5

Fuel Management: A Prerequisite Not an Alternative To Fire Control

Arthur P. Brackebusch

Organized fire protection has paid big dividends in the United States. Reduction of acres burned and fire damage is impressive. Even so, as Chandler and Roberts point out in an accompanying article, fire fighters are hard pressed to make further gains. This is not to say that fire-control technology cannot be improved, nor that all areas are under adequate protection. It is time, however, to recognize that we have good fire control organizations and that further improvements in performance can best be accomplished by managing and reducing hazards.

At this point of reflection, some people view fuel management as a substitute or an alternative to aggressive fire control. Not so! Fuel management does not diminish the need for efficient fire suppression. It is integral to and improves fire control success.

I use the term "fire control" advisedly: to stress the point that agencies must continue the ability to detect, attack, and suppress wildfires. Fire management, a broader concept now being adopted by some organizations, includes the treatment and reduction of hazards by fire and other means. Fire agencies are also beginning to adopt policies which are more amenable to fire's role in wildland ecology.

Importance of Fuel Management

Fire managers are no longer concerned solely with fire suppression. They must advise land-use planners and managers to assure vegetation management amenable to fire protection requirements, and they must be able to carry out a fire management mission that assures accomplishment of established resource objectives.

Wildland fires simply cannot be kept out of fire-prone vegetative types indefinitely. During any period of fire exclusion, the hazard usually continues to build and the probability of a disastrous fire increases correspondingly. Even when fuel build up levels off or becomes static, there is a relatively high probability of eventually experiencing serious fires in such hazardous areas. But fuel management can set the stage for effective fire control in such areas through proper land use and resource management practices. The distribution of fuels, their nature, and their condition can be influenced to buy time and space for organized fire-control crews.

Managers and scientists describe wildland fuels in a

variety of ways, but for this discussion we consider total, above-ground vegetative biomass. This mass varies greatly in character and quantity over time, and under differing conditions a varying amount of it is ready to burn or is available to combustion processes.

In most of the western United States, fuel formation processes exceed decomposition processes. Equalizing agents such as fire rebalance the ledger at varying intervals. Some forests experience a short fire cycle; in others, fire is an infrequent but violent and catastrophic visitor. Where decomposition rates equal or exceed production rates, we have little concern over residue or debris problems. These areas seldom have wildfire problems.

In an unmanaged or unutilized forest, the decomposers plus the equalizing agents balance fuel accumulations at indefinite intervals over time. But few such areas exist in the West. Even the most primitive back country is influenced by mans' activities. There is little opportunity for nature to function in a completely undisturbed way as it did prior to settlement.

Fuel Management vs. Treatment

Where we manage land for specific uses, we alter the timing, amount, and condition of the vegetation and associated debris. We change its readiness to burn. We convert green fuel to dead fuel. As a strictly functional activity of fire protection, fuel management could lead one into the trap of managing land simply for the sake of successful fire control. To avoid the trap, we must view fuel management in relation to all land management objectives. We must be keenly aware that all land use activities will in some way influence the potential for vegetation to be adversely affected by insect or disease epidemics, windthrow or breakage, wildfire, and other hazards. The choices we make concerning what, where, and how we manipulate vegetation ought to be tempered by the expected hazard associated with such activities. This, basically, is what fuel management is all about.

Because fire is a natural part of wildland ecosystems, it should also be considered in fuel management decisions so that its role is favorable, not detrimental to land use goals, including the protection of life, property, and resources from wildfire. Eventually, such fuel management should reduce the effort and expense needed to cope with disastrous wildfires. Meanwhile, many areas need special fuel treatment and considerable specialized fire management. Fuel breaks need to be built, residues should be removed or treated, areas need prescribed burning. Unmanaged areas of hazardous fuel need priority attention.

I believe crushing, burning, removing, or otherwise treating debris is a type of *fuel management* if it is done consciously and as part of a planned resource-use activity. If one ignores this coordination, however, creating a fire hazard that requires subsequent correction—I would call that *fuel treatment*. This is a form of single-purpose *fire management*. It is an extra cost, and not an integral part of the originally planned effort.

In the future we should be able to "call the shots" on kinds of hazards to expect and where they will be located so that a strong, effective fire control organization can deal with the fires that start. There should be

THE AUTHOR—Arthur P. Brackebusch is assistant director (Washington Office), State and Private Forestry, Division of Cooperative Forest Fire Control, U.S. Forest Service, stationed at Missoula, Mont.

time to fight a fire in its early development because of built-in interruptions of fuel.

Land use and management plans need to recognize successional patterns of vegetative types and identify the stage when changes in age and characteristics produce natural changes in susceptibility to fire damage or natural capability of enabling a fire to spread to adjoining forest and range types.

Creating Favorable Vegetation Mosaics

Once the ecological role of fire through the life cycle of a vegetative type is understood, man can harmonize his activities with natural processes. With this knowledge, he can relate land management activities so that areas of high fire hazard are broken or surrounded by areas of low fire hazard—consciously and deliberately creating interruption in fuel loads for fire protection or other purposes (for example, discontinuities of vegetation are desirable for habitats of certain game animals and birds).

An important implication of this concept is that vegetation management must be planned and conducted for as large an area as practical—and with due consideration for all land use goals and potential damages to resources. It is possible to create a vegetation mosaic, by design, which allows the manager to control, or at least ameliorate hazards of all kinds. In the case of fire, we can create desirable fuel interruptions that reduce the potential for conflagrations or serious fast-spreading fires. Mosaics can and should be tied to natural, fire-resistant features of the terrain.

Creation of such a favorable mosaic is useless unless a strong suppression force is available to deliver an effective high-speed attack. If the fire control organization cannot take advantage of the delay in fire spread or fire build-up which results from fuel mosaics, then the risk of runaway fires is still high. Even so, in spite of good fuel management, there will be times when weather conditions permit fires to become uncontrollable.

Many management activities create hazardous fuel situations—for example, thinning. How can thinning operations be spaced and intermixed with other forest conditions so the fire hazard is tolerable? It doesn't make sense to thin a forest for silvicultural benefit if it creates a high hazard and a corresponding high probability of losing the investment by wildfire. We simply must not invest in thinning without fire hazard design and then assume an actuarial approach to fire risk. The risk can be influenced by proper design, for example by distributing the hazard so that fires cannot, except in unusual situations, make large runs and consume healthy, managed forests.

Expected or experienced costs of presuppression and suppression are not valid bases for describing fire risk. Risk must be in terms of potential fire effects to an area, people, and economic and social values assigned to land and resources. Managers begin with land and resource values. Fire effects must be considered in relation to these values if managers are to make appropriate decisions on the kinds of control action warranted and on the degree to which fire management must be built into land-use decisions and management practices.

Fuel Management Opportunities

The western United States presents a large range of fuel management opportunities—grasslands, from plains to coastal types, "Mediterranean" brushfields in southern California, permafrost in Alaska, and rain forest on the Olympic Peninsula. The need is to recognize fuel management opportunities and integrate appropriate action with planned uses of land and resources.

For example, take a situation I recently learned about in Nebraska. There, fuel treatment along transportation nets is desirable because many wildfires originate along road and railroad rights-of-way, and they spread into valuable crop and grazing lands. It is logical to remove some fuels through mowing or other treatment such as plowing or prescribed fire. Game managers, however, point out that these areas are the prime nesting grounds for upland game birds. Treatment of the fuel to reduce fire hazards will reduce bird cover and may destroy nests. Fuel treatment can be timed to be done after the bird hatch, but how does one decide which value takes precedence? Fuel management is a logical approach.

Some parts of the continuous strips of fuel can be treated so that fire cannot spread along rights-of-way. Other parts can be left untreated to provide cover for the birds. Treated areas can be located adjacent to threatened grain fields, pasture lands, or rough, unfarmed land. Untreated areas can be located adjacent to plowed fields or cultivated land where fire would not be likely to spread. Thus, through proper fuel treatment and land management decisions, one can manage for bird nesting and animal grazing and, at the same time, reduce the fire hazard without adding unduly to the cost of land management.

Or consider the chaparral of southern California. Here protection of the vegetation from damage by wildfire is a principal land management objective. The vegetation helps hold the soil in place, protect watersheds, and provide wildlife habitat as well as an aesthetically pleasing environment for suburban and rural dwellers. We fight wildfire not simply to save the brush but to protect such associated values.

It is possible to build fuel breaks or other interruptions in existing brushfields to aid fire control. But fire plays a recognized role in the life cycle of brushfields. Perhaps it would be more appropriate to plan for systematic use of fire—much as timber harvest or grazing is used in other areas—in rotations that create a mosaic of age classes. Such a planned mosaic, regardless of the practice used, would constitute good resource management, and at the same time exercise a strong degree of control over the fire hazard. Fuel breaks and improved fire control technology are needed, but I believe that without conscious fuel management we will continue to be victims of fuel accumulation rather than masters of when, where, and how it will be distributed.

These are just examples of how fuel management, designed to accomplish a broad range of land use objectives, can complement fire control. The choice is not between the two, but to see that the combination can increase the effectiveness of each. □