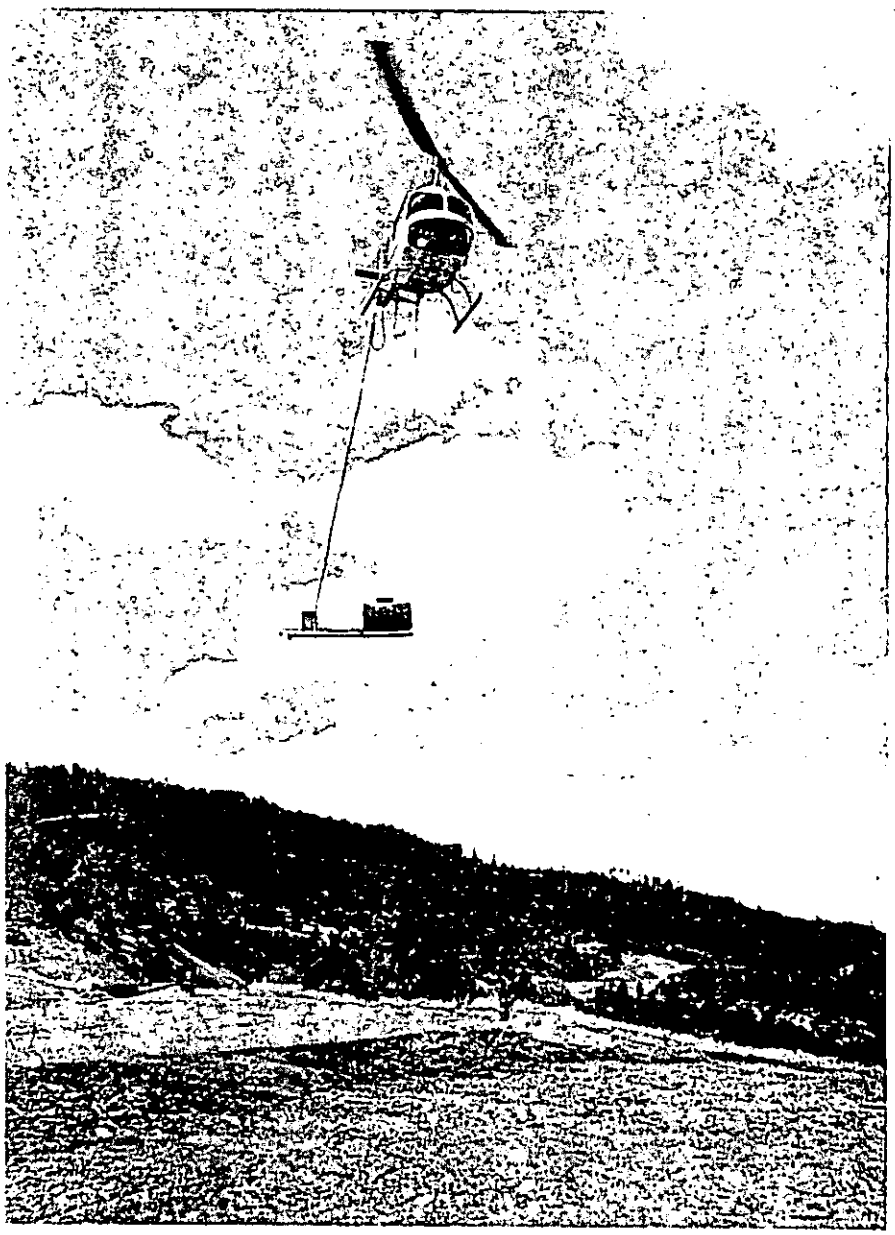


Figure 1.—Helitorch on Bell Jet Ranger III.

[1]Fire Management Officer, Mendocino National Forest, USDA Forest Service, Willows, Calif.

Figure 2.—Two prescribed fires started by the helitorch—Grindstone demonstration area.

Use on Wildfires

The Pacific Southwest Region of the Forest Service selected a committee of land managers and fire management personnel to develop a testing and evaluation procedure for use of the helitorch during the 1979 wildfire season in California.

The committee recommended that two Forest Service helicopters be equipped with the helitorch for the 1979 fire season. Helicopter crews on the Mendocino National Forest and the Cleveland National Forest were chosen as the first two crews because they had experience with the torch during the spring prescribed burning season and because one crew was in the northern part of the State and the other was in the southern.

The committee developed testing and evaluation procedures that included the requirement of a trained firing boss with helitorch experience and a fire behavior officer on each fire where the torch was to be used. A helitorch firing plan and fire weather readings had to be prepared before the torch could be deployed.

The committee also required that the firing boss have control of the helitorch on firing runs by means of an exclusive radio frequency and visual contact during each run. This requirement resulted in a second helicopter being used as the observation platform for the firing boss. Safety regulations would not allow the firing boss to ride in the helicopter carrying the helitorch.

The helitorch was first used on a wildfire on the Nacimiento Fire on the Los Padres National Forest on September 4, 1979. It was subsequently used on six more wildfires in California during the 1979 fire season (table 1).

Advantages and Recommendations

The helitorch gives the wildland fire manager more ability to ignite backfires or to burn out in areas where it is impossible or unsafe to fire by conventional methods. It also provides a much faster ignition method that enables the firefighter to take advantage of such favorable weather conditions as good wind direction and speed and high or low humidity.

Table 1.—Helitorch use in California during 1979.

Date	*Fire Name*	*Forest*	*Use/Remarks*
09/04/79	Nacimiento	Los Padres	Burned 100- to 150-acre island of chamise across a steep canyon from the fireline. Successful burn.
09/14/79	Pinecrest	Angeles	Burned areas inaccessible or unsafe to do by hand methods, 40–60 acres. Burned ground fuels, did not burn canopy. Burn considered a success.
09/15/79	Pinecrest	Angeles	Burned islands of brush under Mt. Wilson after fire made its initial run.
09/16/79	Sage (Monte)	Angeles	Assisted in backfiring around Mt. Gleason complex. Ignited 100 acres of chamise to draw fire away from buildings. Very successful. Observed by a number of city, county, and California Department of Forestry firemen. Also fired about one-half mile on preconstructed firebreak. Very successful operation.
09/17–18/79	Sage	Angeles	Assisted in firing handline. Fire jumped line, and helicopter was used for water dropping and medivac.
09/19–21/79	Santa Ana	San Bernardino	Assisted in hand line fireout operation. Only moderately successful because reconnaissance helicopter was unavailable. Burned out 4 miles of fire line in 9-year-old brush. Used 600 gallons of jellied gas. Incident commander (fire boss) said helitorch reduced manning that fire line by one full shift.
09/21/79	Otay	Land protected by California Department of Forestry, San Diego Co.	Helitorch used on about 500 acres of burnout. California Department of Forestry firing boss said results were very good.

In prescribed burning with few days when burning is permitted, the helitorch makes it possible to burn more area per burn day than the usual hand methods.

After a successful testing evaluation period, the regional helitorch committee met and recommended that the helitorch be declared an operational tool for use in prescribed burning and wildfire in California with a minimum of restrictions and conditions. The committee also recommended that nine helicopters be equipped with and their crews trained to operate the torch during the 1980 wildland fire season. The Angeles National Forest will introduce the helitorch to its night-flying helicopter program, which will give both day and night use to this tool.

Swathe-Felling Mobile Chipper

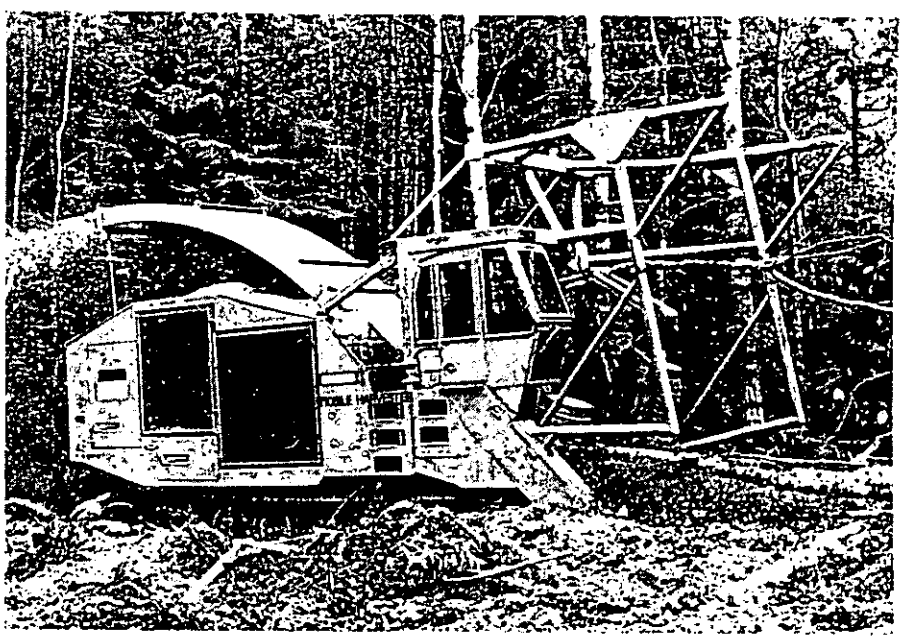
A swathe-felling mobile chipper has been developed by the USDA Forest Service research laboratory in Pineville, Louisiana, under the leadership of Peter Koch, working with the U.S. Department of Energy, five timber companies, and the Nicholson Manufacturing Company of Seattle, Washington. It is the latest thing in efforts to get the most from forest resources. It makes more waste wood economical.

Operating on fairly smooth and level terrain, the chipper can fell and chip trees up to 12 inches in diameter and as close as 6 inches to the ground. Future designs may allow the machine to operate on more difficult terrain.

Moving at 1 mile per hour, it covers 1 acre of land per hour and chips an average of 25 tons of logging residue and standing waste per acre. The chips are blown into a mobile bin that moves them to a roadside for transport to a mill.

A commercial prototype of the machine was first tested near Seattle last year. Some modifications are being made to make it work better.

EDITORS: This photograph has been screened for offset reproduction.



A "friendly forest monster" chews its way through scrap trees and forest residue, gobbling up 25 tons per acre to make forests more productive. The 72,000-pound machine was the brainchild of scientist Peter Koch of the U.S. Department of Agriculture's Forest Service. Koch sought a way to make forests grow more productively and to collect wood that would otherwise be wasted. Wood chips made by the machine are used for fuel or to make paper and other fiberous goods.

The mobile chipper should be available for wide use in forests across the South by early 1981.

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