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Coevolution of National Park Service Fire Policy And the Role of National Parks[1]

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ABSTRACT: Fire policy depends upon the function served by a unit of land and the land manager's perception of fire's role in that function. The role in society played by national parks containing large natural areas has evolved saltatorially over the 111 years since Yellowstone National Park was created. Early policies emphasized management the scene that existed when Europeans first arrived. Present policy emphasizes management for unimpeded natural processes. Each state in the evolution of society's attitudes toward national forests has altered and will continue to alter National Park Service fire policy.

INTRODUCTION

Changes in the management of fire in national forests have always been closely affiliated with changes in the perceived function of those forests. Timber production, grazing, recreation, promotion of wildlife, and wilderness preservation exe goals that elicit different fire management programs. Given present-day knowledge of fire ecology and fire husbandry techniques selecting the appropriate fire management program is a relatively straightforward process. For the U.S. Department of the Interior, National Park Service, goals have never been so clear-cut.

The Yellowstone Act of 1872 created a "*public park m pleasuring ground for the benefit and enjoyment the people*" in which "*the natural curiosities or wonders*" very to be maintained "*in their natural condition*." By 1916, when Congress created the National Park Service through additional legislation, more visionary language directed the new agency "*to conserve the scenery and the natural historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations*" (National Parks Act of 1916)

ERA OF SPECTACLES

From 1886 to 1916, when the U.S. Army administered the national parks, and for the first 50 years of National Park Service management, the mandate from Congress was interpreted in a way that excluded fire (Pyne 1982). In fact, the first generation of national parks was selected for its scenery and spectacles: geysers, waterfalls, big trees, deep canyons. Protection of these phenomena and their immediate environment and of visitors and their enjoyment of the scenery was Park Service policy and was taken directly from the 1916 law. The policy was translated to mean fire exclusion. That fire suppression in some areas creates its own long-term threat to safety and scenic resources was not yet appreciated. During this period, the Park Service lacked the professional cadre and mutually reenforced shared

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values already well developed in the U.S. Department of Agriculture, Forest Service (Pyne 1982). In most cases it was the Forest Service that planned and conducted firefighting in the national parks. Park Service firefighting did not come into its own until the 1930's.

The management of national parks for protection of natural features and for the pleasure of visitors led to tourist accommodations directly abutting those same features and the creation of new amusements such as bear feeding stations and the famous Yosemite firefall. To protect living scenery, forest insects and diseases were fought with pesticides and prophylactic cutting without regard to whether the phenomena were natural, exotic, or aggravated by human presence (Ise 1961). Management of wildlife was largely an ad hoc affair. Although traditional Park Service policy long has been "to permit each species of wildlife to carry on its struggle for existence without artificial help" (Ise 1961), individual superintendents regularly ordered reductions of hoofed animals when they were believed to be overstocked or damaging vegetation.

Thanks to work by scientists such as Adolph Murie and George Wright, the policy of destroying predators to increase ungulates or because their activities were offensive to some was gradually abandoned in the 1930's (Wright and others 1933). By the end of the decade, authors of internal documents (Dixon 1940) and popular articles (Finley and Finley 1940) were questioning the Park Service habit of feeding bears and of. killing them when they become nuisances. But despite valuable advice from people within and outside the agency it lacked a substantive resource policy. Furthermore, no professional scientists and resource managers were available to give life to such a policy.

ERA OF RESOURCE MANAGEMENT

National park resource management entered a new age when an advisory board on wildlife management appointed by then Secretary of the Interior Stewart Udall filed its 1963 report entitled "Wildlife Management in the National Parks" (Leopold and others 1963). The Leopold Committee far exceeded its formal directive and produced a document that spoke to the broad issue of goals and policies for natural resource management in the national parks. Its words very transformed into official policy:

> As a primary goal, we would recommend that the biotic associations within each park be maintained, or where necessary recreated, as nearly as possible in the condition that prevailed when the area was first visited by the white man. A national park should represent a vignette of primitive America.

With this goal clearly and formally stated, the committee said that means to achieve it could include reintroducing extirpated species, controlling or eliminating exotics, and managing population where natural controls or park size and necessary habitat components were inadequate. Although time and patience might restore climax communities disrupted by fire, lagging, or other disturbances, the loss of seral and other fire-dependent communities could only be restored by reintroducing fire. For the Sierra Nevada of California, the report specifically recommended controlled burning as the only method that could extensively reduce "*a dog-hair thicket of young pines, white fir, incense cedar, and mature brush -- a direct function of overprotection from natural ground fires.*"

The committee restated views enunciated in 1962 at the First World Conference on National Parks; there it *had* been suggested that park management served a homeostatic function, substituting artificial controls for natural ecologic factors that had been lost on account of inadequate park size, extirpation, or human activities over time. The Leopold Report stressed the management of a scene and defined that target scene explicitly as the moment when Europeans first laid eyes on it. "*A reasonable illusion of primitive America could be recreated, using the utmost in skill, judgment, and ecologic sensitivity.*"

Possibly the most far-reaching recommendation of the Leopold Committee (1963) was to develop a professional cadre of scientists and resource management specialists within the National Park Service:

> Active management aimed at restoration of natural communities of plants and animals demands skills and knowledge not now in existence. A greatly expanded research program, oriented to management needs, must be developed within the National Park Service itself. Both research and the application of management methods should be in the hands of skilled park personnel.

The Leopold Report at last provided a rationale for managing natural or wilderness areas in national parks. It called for acquiring scientific information so that the "vignette of primitive America" could be determined and the tools best able to restore it selected. It repeatedly specified controlled burning as a preferred tool for manipulating vegetation because of its low cost and its ability to simulate the effects of wildfire.

Those familiar with the writings of John Muir know that his descriptions of open stands of conifers on the western slopes of the Sierra Nevada and hie reports of frequent fires set by local Indians (and by this time ranchers as well conflicted sharply with conditions in Yosemite and Sequoia National Parks in the latter 20th century. Reports by Hartesveldt and his coworkers (Hartesveldt and Harvey 1967; Hartesveldt and others 1975) found a classic example of fire dependence in the giant sequoia *(Sequoiadendron giganteum).* The era of suppression apparently had drastically reduced reproduction while encouraging undergrowth that jeopardized the famous giants when fire did--inevitably--recur. Biswell (1967) provided the technical basis for fuel reduction by prescribed fire, and the National Park Service at last felt it had the policy imperative, the biological justification, and the technical skills to introduce this management technique. As Pyne (1982) reports, early successes in the Sierra Nevada emboldened resource managers, and the 1970's were years of great experiments with prescribed fires in several national parks. some of these, enthusiasm unfortunately exceeded fire management techniques or a full understanding of the ecological consequences.

The Park Service had two distinct reasons for introducing prescribed fire into its natural areas. The first was that nearly a century of fire suppression presumably had altered pristine plant communities. The second was that buildup of. both living and dead fuels constituted a threat of unnaturally hot and dangerous wildfire that imperiled park resources, people, and surrounding lands. These threats and their solution through prescribed fire rapidly became incorporated into management documents (for example, van Wagtendonk 1974; Sequoia and Kings Canyon National Parks 1979). Fires produced by natural ignition sources were permitted to burn with increasing frequency, but only insofar as they very

in prescription furthered management objectives. As natural areas were modified by prescribed fire, managers felt the reduced fuel loadings would permit larger proportions of the parks to be included in natural fire zones. Both natural and prescribed fire, however were intended to serve the same end: restoring and perpetuating Leopold's "*vignette primitive America*."

Evidence continues to accumulate that, throughout much of the world, aboriginal humans greatly influenced vegetation by burning (Pyne 1982). This appears to be true of California, including the Sierra Nevada (Lewis 1973). When Kilgore and Taylor (1979) reconstructed the fire history of sequoia-mixed conifer forest, they found a fire frequency substantially greater than one that could be generated by contemporary natural ignition rates and concluded that Indians were responsible for a large but undetermined preparation of the fire scars they found. Partly because it is now difficult to distinguish the historic effects of aboriginal burning from those of lightning-caused ignitions, and partly because the Leopold Report specifically referred to "the condition that prevailed when the area was first visited by the white man" (from which one may infer that Indians were to be included in that landscape), managers in the Sierra Nevada parks have been inclined to merge both ignition sources and their ecologic effects when calculating "natural" vegetation patterns and developing prescribed burning plans. Similar Indian burning effects have been noted and similar management conclusions drawn for other areas, such as the Northern Rocky Mountains (Barrett and Arno 1982).

Under the Leopold approach, resource managers in a growing number of western parks with significant natural or wilderness areas have made their first step to restore vegetation structure to what it was in presettlement times, generally defined as approximately a century ago. In most cases that structure has been estimated from present stand structure, fire scars and other physical evidence, historical records, and inferences drawn from similar vegetarian elsewhere. All of these techniques – except rare instances where actual reports of Indian burning frequency and extent are available – lump ignition sources for past fires. A combination of mechanical manipulation and prescribed fire has then been applied. Although not always explicitly stated, program objectives for the "first round" of burning programs generally include (1) restoring the presettlement scene; (2) protecting visitors, structures, featured resources, and designated scenery; (3) preventing, as an outcome of ignition from any source, uncontrolled wildfire that could burn areas within or outside park boundaries in an unacceptable fashion. The rationale for this approach is fully developed by Parsons (1981).

As techniques for burning have developed to the point where first-round fire management programs can be implemented successfully, managers have been confronted with the dilemma of where to proceed next. In natural areas, one is left with the alternatives of ceasing prescribed burning and permitting natural ignitions to provide the sole source of fire, or supplementing/supplanting natural ignitions indefinitely with prescribed fires whose parameters would be determined by available information on presettlement fire behavior, present and historic vegetation structure, or both. In practice, the first alternative is unlikely ever to be implemented strictly: protection of various resources and conflicting fire policies on adjoining lands will require prescribed fire for reasons other than ecological objectives. The second alternative is obligatory if Indian burning was a significant factor in creating the presettlement scene.

ERA OF ECOLOGICAL RESERVES

As other wild ecosystem are compromised by a

variety of human activities, such as mining, grazing, logging, and recreation, those that are left untouched become increasingly valuable as living laboratories of natural ecological processes. Their value as controls in a world where human influence is virtually omnipresent varies inversely with the degree to which they disturbed. This newly emphasized function of natural areas is explicitly recognized by the dedication of International Biosphere Reserves under UNESCO's Man and the Biosphere Program. American biosphere reserves include not only national parks but also land managed by other agencies and include both natural and manipulated sites (Risser and Cornelison 1979).

For the National Park Service, recognizing the scientific values of natural or wilderness areas introduces same conflicts with other uses. Human visitation, which is already acknowledged to compromise wilderness value when it reaches certain levels, may significantly compromise scientific value at yet lower levels. Collection of scientific information often includes setting up scientific equipment, destructive sampling of resources, and other visual and acoustic blights on an otherwise unmarred landscape. For the National Park Service, these conflicts remain unresolved at the policy level.

The Leopold approach of scene management is incompatible with management for unimpeded natural processes. By designating a particular set of conditions a "reasonable illusion of primitive America," and calling upon both natural and artificial processes to achieve it, new anthropogenic artifacts – however subtle or artful-- are introduced into the system and compromise any study of natural processes. An alternative approach recognizes, as did the Leopold Committee, that parks are ecologic islands and cannot be managed as limitless wilderness. It still requires revising or mitigating anthropogenic effects in natural areas. But by abandoning the notion of an end product – the "correct" scene-- natural processes are permitted to proceed unimpaired within previously stated constraints of protection of life, property, and designated resources. This new perspective recognizes that ecosystem processes and ecosystem elements are both real properties, that they are inter-dependent, and that both are valid and important objects of study.

The natural process approach to wilderness management obviates some difficulties with the Leopold model and introduces a few of its own. Cycles and trends in climate, erosion, and plant succession no longer pose as management issues; they can be observed rather than confronted. Wildlife population phenomena such as epizootics, irruptions, and collapses likewise are no longer at issue. What once were problems are now phenomena. Simulation of aboriginal burning is inappropriate because it freezes a moment in Indian cultural evolution, climate, and biotic relations for all time. Had they been free to follow their own cultural destiny, Indians presumably would not have pursued deer, collected acorns, and ignited fires in perpetuity.

Bonnicksen and Stone (1982) elucidate some of the inherent contradictions in what they call "structural maintenance objectives" and point out the interdependence of structure and process. They claim that in the Sierra Nevada sequoia-mixed conifer forest, changes in forest structure produced by decades of fire suppression have now sufficiently altered fire behavior so that fire/ forest interactions with or without simulated Indian burning do not follow the pattern that would have prevailed had Europeans never entered the scene. Bonnicksen and Stone focus on relatively short-term phenomena and ignore long-term variations in forest and fire produced by climatic cycles that could far outweigh human influence.

A serious difficulty in permitting unimpeded natural processes in national park natural areas is that knowledge of anthropogenic factors to be corrected is poor. Lacking data on long-term lightning ignition and spread patterns, one cannot compensate for loss of fires that previously invaded from beyond park boundaries. When ungulate populations explode and collapse, is it from loss of predators or habitat beyond park boundaries or a natural phenomena?' That kind of information can be obtained only by scientific study of the phenomena. The study of wildfire pattern and process is itself valid, but it requires repeated observation of the phenomena in question. National park wildernesses have fever confounding variables than most other sites.

A greater obstacle may be that wildfires include high-intensity and extensive conflagrations that are frightening, dangerous, and unpopular. Evolving fire management techniques may eventually permit more frequent containment and less outright suppression of chaparral fires and forest crown fires, but until then lower intensity partial simulations must suffice. In the many locations where fuel buildup from fire suppression would produce an unnaturally hot wildfire, prescribed fire remains the necessary first step.

The ecological reserve approach to national park wilderness and natural areas is compatible with the Wilderness Act of 1964 and the philosophy behind the Act as developed by Nash (1978). The role of fire in park wilderness is substantially that described by Heinselman (1978). National parks have traditionally emphasized the recreational use of wilderness for its esthetic and spiritual value, a policy that is largely harmonious with the parks' value as reserves of wild natural objects and processes from which ve may learn more about the world and how ve are changing it.

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