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REPORT ON
SECOND JOINT U.S. FOREST SERVICE - U.S. NATIONAL PARK SERVICE
FIRE MANAGEMENT WORKSHOP

HELD AT
NORTHERN FOREST FIRE LABORATORY
MISSOULA, MONTANA

FEBRUARY 26-27, 1974

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Second Joint U.S.F.S. - U.S.N.P.S. Fire Management Workshop

February 26-27, 1974 Missoula, Montana

Purpose and Scope

The purpose of this second workshop on wildland fire management was to provide open exchange of ideas regarding wilderness fire management needs which transcend agency and international boundaries.¹ Some 35 people contributed ideas and experiences from research and land management viewpoints and from areas ranging from western Canada to Sequoia-Kings Canyon National Park in California to Everglades N.P., Florida. Presentations were made on the existing fire management programs of 11 different land management administrative units throughout the U.S. National Forests and National Parks and a statement on western Canadian developments. Other non-regional topics concerning fire management programs were discussed, ranging from methods of interpreting fire management objectives to the public to application of fire spread models to field decision making in fire management.

Fire Management Policy of U.S. National Park Service

The reasons for increased attention to fire management planning in the U.S.N.P.S. is the change in fire control policy which now states that for natural areas:

"The presence or absence of natural fire within a given habitat is recognized as one of the ecological factors contributing to the perpetuation of plants and animals native to that habitat.

Fires in vegetation resulting from natural causes are recognized as natural phenomena and may be allowed to run their course when such burning can be contained within predetermined fire management units and such burning will contribute to the accomplishment of approved vegetation and/or wildlife management objectives.

Prescribed burning to achieve approved vegetation and/or wildlife management objectives may be employed as a substitute for natural fire.

Any fire threatening cultural resources or physical facilities of a recreation area or any fire burning within a recreation area and posing a threat to any resources or physical facilities outside that area will be controlled and extinguished.

The Service will cooperate in programs to control or extinguish any fire originating on lands adjacent to a recreation area and posing a threat to natural or cultural resources or physical facilities of that area.

Any fire in a recreation area other than one employed in the management of vegetation and/or wildlife of that area will be controlled and extinguished."

(Source — U.S. Department of the Interior, National Park Service — Administrative Policies for Natural Areas of the National Park System pp. 17 and 18).

¹ The first workshop was held in Missoula in May, 1973 and was reported on by this writer.

Existing Fire Management Programs

(i) Yellowstone National Park

Two fire management zones have been established for two years. The northeast unit is 190,000 acres, primarily spruce-alpine fir forest interspersed with meadows. The southeast unit is 150,000 acres heavy to lodgepole pine with significant pine beetle infestation. No fire weather severity limitations exist on the decisions to let natural wildfires burn uncontrolled within the unit boundaries. All fires are manned by an observing term and fuel and fuel moisture measurements taken. Since the policy was adopted, only two lightning fires have occurred in the units and total area burned was less than one acre.

(ii) Rocky Mountain National Park, Colorado

The entire 250,000 acre park which straddles the Continental Divide is a fire management unit in which natural fires are left uncontrolled and monitored by an observing crew. Only two lightning fires occurred in 1973 and both went out under one tenth acre in size. Under the auspices of their fire management plan they are studying the effects of the five large historic fires in the park, including measuring fuel amounts and vegetation changes as compared to unburned areas adjacent. They are planning some use of prescribed fire to reduce fuels in heavy use areas like campgrounds and for boundary strips along the east and west park boundaries. The present policy is to suppress fires which spread outside park bounds but to leave unattacked any fire which spreads into the park from the adjacent national forest. The U.S. National Fire Danger Rating System (NFDRS) is used to rate fire weather severity for planning decisions.

(iii) Saguaro National Monument, Arizona

Natural wildfire has been re-established since 1970 in its significant role in the high elevation forest ecosystems of a 46,000 acre district of Saguaro (11,000 acres burned in 270 fires from 1939 to 1970 with five fires exceeding 3.5 acres during the period of fire prevention and suppression). Natural fires are only allowed to burn under prescribed conditions of weather severity (rated by indices of the NFDRS) and location, such that physical, cultural and natural resources are protected from loss in a conflagration. Weather history and past fire history were analyzed before the fire management plan with natural fire prescriptions was written.

During the three years operation of the plan, 24 out of 46 lightning fires were left unsuppressed with the largest one spreading to 620 ac. and total acreage burned 904 ac. Some hot burning in heavy fuels occurred, but most of the area burned with low to moderate intensity in Ponderosa pine type with little overstory damage. Public access during fires is not eliminated but is controlled to certain areas by permit.

(iv) Wind Cave National Park, S. Dakota

This is a prairie grassland and Ponderosa pine area of 28,000 ac. in the Black Hills where significant encroachment of the pine forest into the grasslands has occurred since 1870 due to fire protection. Since 1970 a prescribed burning program has been practised to alleviate the pine forest encroachment and reduce the fuel buildup which often produces intense and rapid spreading wildfires. No lightning or man-caused fires are allowed to burn freely however. One major objective

of the prescribed fire program is to provide habitat for bison and elk.

(v) Manning Provincial Park, British Columbia

Manning Park is a 176,000 acre park straddling the Cascade Mountain divide adjacent to the U.S. Border in southwestern B.C. The B.C. Parks Branch in consultation with the Canadian Forestry Service fire research unit has been preparing a fire management plan for the park. The objectives are to delineate management zones and weather conditions under which natural fire can play a beneficial role in shaping various park ecosystems. The maintenance of the sub-timberline alpine meadow areas, which are a very important resource for park visitors, depends on periodic fire to halt the encroachment of forest. It is felt that lightning fires can play a beneficial role if left unsuppressed under moderate burning conditions, as rated by fuel moisture codes of the Canadian Fire Weather Index system of fire danger rating. If the plan is adopted, fire would continue to be excluded from certain areas where natural and man-made values would be threatened and man-caused fires would be suppressed in all areas. Natural fires would not be allowed to burn freely under extreme fire weather severity in some fire management zones as potential for large intense fires does exist in some areas of heavy fuels and steep topography.

(vi) Grand Teton National Park, Wyoming

The park consists of two physiographic units, the Teton Mountains and the open rolling Jackson Hole Unit. The Teton Mtns. is a 120,000 ac. fire management unit in which natural fires are allowed to burn except under extreme fire weather severity. In 1973, 11 fires occurred, the largest reaching 5 ac. and this one smoldered in deep duff from July 12 to Sept. 27.

(vii) Sequoia and Kings Canyon National Parks, California

In these two adjacent parks there are presently 600,000 ac. in a natural fire management unit which is almost 70% of the park area. The program started in 1968 and included only a small area at that time. Only four natural fires occurred in the zone from 1968 to 1970. The natural fire unit was expanded in 1970 and again in 1972 and in the six years of the program 80 lightning fires have been let burn and have burned some 5600 acres to 1973. The natural fire unit is mainly above 9,000 feet and goes to 16,000 feet, although significant drainages between 6,000 and 9,000 feet have been added.

The objectives of the program are to restore more natural ecosystems using both natural fires in higher elevations and prescribed control burning in the sequoia mixed conifer forest type of mid elevations. This type was changing quickly to favor more tolerant white fir and incense cedar dense thickets because of fifty years of fire protection and fuels were building up to high loadings, presenting major threats to destruction of prized giant sequoia groves by catastrophic fire. A more open forest favoring sequoia reproduction results from frequent low intensity ground fires and fuel accumulations were kept low. The natural fire periodicity in the sequoia type is 8 to 12 years.

Wildfires are monitored by air, and ground crews set up plots in front of the let burn fires to measure fuel quantity and spread rate. Interestingly a spread rate of 1 chain per hour is the most commonly observed spread rate regardless of slope, wind, and whether or not the fire is heading or backing. Vegetal succession is being studied on the natural let burn fires. No adverse public

criticism of the fire management program has resulted, although a vigorous public information effort is continuously kept up as to the program's objectives, both with respect to the high elevation "let burn" and the mid-elevation prescribed fire phases.

The "let burn" program is not administered carelessly, as each fire is reported immediately to the Park Wildfire Committee who evaluate its potential behavior daily and can order it herded or suppressed if weather or boundary conditions warrant action. Pre-suppression costs for the Parks have not changed due to this program but suppression costs have been substantially reduced.

(viii) Glacier National Park, Montana

No fire management plan yet exists for Glacier, as a complete fire control policy is still followed although historical fire occurrence and behaviour records are being assembled as background data, along with Fire Danger Indices, to aid fire management planning.

The NFDRS Burning Indices, particularly one, two, and three day index forecasts are presently used for standby and initial attack crew manning and dispatch decisions. All Park employees have been trained at a special course in use of the National Fire Danger Rating System. Analysis of historic Park weather data by the fire control staff has enabled local calibration of the Danger Indices into classes of Extreme, High etc.

This park anticipates negative local public opinion to fire management proposals as severe fire losses in the area in 1967 and a timber oriented local economy tend to produce anti-fire reactions.

(ix) Everglades National Park, Florida

The Everglades are not being managed as natural ecosystems because several decades of man's activities have so affected the water regime, the Glades cannot be considered as "natural" systems any longer. Hence fire management is an "almost anything goes" proposition. Prescribed fire was first used in the park in 1957 and is now being intensively used. Most natural fires are now let burn as are some man-caused fires and no tracked fire suppression equipment is used anymore on any fires due to extensive damage from past use of such gear.

There are three fire management units in the park, the Mangrove unit, the Glades unit and the Pinelands unit. All lightning fires are allowed to burn in all units and fire behavior and effects are studied on all of them (54 fires in 1972-73). Fire behavior is predicted from weekly sampling of soil moisture in all units and monitoring of weather for calculating Danger Indices, particularly the U.S. Forest Service Drought Index.

Natural fire frequency is on such a short cycle (4 to 7 years in Pinelands - palmetto type and 8 years in Sawgrass - Everglades type) that prescribed fire is required frequently to accomplish various management objectives.

Briefly these objectives and methods are to use natural fire and periodic prescribed fire by aerial ignition to eliminate invading exotic hardwoods such as Eucalypts and such weed conifers as Australian pine and maintain open pine woods and keep fuel quantities in the sawgrass type to manageable levels.

While prescribed fire was first used in the Pinelands in 1957, it was not used in the Glades until 1966. The Glades are aeriually ignited using delayed action ignition devices (DAID) dropped from a helicopter. The sawgrass marshes are actually burned over free water and new growth is initiated within days of the burn.

To emphasize the importance of fire in Everglades N.P., between 1948 and 1971 some 460 fires burned some 700,000 acres and the Park area is approximately 600,000 acres.

(x) Bridger - Teton National Forest, Wyoming

Two wilderness areas comprising 900,000 ac. are being considered for fire management units, including areas of heavy fuel in overmature lodgepole, fir and spruce with intensive bark beetle kill.

The objectives are to return natural fire to wilderness, reduce fuels, reduce epidemic insect attack, improve elk habitat. Work now going on in connection with this fire management planning includes defining ecological land units, habitat typing, delineating sensitive watersheds, low intensity fuel sampling and pre-attack planning.

They have already undertaken an intensive public relations campaign on the fire management concept using press, radio, TV and public meetings.

(xi) Selway-Bitterroot Wilderness, Bitterroot and Nez-Perce National Forests, Idaho

The U.S.F.S. approved a fire management plan for the 66,000 acre Whitecap and Bad Luck Creek areas of the Selway-Bitterroot Wilderness in 1972. During the 1973 season, six lightning fires occurred, one burning 1200 acres and the other five all covering less than 1/4 acre each.

The fire management prescription for the large fire called for suppression action after two days of observation because of the level of Buildup Index and the risk of the fire crossing a management zone boundary from the ponderosa pine - savanna ecounit into a ponderosa pine - Douglas fir south slope ecounit. Severe fire weather at this time made the holding of the fire at the zone boundary impossible and it made several runs over a three week period of active control actions until a significant rain put it out. In addition a spot from this fire ignited a new fire outside the approved fire management area and required suppression action, resulting in a final fire size of 1600 acres.

The managed fire burned with varying intensities through grass, shrubs and ponderosa pine and Douglas-fir stands during a 43 day burning period. Burning patterns varied from light grass and surface litter burns through some tree crown scorch areas to pockets of full crowning. Pre- and post-fire fuel inventories were compared and showed most fuel size classes and categories were significantly reduced except for an increased litter component in young Douglas-fir burned-over stands due to heavy scorched needle fall. Vegetation transects will be measured for change for some years. Some immediate changes were noted in that shrubs were resprouting within 3 weeks, with willow up to 1 ft. high and grasses 2 to 3 in. high. Wildlife were immediately attracted to the burn.

Public reaction to the fire management policy after the 1973 large fire occurrence has been favorable overall. A 15 minute slide-tape program of the objectives and 1973 experiences with the Whitecap fire management program has been prepared for public information.

The intention of the Forest Service is to expand the fire management area boundaries this year to make the program easier to administer in the field and reduce artificial boundary problems superimposed because of the small size of the area.

IBP Fire Ecology Project Progress in 1973

This Missoula based Coniferous Forest Biome project deals with fire effects in coniferous forests and work in 1973 centered on three work areas.

An inventory of fire research needs was conducted by soliciting fire effects priority problems from forest scientists and land managers in the western States and Canada. More than 1000 questions were raised by the respondents and a select panel of experts will engage in a Delphi process to categorize these questions into a few major problem areas and begin modeling exercises on high priority problems.

A model has been constructed which superimposes fire effects onto basic hydrologic and carbon cycles in coniferous forests as an aid to exploring cross-disciplinary problems concerning land managers and research ecologists. This is presently a conceptual model and has not yet been converted to functional algorithms. Small groups of local Missoula specialists will meet periodically to deal with translating the research needs into functional model relationships. The prime objective here is to obtain conceptual understanding of ecosystem dynamics with respect to fire, with model output prediction being of secondary importance.

The third accomplishment is a 3,000 citation literature abstracting on fire effects in coniferous forests which can be computer accessed and searched by 60 key words. This file will be distributed on a limited basis and stored in a U.S.F.S. data bank at Oakridge, Tenn. for service-wide access.

Field Application of Fire Spread Models

R. Rothermel of the Northern Forest Fire Laboratory presented some field guides to enable the fire manager to translate Burning Index ratings from the NFDRS into predictions of fire growth in some specific fuel complexes for various conditions of slope and wind. Tables and nomograms presented predicted spread rates, flame lengths, burned area and fire perimeter for one hour and four hour periods. A fire severity index graph was presented to relate to fire containment difficulty, considering the combined effect of spread rate and energy output, for various fuel types as described by the fuel models of the NFDRS.

Support of the attendees was strong for field interpretive guides for more effective use of the NFDRS.

Conclusion

The rapid progress in changing the course of wilderness fire management continued in 1973 in the U.S. and is likely to keep on developing as agencies are recognizing the need to match fire control policies with resource values being managed and protected.

W.R. (Bud) Moore, i/c Fire Management for Region 1 of the U.S.F.S., stressed the importance of fire management objectives in natural wildlands being different from those on more intensively managed forest lands where timber production is a primary product. He emphasized however that suppression costs must be reduced on all fires and a pressing need is for better assessment of suppression dollar expenditures with respect to resource values protected. In his view, sound benefit/cost analysis methods of let burn fires must be developed. Care should be taken to avoid losing the gains from recent fire management policy changes because of careless and too rapid expansion of fire management planning through extrapolation of results in one area to what might be expected in another. Careful scientific ground work and historical study must be done for any new area contemplating the managing of wildfire to prescription.

NATIONAL PARK SERVICE —FOREST SERVICE WILDERNESS WORKSHOP

Missoula, Montana
February 26-27, 1974

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