

Outline of a fire prevention short course presented by
S. J. Muraro, Can. For. Serv., Pacific Forest Research Centre,
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AN INTRODUCTION TO FIRE PREVENTION

Introduction

My objective here is not to entertain you with a series of posters, flicks and movies. Rather I am going to attempt to place that portion of the protection task labelled prevention in a new perspective. Conventionally people view prevention courses as boring, I suggest that an effective and well managed prevention campaign is anything but boring - it becomes an undesignated but integrated part of every other protection function.

My specific goals are:

- (1) To present the traditional and current role of prevention and its perspective to fire management.
- (2) To provide an outline of general prevention techniques and requirements for planning.
- (3) To stimulate a desire on your part to obtain the required information.

If I fulfill these goals or you all go to sleep before the end of the eleven hours designated for this portion of the course, we will all retire to a more amenable atmosphere. Keep in mind the lights will be on; no slides or flicks.

To obtain these goals I have assembled a package of copied material some old in age but young in concept - and some new. Although many of these papers mention terms like social values, psychologists, fuel management and fire management with little specific reference to prevention, their content clearly carries a message related to both hazard and risks. I will refer to these papers and have used quotes from them, however, I feel the exposure to them and the opportunity of reading them will justify my presence. The country of origin is different, the organization is different however the concepts are valid, regardless of these differences. In some cases the concepts presented are more applicable

in the Yukon than in the area of origin and have a greater chance of implementation here due to the reduced administrative inertia.

The package of reprints should include the following papers:

- 1) Relation of Forest Fire, its control and use, to multiple Use Management.

Kenneth P. Davis and David T. Mason, Yale University, New Haven, Conn.

- 2) Latest Developments in Fire Prevention Research.

William S. Folkman, PSW Forest and Range Exp. Station, Berkeley, Calif. Note (Papers 1 and 2 were presented at the Annual meeting of Western Forest Fire Committee, of the Western Forestry and Conservation Association on Dec. 5, 1967 in Seattle, Washington).

- 3) The new thrust in Fire Prevention. - Ben Lyon

- 4) National Fuel Inventory System - David M. Jay

- 5) The Dynamics of Fire Related Processes in Ecosystems.

C.W. Philpot.

(NOTE: Papers 3, 4 and 5 are excerpts from lessons presented at the Advanced Fire Management Course sponsored by the U.S. Forest Service at Marana, Arizona March 19-29, 1974).

- 6) Including Fuel Management Considerations in land use Planning.

Hugh Pongman Ass. Regional Planner. Region 4. U.S. Forest Service.

Presented at Fuel Management Workshop at Marana Arizona - March 1973.

Prevention - What is it

The activities designated as prevention are often construed to include only those activities dealing with public oriented prevention campaigns characterized by Smokey Bear, Bert Beaver and other assorted wildland creatures. There is however a number of concise definitions for the term fire prevention. In spite of the available definitions there is, amongst fire control experts, a diversity of opinion as to what activities should be designated as fire prevention ranging from all control activities to only the reduction of risk. - Refer - Ben Lyons Lesson Plan.

Definition of Fire Prevention

The Glossary of Forest Fire Control Terms (1963) published by the Associate Committee on Forest Fire Protection (now C.C.F.F.C.) defines prevention as:

- (1) "Activities directed at reducing the number of Forest fires and includes public education, law enforcement personal contact, and reduction of hazards and risks". Note a Forest Fire is defined as : Any unauthorized fire burning in a forested area.
- (2) The U.S. Forest Service Glossary of terms used in Fire Control, 1956, and the SAF's "Forest Terminology (third edition)" defines Prevention activities as: "Activities directed at reducing the number of fires that start, including public education, law enforcement, personal contact and reduction of fuel hazards". This definition does not qualify fires.
- (3) A professor's lecture notes defined prevention as "those activities concerned with the attempt to reduce the number of fires through education, hazard reduction and law enforcement".
- (4) Brown and Davis in the 2nd edition of Forest Fire Control and use to not precisely define prevention but state "Fire prevention can be accomplished either by removing the source of the firebrand or by removing the fuel it may ignite".

Although there are minor differences in these definitions all of them are probably adequate in terms of the Fire Control Concept. They all clearly state the dual role of hazard reduction through various fuel management practices or fuel treatments and the reduction of man caused and natural risk through a variety of means. Only one however, clearly qualifies the type of fire either as desirable or undesirable. This is perhaps the time to clarify the terms hazard and risk. In the context of this presentation,

Definition of Hazard "is the potential fire control problem characterized by the composition, arrangement, loading and condition of the fuel complex."

In this definition it is a fuel related variable with weather influencing only its condition. Other definitions are more encompassing, for example,

the U.S. Forest Service defines hazard as "A fuel complex defined by kind, arrangement, volume, conditions and location that forms a special threat of ignition or of suppression difficulty". The CCFFC have two definitions (1) "The threat of ignition, spread and potential control difficulty presented by Fuel types based on their composition arrangement volume, condition and location."

(2) A general term used to express an assessment of constant and variable factors for a given fuel type in a given area which determine whether or not fires will start, spread and do damage and also the degree of difficulty of control to be expected".

In addition a footnote states that hazard concerns fuels only.

Definition of Risk

The definitions for risk from the previously quoted sources are much less variable than for either hazard for fire prevention.

The U.S. Forest Service glossary of Fire Control terms defines risk as: (1) "The chance of fire starting as determined by the presence and activity of causative agents (2) a causative agent.

The C.C.F.F.C. definition is very similar and states Risk "is the relative chance or probability of fire starting determined by the presence and activities of causative agencies" (Fire risk refers to agencies that cause fires).

In the conventional sense of fire control, prevention activities enjoyed a position on par with those of presuppression and suppression. Realistically however it has got the short end of the stick.

Fire Prevention in the Concept of Fire Management

A clear and uniform definition of terms (ie. the language) is the first step towards understanding and communication on the subject of fire

prevention. However the definitions presented were designed to fit the concept of fire control as opposed to a broader concept embodied by Fire management. The term fire management is not a new term for fire control however it does embody the principles that good fire control personnel recognized and strived for.

An oversimplification of the differences which may seem philosophical, but which is very real is that fire control was conventionally viewed separately from land management. Land managers however were equally at fault by considering their own narrow objectives without considering the implications of their actions and policies on the fire control job. In spite of the fact they relied on Fire Control to protect the values that were being managed the procedure of management in isolation placed handicaps on the protection agencies. In contrast fire management embodies the philosophy that the protection function is a part of land management not apart from it. Good land management has to include considerations for protection and in fact good land management policies that adequately consider all facets of the objectives makes many protection problems disappear, if protection input is in phase. The traditional activities of hazard reduction, and fuel breaks, can be accomplished and maintained at an acceptable level commensurate with management objectives, with little or no additional cost if considered in phase with other land uses. A paper, Relation of Fire to Land Management and Use to multiple land management by K.P. Davis - presented at the 1967 Western Forestry and Conservation meeting in Seattle does an excellent job of pioneering the expression of fire management concepts. From efforts such as this has evolved a definition of Fire management as being: The integration of fire control, fire behaviour and fire effects knowledge applied towards attaining specific land management objectives that satisfy the ecological, social and economic requirements of society.

"More concisely it is the integration of protection principles into land management plans". Good land management practice considers the protection

needs and deals with them in an integrated manner that achieves them in the most practical, economical manner and ecologically compatible fashion.

Prevention - Why is it needed

A prevented fire does not need to be suppressed, and no damage can occur therefore the whole objective of fire control is accomplished. (In the context of fire management; if fire were desirable then prescribed fire could be applied). Prevention is therefore the logical first offense of any fire control agency. Presuppression and suppression capability is designed and developed to compensate for failures in prevention.

Oddly enough, one method of prevention ie. the use of legislation was often the first formal approach to wildfire control and was often instituted prior to the development of organized wildfire suppression groups. In 1850, legislation prohibited woods fires in California. Much of this early legislation followed some of the disastrous fires of the past. Table 1A lists some of these with their causes. Note that only the Michigan fire in Sept. 1881 specifically mentions lightning and then only in combination with settler fires. Clearly there was and still is a need for legislation to control the use of fire. Closer to home the Alberta fires in 1968 were largely due to inadequate prevention legislation as applied to land clearing fires outside the forested area. In the U.S., man caused fires average 91% of total fires, the difference in the prevention problem is emphasized by the variation of man caused fires in different regions, from 36% in the Rocky mountain region to 99 and 98% in the eastern and southern areas.

In Canada the average annual number and proportion of fires for the period 1961 to 1966 are as follows:

Area	Number of Fires		%
	All causes	Lightning	
Man- caused			
Maritime	1063	51	95
Newfoundland	181	10	94
Central	2597	647	75
Prairie	1159	416	64
British Columbia	2126	806	62

In the Yukon an average of 65% of the fires from the period 1965 to 1973 are man caused fires - whereas in the N.W.T. 41% are man caused. In both these cases however the proportion of acreage burned is drastically different, lightning accounting for about 95% of the total area burned.

"Why is prevention required can then be answered simply because there is a significant but highly variable number of fires that could have been prevented by attacking the risk problem or could have been more easily managed through either deliberate fuel modification programs or through good land management.

"Fire occurrence statistics will indicate the general and specific direction of the prevention program.

Prevention - Where is it needed?

An active and viable prevention programme is required wherever the need for a suppression capability exists. In other words justification for expending resource for suppression is the best argument for prevention activities. Remember the development of suppression capability suggests a fatalistic attitude that recognizes that the prevention effort is not going to be completely successful.

The specifics of the prevention effort whether it be oriented at fuel management or at risk reduction are highly variable in both time and space. In even these broad terms the fire statistics and fire atlas are prime tools for pinpointing the specific geographic problem areas and the problem group.

One of the keys to effective prevention effort is its direction, it must be aimed at the right group at the right time and in the right place. Determining the proper phasing and emphasis is by far the most difficult part of the job.

Prevention - Who should do it?

The prevention job offers the opportunity for everyone within the land management agency to actively contribute. Adopting the principles that fire

management not apart from it is the best place to start. With the policy, resource managers integrate prevention practice through their everyday practice by considering fuel management implications. It is not only the fire control officer who should be considering fuels. In most instances only the more difficult problems require his expert input to fuel management. Rudimentary fuel management decisions can generally be solved by the use of elementary knowledge and common sense. Better the fire specialist provide rudimentary training in fuel management to other resource managers rather than have to make each individual judgement personally - and become a paper tiger. If this is done, fuel management can be considered and if required accomplished in conjunction with the prime job rather than after it when a poorer job, if achieved at all is only obtained at a higher cost.

The engineer should consider right of way disposal in conjunction with construction developers should consider the implications of fuel modifications and additional risk when planning wildland habitation. Homes constructed in fire proof environments should be designed to afford the best from outside ignition. Timber management personnel should consider the implication of silvicultural systems, felling and yarding techniques and utilization standards on fuels. It may be better to subsidize a higher level of utilization than to do hazard abatement after logging. The fire specialist is in the best position to accomplish fuel management ie. prevention by his decisions pertaining to individual fire suppression.

Hiring policies for fire suppression can be a most effective method of preventing man caused fires ignited for wages - Don't hire the suspect person or group. If habitual unmanaged range fires are the problem - intensive suppression effort will discourage ignition.

Within the management group the local level of personal contact can have the greatest payoff for alleviating risk. However at each level of

administration within the protection group there exists a prevention function. These functions range from establishment of policy regarding fuel management to the institution of fire regulations and legislation at the upper level of the administrative chain. The "doing" end of the protection echelon can make or break the prevention campaign. Personal contact with suspect persons, "show me" trips and lectures to local groups and schools afford some of the best opportunities for reducing risk associated with a variety of urban-forest interface fires.

Prevention - When should it be implemented?

There is always an opportunity to implement some form of prevention. Studies by sociologists have shown that the character of an agency and its personnel strongly influence the reception of its message. - The interpretation of both the supervisors and personnel roles within a management organization can strongly influence the credibility of their statements - including the prevention message. The message here is that the behavioural patterns of personnel can either detract or add to the effectiveness of either a specific or generalized prevention campaign.

For specific prevention efforts timing is one of the more important facets influencing success. Specialized efforts are most successful if they are coincided with the period or immediately precede the problem causing event. Obviously a campaign to reduce hunter fires should increase in intensity with the level of hunting interest, starting when and where they purchase licenses, ammunition or food. Low key prevention messages can be accomplished by club membership and involvement in programs. To cite an extreme example; one would not expect a great response if a fire prevention message designed to appeal to children was shown either during the day or late at night during the blue movie. It is extremely easy to spend large sums on a prevention campaign regardless of how well the program is presented if it misses the target either by using the wrong message or is launched at the wrong time, it will fail.

Many agencies maintain a year round program with strong specific programs aimed

well defined groups at the most opportune time and place.

As long as there are people and ignition agents and fuels we are bound to have fires that could have been prevented - the right timing of efforts will increase the chance of success.

Conclusions

I have attempted to introduce this course on fire prevention by defining some concepts and stating the what, why and where, who and when of the prevention task. This introduction will serve to introduce what I hope to be the main lesson of this course. The fire report form and the fire atlas which are keys to designating the what, who, where and when that should receive the prevention message.

The attached outline designates some of the specific and general groups of fire courses. The attached flow chart designates the role of prevention in fire management.

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TABLE 1A - LARGE FOREST FIRES OF THE PAST

Name & Date	Location	Acres	Lives Lost	Cause
Miramichi Oct. 1825	New Brunswick: Maine	3,000,000	?	Many small logging and and settler fires
Peshtigo Oct. 1871	Wisconsin and Michigan	1,280,000	1,500	Land clearing and unattended fires
Michigan Sept. 1881	Eastern Michigan	1,000,000	160	Settler fires and lightning
Hinckley Sept. 1894	Minnesota	?	418	Fires left burning from August
Wisconsin Sept. 1894	Northwestern Wisconsin	1,000,000	few	Many settler and logging fires
Yacolt Sept. 1902	Southern Washington	1,200,000	38	Slash fires that blew up
Adirondack June 1903	Northern New York	637,000	0	Railroads, smoking, and incendiary
Idaho Aug. 1910	Northern Idaho; N.W. Montana	3,000,000	85	1736 individual fires that merged together
Tallamook Aug. 1933	N.W. Oregon	311,000	1	Friction from logging plus 1 incendiary
Maine Oct. 1947	Maine	205,678	16	Slash fires left due to feeling that fire season was over.

It should be noted that the majority of these large fires were the result of many small fires that merged together. Most of them occurred in the fall when the general feeling among people was that the danger of forest fire was over for the year.

FIRE PREVENTION

(Outline taken from FORESTRY HANDBOOK, Society of American Foresters, 1955)

OBJECTIVE. The purpose of fire prevention is to reduce the number of man-caused fires to the lowest practicable minimum. In planning and action, prevention efforts should be on a parity with other phases of fire control.

ANALYSIS OF THE PROBLEM. An analysis of the problem with which prevention must deal requires that localized risk and hazard surveys be made to determine:

1. Where fires occur--zones of different intensity and the reasons for this.
2. When fires occur--time of year and length of risk season.
3. What causes fires--general and specific causes.
4. Who causes fires--class and source of people responsible.
5. How fires start--specific and contributory conditions and circumstances.
6. Why fires occur--motives and reasons.

ACTION. The program of action directed at fire prevention includes:

1. Selection of appropriate prevention measures.
2. Administrative organization and timely application of selected measures.
3. Systematic, recurring evaluation as to relative success.

The following techniques and devices have been used singly or in combination to help control the various causative agents:

1. Debris burners.
 - a. Personal contacts with potential or active burners.
 - b. Laws and permits restricting burning season, time of day, or conditions.
 - c. Encouragement and guidance in burning during safe periods.
 - d. Organization of rural suppression crews.
 - e. General education.
2. Hunters, fishermen, campers.
 - a. Permits to use the woods.
 - b. Club programs and committees.
 - c. Closures during critical periods.
 - d. Habitat improvement projects.
 - e. Tours and demonstrations.
 - f. General education and reminders.
3. Railroads.
 - a. Hazard reduction on right-of-way.
 - b. Spark arrestors.
 - c. Patrols and inspection.
 - d. Personal contact with supervisors of maintenance crews.
 - e. Organization and training of crews in fire suppression.

4. Logging, lumbering, and other woods operations.
 - a. Restrictions on where, when, and how to operate.
 - b. Fire tool requirements.
 - c. Personal contact with supervisors and crews.
 - d. Elimination of fires during critical periods.
 - e. Organization and training of suppression crews.
 - f. Hazard reduction.
 - g. Inspections.
5. Incendiarists.
 - a. Personal contacts with suspects.
 - b. Law enforcement.
 - c. General education.
6. General or "shotgun" methods to reach all groups and to create informed public opinion.
 - a. Talks, lectures, motion pictures, and slides.
 - b. Exhibits, signs, and newspaper and magazine articles.
 - c. Radio--spot announcements, discussions, special programs.
 - d. Tours, "show-me" demonstrations.
 - e. Printed devices--rulers, blotters, calendars, booklets, etc.
 - f. House-to-house canvass in hot spots.
 - g. Organization and training of volunteer crews.
 - h. "Keep Green" and "More Trees" projects.
 - i. Teachers' guides, bibliographies, workshops.
 - j. Closure of public areas during critical periods.
 - k. Law enforcement, including personal contacts with judges and prosecuting officers.

An intangible, but undoubtedly the most valuable preventive influence is an informed and indignant public opinion. Efficiently executed prevention efforts can develop such an attitude.

SUGGESTIONS FOR IMPROVING FIRE PREVENTION EFFORTS:

1. Analyze and then attack the real reasons for fires.
2. Promote friendly, cooperative relations with the people who live, work, or travel in the area. Solicit their help.
3. Impress upon individuals their personal responsibility for fires. Long experience in the woods and in using fire breeds carelessness.
4. Carry out hazard and risk reduction activities.

FIRE PREVENTION

RISK REDUCTION

PURPOSE

TO REDUCE THE NUMBER
OF UNWANTED FIRES

THIS IS
ACHIEVED PRIMARILY
BY
INFLUENCING
BEHAVIOUR PATTERNS
THROUGH

- ✓ EDUCATION
- ✓ MOTIVATION
- ✓ INFORMATION
- ✓ LEGISLATION
- ✓ ENFORCEMENT

OF PEOPLE

OR
REDUCING LIGHTNING BY
WEATHER MODIFICATION

FUEL MANAGEMENT

PURPOSE

TO ESTABLISH AND
MAINTAIN A FUEL COMPLEX
THAT ALLOWS REALISTIC
FIRE MANAGEMENT.

THIS IS
ACHIEVED PRIMARILY
BY
FUEL MODIFICATION AND
MANIPULATION PROGRAMS
THAT ALTER

- ✗ THE CONDITION
- ✗ THE COMPOSITION
- ✗ THE ARRANGEMENT
- ✗ THE LOADING

OF WILDLAND FUELS

OR
APPLICATION OF GOOD
LAND MANAGEMENT PRINCIPLES
WITH FIRE MANAGEMENT
CONSIDERATIONS

FAILURE REQUIRES

PRESUPPRESSION

SUPPRESSION