Fire Management in Rocky Mountain National Park

PART I PLANNING AND OBSTACLES

DAVID B. BUTTS
Resources Management Specialist
Division of Natural Resources
USDI, National Park Service
Washington, D.C.

INTRODUCTION

THE Rocky Mountain National Park was established in 1915. This was during what has been called the preservation era of resources management that extended into the 1930's. The next emphasis was that of single purpose management. Starting with the CCC's the forest protection program really got underway, and "keep fire out" was to be the byword for the next 4 decades. The ability of the staff to really influence the effects of fire became more intense as technology advanced. One major advantage to fire management evolving from this effort was more accurate records of fire occurrence beginning in 1930.

The fire management plan of today is a by-product of the ecosystem management that evolved in the late 1960's. Fire, as an ecological factor, was not previously acknowledged in resource management.

Throughout this paper I will refer to natural fire, which is synonymous with "lightning-caused fire." The low incidence of natural

fires facilitated the rapid transition from fire control in 1972, to the fire management plans of 1973 and 1974. The small number of fires suppressed over the 40 plus years minimized man's influence on the natural systems. Details of fire history are covered in Part II, Current Fire Research.

The vegetative cover of the park is typical of the Central Rocky Mountains. The lower east side of the park at elevations of about 8,000 feet (2,438 m) has a montane forest of ponderosa pine *(Pinus ponderosa)* primarily on the valley bottoms and south exposures with Douglas-fir (*Pseudotsuga menzeisii*) on the north exposures. Above this and at the lower elevations on the west side are extensive sub-alpine forests of lodgepole pine *(Pinus contorta)*, and then the spruce (*Picea engalmanii*)-fir (*Abies lasiocarpa*) extending to tree line at about 11,500 feet (3,505 m). Scattered within the montane and sub-alpine forests are stands of aspen *(Populus tremuloides)*. Limited stands of limber pine *(Pinus flexilis)* are found primarily on rocky ridges.

TOPOGRAPHY

These features provide a major influence on the fire management program in Rocky Mountain National Park. The backbone of the continental divide runs north and south through the park mostly at 11,000-13,000 ft. (3,353-3,962 m). It creates an extensive area of alpine zone barrier between the two major forested regions in the park comprising the east slope and west slope of the Rocky Mountain Front Range. In addition to this major east-west division there are numerous smaller drainages which tend to break up the lower elevation forest canopy through rather drastic changes in slope and exposure.

Only at a very few places in this continental divide do we find vegetational links of continuous nature between the east and west slope. In most cases it is a scattered vegetation with numerous rock outcrops on the crest of the divide. It is particularly steep on the east side where there are numerous cirques.

From the crest of the divide at 13,000 feet (3,962 m), the terrain slopes to the so called "valley" or west edge of the great plains, in the Fort Collins, Denver area at about 5,000 feet (1,524 m) ele-

vation. To the west of the park lies the Middle Park, a large basin at about 8,000 feet (2,438 m).

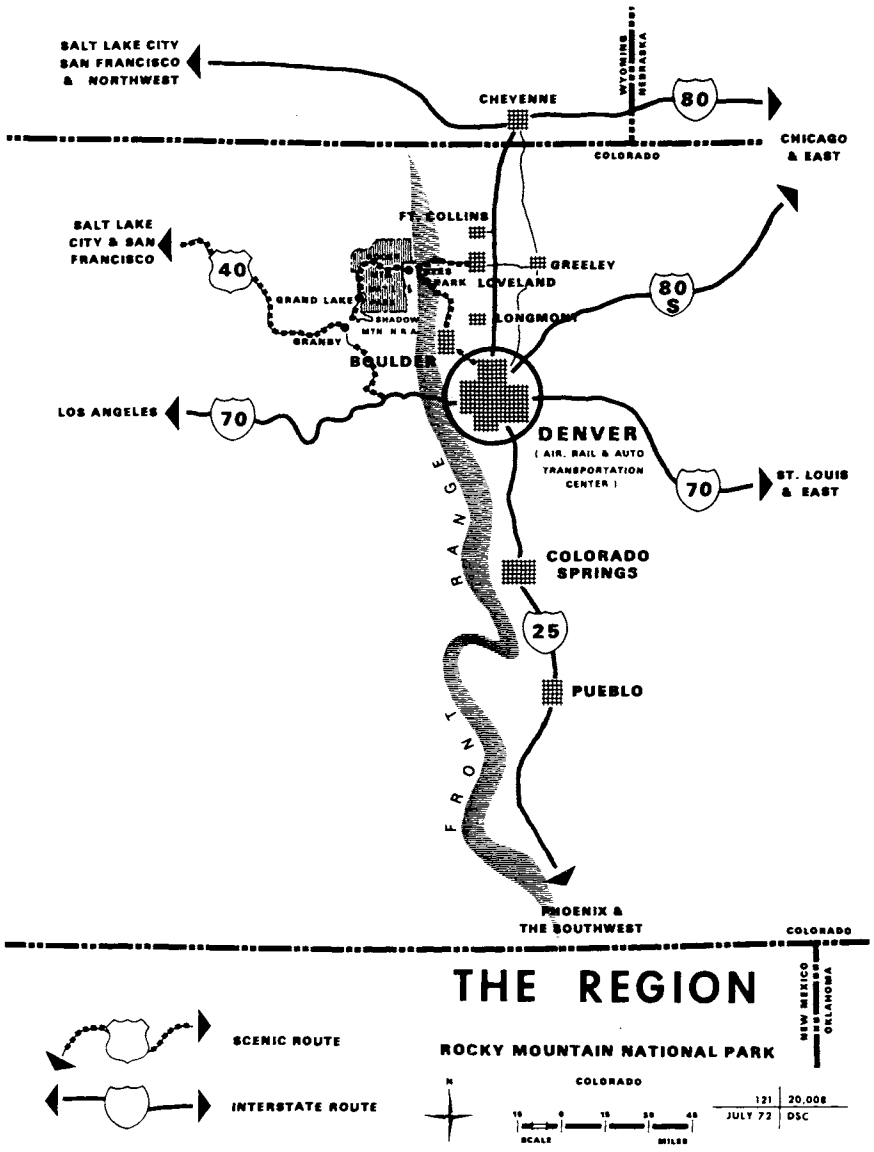

Fig. 1. The Region—Rocky Mountain National Park.

DEMOGRAPHY

Superimposed on this topography we have the development in the vicinity of the park. With increasing intensity the lands immediately adjacent to the park are being converted into second home sites (Fig. 1). This includes the entire area from Estes Park to the southeast corner of the park encompassing essentially 60 percent of the east boundary. The injection of developments into the closed canopy conifer stands that run continuous up to treeline of the park poses one of the most difficult fire management problems to be resolved in evaluation and the implementation of this plan.

The populations are centered in the towns of Estes Park and Allens Park on the east side and in the Grand Lake community located immediately adjacent to the park on the west side. These communities are heavily dependent upon the short summer tourist season for their economic base. Considered from the viewpoint of the Front Range of the Rocky Mountains we find the Denver megalopolis is only about 65 miles away (105 k), downslope at elevations ranging around 5,000 feet (1,524 m). The upper portions of Rocky Mountain National Park are visible from this metropolitan area and any smoke columning from within the park would be visible from the metropolitan area. The majority of this park falls in the Denver air shed which is already experiencing Los Angeles type pollution problems.

FIRE HISTORY

The past fire frequency in this park of natural fire has not been as intense as found in most of the western parks (Fig. 2). The average incidence of only 2 to 3 lightning fires per year is very small in contrast to Yosemite. One hazard is that the typical fire in the park, going back many years, is a very small fire of less than ¼ acre. Large crown fires occur at long intervals but result in complete type conversion and are those that significantly alter the vegetative mosaic of the area. A review of fires which have occurred during the recorded time since 1930 shows that only one large fire, of 960 acres (391 ha), took place. Since 1930 there has been

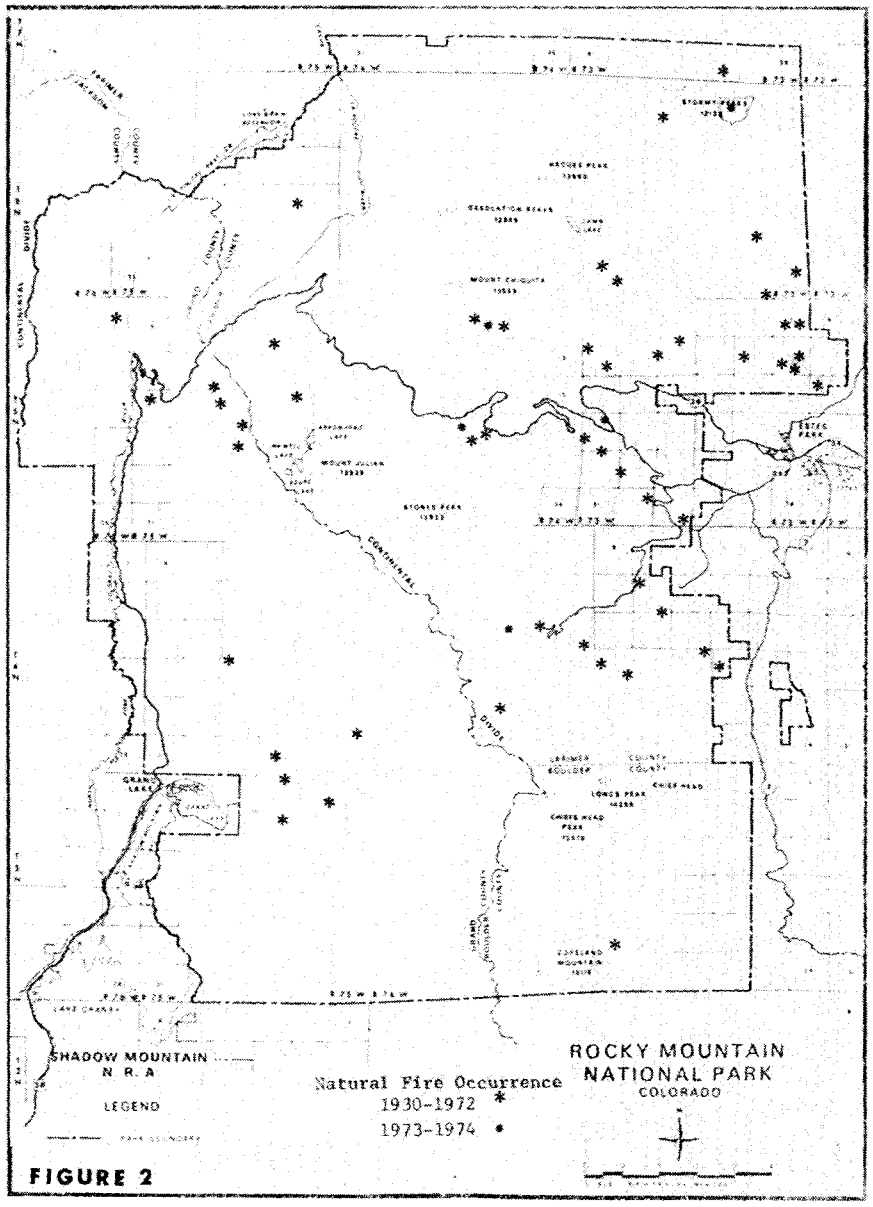
SHADOW MOUNTAIN
N. R. A.
LEGEND
Natural Fire Occurrence
1930-1972 *
1973-1974 •
ROCKY MOUNTAIN
NATIONAL PARK
COLORADO

FIGURE 2

a ratio of about three man-caused fires for every lightning caused fire. Man-caused fires are still a major threat to these natural ecosystems.

THE MANAGEMENT PLANS

1973 PLAN: (Figure 3)

This was a marked departure from all-out control. Based upon fire history the natural fire zone was pushed as close as possible toward the park boundary. Except in the southeast corner of the park where an up-slope out of the park condition exists, the maximum distance from boundary to natural fire zone is .6 mile (1K). Developed areas were protected at all times as are sites with rare or endangered species.

The basic options in the prescription were observation, or suppression, or a combination (Table 1). An override of all options would take place if there is life hazard.

One program planned but never exercised, was the reinforcement of zone margins around the park and developed area by fuel hazard reduction. A 50 foot wide strip was to be prescribe burned periodically to reduce the probability of fine fuel rapidly carrying fire either way into or out of the zones. It would not only maximize the natural fire zone but also reduce the probability of man-caused fire from influencing the natural zone by spread from areas of high man-caused risk.

1974 PLAN: (Figure 4)

The zones were changed markedly, sharply reducing the natural fire zone. The major shift operationally is to lessen need for calculated decisions about the actions to be taken. More of the park was placed into the conditional zone.

The enlargement of the controlled zone eliminates the natural fire influence in that zone and will necessitate more research to develop and substantiate a prescription simulating natural fire influence. Present data is just not available to support such a prescription at this time.

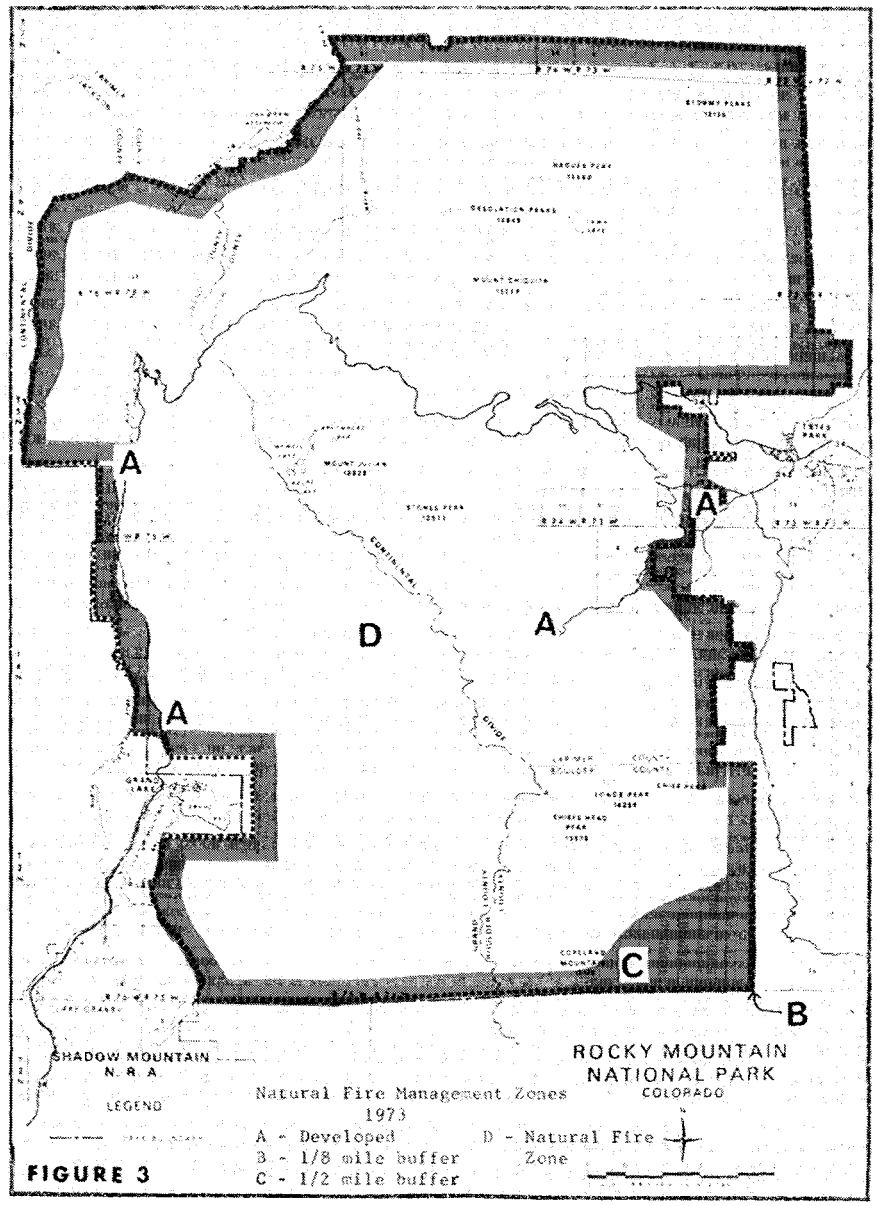
A
A
A
D
A
A
C
B
SHADOW MOUNTAIN
N. R. A.
ROCKY MOUNTAIN
NATIONAL PARK
COLORADO
LEGEND
Natural Fire Management Zones
1973
A - Developed
B - 1/8 mile buffer
C - 1/2 mile buffer
D - Natural Fire
Zone

FIGURE 3

Table 1. Rocky Mountain National Park fire prescription.

Action / Cause & Zone	Man with at least 2 men	Observe*	Observe* and Suppress**	Suppress**
Man Caused	All Fires			All Fires
NATURAL FIRE				
Zone A Developed Areas	All Fires			All Fires
Zone B 1/8 mile from Boundary	All Fires		Manning Class I & II days w/positive spread into Zone C. Mop-up rear of fire to prevent escape from park.	Fires on Manning Class III, IV & V days
Zone C 1/2 mile from Boundary	All Fires	Fires on Manning Class I & II days with positive spread into Zone D	Observe fires or portions of fires on Manning Class I & II days stable or with spread into Zone D. Suppress fires or portions of fires with positive spread into Zone B.	Fires on Manning Class III, IV & V days
Zone D Management Zone	All Fires	All Fires	Observe in Zone D but prevent spread through Zone C and into Zone B	"Red Flag Alert" unpredictable behavior threatens life or property threatens rare or endangered species

*Park Management Funds

**FFS funds used

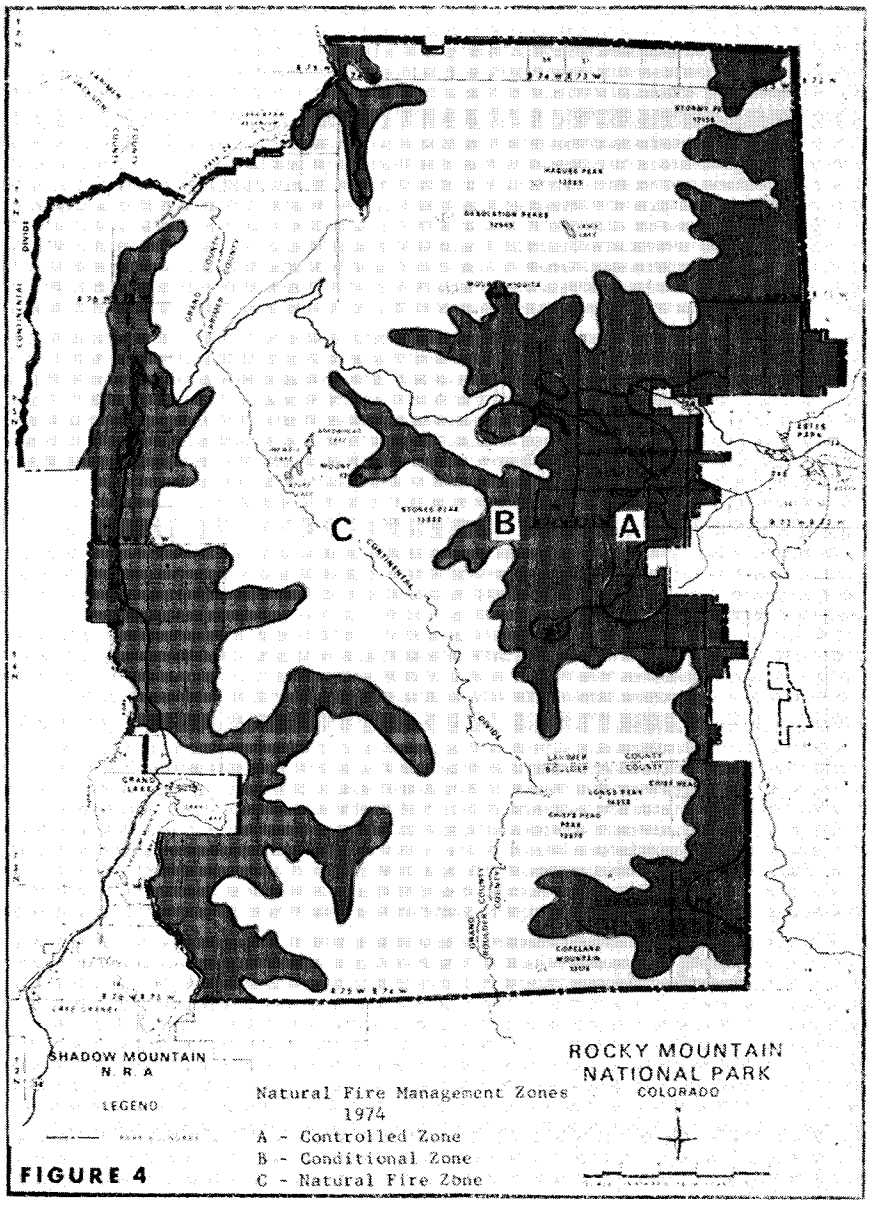
C
B
A
SHADOW MOUNTAIN
N. R. A
LEGEND
Natural Fire Management Zones
1974
A - Controlled Zone
B - Conditional Zone
C - Natural Fire Zone
ROCKY MOUNTAIN
NATIONAL PARK
COLORADO

FIGURE 4

CRUCIAL TESTS

WEATHER

The potential threats to the program are set around two major facets. The first is weather. What happens when a prolonged fire burning for several months creeps over a rather large area of the park? How reliable are our forecasts to permit adequate prediction of potential behavior? The National Fire Danger Rating System indices were not intended to be used for this type of fire behavior but rather for the single initiating fire.

In addition there is a phenomenon in the park associated with high velocity down-slope winds which, in the case of this park, run from the crest of the divide toward the metropolitan area to the east of the park. Two major windstorms have caused blowdowns in the park. One occurred in November, a time of the year which is not likely to cause any problems with natural fires except in extremely dry falls where long term fire has persisted. The other windstorm took place in May, a period that is quite likely to be subject to early lightning activity.

As yet the predictability of windstorms is uncertain at best. Last summer a preliminary research study on the occurrence of the high velocity winds on the Front Range was completed (Glidden, 1974). This study indicated that the park may well have winds registering the highest velocities recorded in the United States. Most of these winds do occur in the treeless Alpine and indications are they probably would occur during the winter. However, the fact that these winds do occur and our limited understanding of the dynamics which precipitate them creates a need for caution in blanket assumptions of fire behavior, particularly on the east slope.

PUBLIC RELATIONS PROGRAM

In addition to the weather phenomenon, we have the major potential for adverse reaction from the public in the Denver metropolitan area. It would be safe to say that during normal years when two to three lightning fires occur during the year that the program would have rather low profile and receive continued support. What

about the big year when a large fire takes place and becomes quite obvious from the entire area? The possibility of numerous small fires taking place would create a more visible program. Another situation is represented by the fire which continues to creep along, enlarging as it goes, and gets on people's nerves as a result. A continuous communication program will be required to assure that the public support is retained.

The key point of this communication is that it must be bi-directional. We must be listening to what the public says as well as telling them what we are doing. Particularly in the case of a long term fire our communication must not only deal with the public, but also must start with the park staff. The park staff must voice support for the program. It does not take many critical employees to undermine the entire program and foster adverse public reaction.

Public relations ground work was laid in 1973 at Estes Park through a short TV presentation on local networks in order to discuss the implementation of the plan. In addition the summer newspaper which is distributed throughout hotels and motels in the area had a small article discussing, "Fires Good and Bad" in order to bring to the public attention that a change was taking place in what had been a complete fire control program.

The papers in Longmont and Loveland carried guest editorials on natural fires. The Natural History Association was able to obtain permission from the U.S. Forest Service for the distribution of the booklet, "The Natural Role of Fire" (U.S. Forest Service, 1973), which was distributed in the park.

On July 24, 1973 a test of the system took place in the form of "Junction" fire which was just 20 feet off the edge of Trail Ridge Road, near Deer Ridge Junction. The visitor reaction to the fire was assessed at that time. The success of the Smokey Bear program was obvious. The first visitors on the scene charged up the hill, the boy with the water jug and mother with the shovel running to put the fire out. The Rangers got there just in time to stop the suppression activity, carefully placed the logs back where they had been, took a deep breath, and started to explain why we were letting fires burn. Fortunately the father was aware of the plight of Kirtland's warbler, in Michigan. This species is said to be dependent upon post-fire

succession. He took over the job trying to explain it to his wife who was still somewhat miffed about our change of plan.

In order to adequately provide the intensity of public relations activity needed with this very visible fire an interpreter was on the scene during the daylight hours and firemen remained around the clock to prevent the fire from being extinguished. After 5 days rains and hail put it out naturally.

Where these fires can be viewed from vantage points along park roads and manning is not feasible, it may be advisible to post a temporary sign so that all who stop will have some information. Obviously an interpreter is better but such a sign was developed to cover situations when manpower was not available. The following wording was our first attempt at such signs:

NATURAL FIRE AREA

> The fire that is visible from this point is a natural fire caused by a lightning strike. Lightning has influenced the forests and vegetation throughout their evolution. In order to perpetuate the composition of the vegetation that you see around you, the National Park Service has instigated a fire management program which allows such natural fires to burn so long as human life and property are not endangered. This fire, and others like it, will help to perpetuate the vegetative composition for which this Park was established, including stands of aspen and lodgepole pine, and ponderosa pine in the lower elevations.
>
> At the same time, man is still considered to be a major threat to the vegetation of this Park through his careless handling of fire and disregard for the unique vegetation of the Park. We ask your continued help in preventing man-caused fires.

To date only a few natural fires have occurred to test this plan. Some interpretation has taken place to reach the public, however, review of these techniques is needed. A recent study completed on backcountry management in the park focused on the practicality

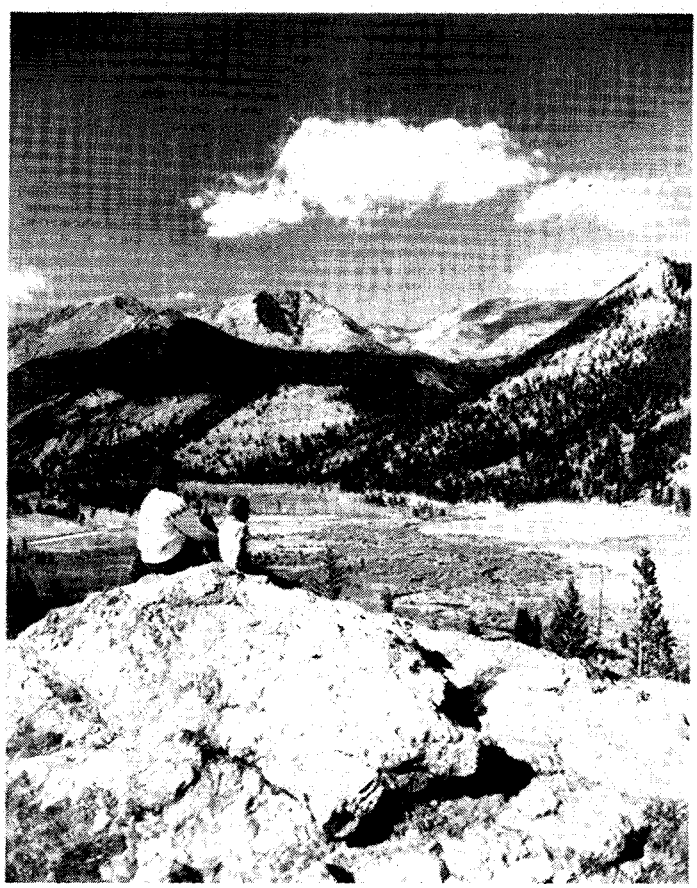

Fig. 5. Horseshoe Park—All management ecosystems are visible; aquatic, wet meadow, grass—brushlands, montane forest, sub-alpine forests, up to the alpine on the distant skyline. Roger Contor—National Park Service.

of using various media in reaching the backcountry users (Fazio, 1974). This study has raised serious doubts that just "any media" is effective as a means of communicating to the visiting public. There appears to be great possibility of spending large sums of money on entirely useless types of media presentations to get across fire management.

Live interpretation assures that the person with the questions gets the answers. Beyond this, aiming the fire management message at a transient public is difficult for *a* park. The broad nationwide, or at least regionwide, message needs to be carried by regional or national media. This can then be reinforced by the localized program at each park.

We must continue to reinforce our fire management programs through providing information from one area, such as Rocky Mountain National Park, which would support and help the public understand fire management programs of other parks such as Yellowstone or in adjacent national forests.

TERMINOLOGY

One aspect of this public relations program that came to light was the potential for considerable misunderstanding with the use of different terms. This aspect of fire management planning must be resolved, not within Rocky Mountain National Park, but within the group gathered here at this session and the agencies represented. A revision of the, "Glossary of Terms Used in Forest Fire Control" (U.S. Forest Service, 1956), is critically needed to provide for a clear consistent use of terms by all in their written communication as well as their verbal statements in the field.

Of particular interest to persons working in fire management must be the communication to the public of a responsible program of sound resources management. Probably the biggest threat to this sound resource approach is the implication of either negligence, or at best disregard, for resources by the too commonly used term "let burn." We must make a concerted effort to eliminate the implications and the use of this term from our vocabulary if we are not to be grossly misunderstood by the lay public.

I would suggest that we adopt the consistent use of such terms as management fires to apply to the full spectrum of fires which are designed to achieve predetermined objectives. Within this broad category we could use the term natural fire for all those fires of natural origin, that is, lightning ignited.

In addition, the use of the more common term prescribed burning

would apply to those fires which are deliberately ignited to achieve similar predetermined management objectives. Only through the consistent use of commonly understood terms can the fire management program of one park, such as Rocky Mountain National Park, reinforce and contribute to the understanding by the public of fire management programs elsewhere in the Park Service and also in other agencies.

CONCLUSION

The Park Service and other land management agencies which are attempting to perpetuate natural systems must be cautious in the area of using prescribed burning to mimic natural fire. Biswell, in his work in California, divided prescribed burning into two basic component parts, "restoration burns", and "maintenance burns" (Biswell, 1963). The first is used to correct alteration caused by full control. In a commercial forest management system maintenance burns are then used. However, in a natural system restoration burns should be followed by natural fire to provide maintenance of the system.

The tendency on the part of management personnel is to want a neat program, one which responds when those running it want it to respond. Natural fire occurrence is not that neat! It is much more random in character from the standpoint of location, intensity, and timing. There is a great possibility that a particular park or wilderness area could go for 20 years or more with no major influence on vegetative cover by large fires. It is also possible that a major fire could occur in the first year of a program. Where managers are apprehensive about a big fire the first year, it would be easy to decide that the program would always be done through prescribed burning. This move assumes that we, in fact, know enough about natural systems to provide the location, timing, and the intensity of fire that will perpetuate a truly natural system. We do not! Such prescribed burning results in an artificial system. In some parks it may be the best we can do, but it is not so here.

Basically the implementation of the fire management plan of

Rocky Mountain National Park has four keystones. First, the plan considers all the factors influencing the behavior of fire and its past activity. Secondly, it relies on adequate staffing and the assurance that personnel familiar with behavior fire are available to assure proper interpretation of the various indices and to manage the fire program. This is not easily done in the present system of position descriptions, transfers, and promotions. There is real potential for misunderstanding and sacrificing of programs through transfer. Third, is the preparedness of the organization both physically and mentally. Because the probability of winds and lightning behavior extends over much of the year, it is not enough to rely on seasonal staffing in order to carry out this program. Permanent staff must have the abilities and the initiative to keep a fire management program viable and prepared for fire occurrence when it takes place. Lastly, is public acceptance derived from an adequate public relations program.

Adequate staffing for implementation of this type of plan raises an administrative question. Should fire management plans be based primarily on the needs of the ecological factors of a park or wilderness area or managed stand, or should the availability of personnel assigned to that area dictate the need to completely revise fire management plans regardless of the resource needs? This question must be addressed by an administrator considering such a plan.

The fire management plan at Rocky Mountain National Park is a sophisticated program as is any fire management program utilizing natural ignition. It requires adequate staff, training and effort to produce a quality program. This commitment has been made and will be followed through to assure that our program will not jeopardize the program of another area or agency through loss of control or adverse public reaction.

The systematic approach advocated several years ago has been achieved here (Butts, 1968). There has been an initial objective evaluation of past fire activity in the park, a decision has been made on possible influence of fire control activity, a plan has been evolved and will be refined based upon research, and a public relations program is underway to make it known and continue to inform the public.

Is the program successful? Some might say no because of the small acreage burned. I say it is! Success in ecological management of a natural system should be based upon the premise that the natural influence of fire has again been restored. The timing, distribution and magnitude of the resultant fires is the result of the restoration not a measure of its success.

LITERATURE CITED

Biswell, Harold 1963. Research in wildland fire ecology in California. Tall Timbers Fire Ecology Conf. 2 p. 63-97.

Butts, David B. 1968. Fire for management in national parks. Rocky Mountain High Plains Park & Recreation Journal, Vol. 3, No. 2 p. 1-113.

_____. 1974. Fire Management Planning in Rocky Mountain National Park. *In* Let the Forests Burn? Student Chapter, Society of American Foresters, Colorado State University p. 10-18.

Fazio, James R. 1974. A mandatory permit system and interpretation for backcountry user control in Rocky Mountain National Park, an evaluative study. unpublished Doctors thesis. 246 p.

Glidden, David E. 1974. Analysis of alpine and subalpine wind conditions in winter, Rocky Mountain National Park. unpublished report. 91 p.

U.S. Forest Service 1956. Glossary of terms used in forest fire control. U.S. Dep. Agric., Agriculture Handbook 104 24 p.

_____. 1973. Natural role of fire. U.S. Dept. Agric. 22 p.