

The Role of Fire in Ecosystem Management¹

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Abstract: USDA Forest Service management practices have significantly changed. Past practices were predicated on a strong public expectation for commodity production and protection from the forces of nature that were perceived to threaten that goal. Fire suppression, selective logging, intensive grazing, constrained prescribed burning, and a general emphasis on wood fiber production have, in part or collectively, changed many forests. However well-meaning at the time, in some ecosystems, these changes have adversely affected the health and resiliency of the resource to the point where sustainability may be impeded. Currently the Forest Service has modified its focus and its management practices. These changes have important implications for the agency's wildland fire managers. This paper describes the role of fire in ecosystem management and it answers these three questions: 1) what is ecosystem management? 2) why should fire be considered in ecosystem management? and 3) what role do fire managers have in ecosystem management?

What is Ecosystem Management?

Ecosystem management emphasizes an ecological approach to resource stewardship. It is a holistic approach to natural resource management that attempts to manage the forest, not just the trees. It focuses on long-term landscape management of basins and provinces, not just stands within 10-year planning cycles. The premise is that, in managing for whole, healthy ecosystems, we are better able to sustain resource outputs for the future. Instead of emphasizing short-term resource extraction, ecosystem management attempts to manage for the healthy, long-term functioning of the entire system, with the expectation that, in doing so, commodity and amenity outputs will follow on a sustainable basis.

In some forests, ecosystem management will require that essential ecological processes, such as fire, become more widely included. In these forests, the condition of the resource will ultimately be influenced by the ecosystem's ability to function within natural ecological amplitudes.

Certainly, ecosystem management is more a journey than it is a destination. More than 70 years ago, Aldo Leopold recognized the inextricable webs that define the science of ecology and our understanding of ecosystems: "we [must learn to] realize the indivisibility of the earth—its soil,

mountains, rivers, forests, climate, plants, and animals, and respect it collectively" (Meine 1988).

Ecosystem management can also appear to be a contradiction in terms, as Frank Egler remarked, "Ecosystems are not only more complex than we think, they are more complex than we can think" (Egler 1977).

Despite much information about this type of management, we are not yet always able to manage for whole ecosystems. In our attempts to provide for public expectations today—whether clean air or rare owls or big trees—we need to ask ourselves if we might be managing for one thing at the expense of another. In managing for discrete components of the ecosystem, might we be inadvertently jeopardizing the health of a larger whole?

The concern may be most acute in fire-adapted ecosystems. Sustaining these systems in a healthy condition will require the use of prescribed burning. The smoke and risk and cost of those treatments are almost always socially intolerable. However, avoiding treatment promises to result in consequences far worse. In some areas of the United States, we may be glimpsing some of those consequences.

To understand and manage ecosystems we must remember a cornerstone to the concept of ecosystem management: the adaptation of our practices in response to acquired knowledge. In that respect, the development of our thinking and our management practices remain evolutionary.

Why Should Fire be Considered in Ecosystem Management?

The biological effects of fire have a profound influence on composition, structure, and function of forest, brush, and grassland ecosystems on National Forests. The effects of fire are particularly apparent in short interval fire-adapted ecosystems in which fires resulting from lightning or burning by Native Americans, for example, were the most frequent, generally occurring at 5- to 25-year intervals. These ecosystems were the first to manifest adverse biological consequences because of fire exclusion. Fire-related ecological problems are most immediate in short interval fire-adapted ecosystems.

In the prolonged absence of periodic, low-intensity surface fire, stands undergo relatively rapid changes in species composition and structure that often become predisposing factors to epidemic insect and disease outbreak and severe stand replacement wildfire.

Significant forest health problems appear to be most concentrated in short interval fire-adapted types, commonly represented by long-needle pine species (e.g. ponderosa,

¹An abbreviated version of this paper was presented at the Biswell Symposium: Fire Issues and Solutions in Urban Interfaced and Wildland Ecosystems, February 15-17, 1994, Walnut Creek, California.

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Jeffrey, eastern and western white, red, loblolly, short-leaf, long-leaf, and slash pine). These pine types, as either dominants or in association with other species, are estimated to occur on nearly 30 percent of the suitable timber base on National Forest lands.

The Blue Mountains in northeastern Oregon and southeastern Washington, the mountains in south-central Idaho, the Colorado Front Range west of Denver, and the central Sierra in California—all conifer-dominated short interval fire-adapted ecosystems—are areas plagued by serious forest health problems. They are also areas where severe wildfires have recently occurred and, inevitably, will recur.

What Is the Role of Fire Managers in Ecosystem Management?

Sustaining short interval fire-adapted ecosystems is expected to be a difficult challenge. In order to better prepare the Forest Service for the issues that are likely to emerge, the USDA Forest Service's Fire and Aviation Management Staff directed development of staffing paper *Fire-Related Considerations and Strategies in Support of Ecosystem Management* (Williams and others 1993). This paper made five recommendations that were recently adopted as fire and aviation management goals:

- Communicate the ecological roles of fire to our decision-makers and the public. In short interval fire-adapted ecosystems, complex issues are inherent and the risks that surround wildfire threats and prescribed fire applications sharpen the potential for conflict in the social arena. The Forest Service will more completely develop and communicate the scientific rationale behind management of fire-adapted ecosystems.

- Display the long-term effects of prescribed fire and wildfire suppression options. The land management planning process affords the means to display trade-offs, assess benefits and consequences, and determine costs among a full range of alternatives. In order for the public and our decision-makers to benefit from the information required to make informed judgments, fire and aviation management will better display the long-term effects of prescribed fire and wildfire suppression options.

- Maintain strong wildfire suppression capability and continue to strengthen prescribed fire expertise. Fire

suppression capability will remain a vital cornerstone of the Forest Service mission as fire-adapted ecosystems continue to approach high-risk conditions and as private development continues to expand at the wildland/urban interface. Prescribed fire, despite the concerns that surround its use, remains an important, ecologically appropriate management tool. Fire and aviation management will develop practitioners that have the skills to use fire safely and effectively.

- Manage prescribed fire risk: assess it, mitigate it, and seek partners to share it. Risk management will become a fundamentally important component of the prescribed fire program. A risk assessment process will become the basis for ignition decisions. Managers will be better apprised of high-risk prescribed burning treatments and avoid them, unless they can be adequately mitigated or risks can be shared among partners. Fair, timely reimbursement will be provided the public in the event of loss resulting from prescribed burning escapes.

- Align fire management programs to better complement one another. Although fire policies are sound, program areas (prevention, pre-suppression, suppression, fuel management, and prescribed fire use) will be fully integrated, better reflect a common purpose, and complement one another toward an ecosystem management objective.

These goals and actions signal important changes for Forest Service fire and aviation management. They require that managers take a proactive role in explaining the consequences of both the presence and absence of prescribed burning and wildfire suppression and fully integrate these considerations into the decision-making process. They also require an improved, more balanced fire management approach to land and resource management.

References

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