

# Implications of National Park Service Fire Management Policies for the Status of Sensitive Plant Species

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Fire is a multidimensional process affecting virtually all aspects of plant and community ecology. The frequency and timing of fire occurrence interact with elements of the fire environment (wind, temperature, humidity, available fuels, topography) and other environmental conditions (disease cycles, climatic history, other disturbance cycles/events) to directly and indirectly influence a plant's individual and/or population survivorship potential. Community-level fire effects (i.e., unleashing competitors, habitat changes that attract predators, microclimate change) also influence the survivorship potential of sensitive plants. A fire regime, unaltered in its range of intensities, frequencies, and timing is one of several process elements essential for maintaining the ecological integrity of wildland ecosystems. Any species may "acquire" a state of "endangeredness or threatenedness" if essential process elements are significantly altered.

Unlike many environmental processes (i.e., chemical weathering, nutrient cycling, decomposition, climate, successional trends), fire occurrence is neither incremental nor is its extent entirely uncontrollable. The perception of fires' apparent (and sometimes real) destructiveness, acuteness, and controllability has allowed wildland managers to separate this important ecological force from its less manipulable companion processes. This predisposition for managing fires, especially naturally ignited fires, may contribute to or create

A state of "threatenedness or endangeredness" may be derived from two distinct causal pathways:

1. The first pathway is process-driven extinction or natural selection. Individual species may be eliminated or endangered in a changing physical, community, and/or genetic environment. Fire management actions taken to preserve species threatened by such changes are incongruent with process-driven wildland resource protection and require special consideration (i.e., the emerging NPA biological diversity initiative). "Conscious" disruption of existing environmental conditions by a single species (humans) is excluded from this definition of process-driven extinction,

2. The second pathway is driven by the conscious activities of humans. Management of wildland fire is one of these activities. For the purpose of discussion, fire management policies potentially affecting (or creating) endangered plant species are divided into those specific to naturally occurring fire and those related to prescribed fire.

## MANAGEMENT OF NATURAL FIRE

It's likely that the blanket fire suppression policy of past decades contributed to (or is responsible for) scarcity of several plant species. One line of evidence supporting this hypothesis is the appearance relatively large numbers of seedlings of rare species following fires. Examples include the tree one,

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*Carpenteria californica* (C1), the Carmel Valley Bush Mallow, *Malacothamnus palmeri* var. *involucratum* (C3), and the Pinnacles buckwheat, *Erigeron nortonii* (C3c).

Current policy permits naturally ignited fires to run their course within ecosystems judged to be essentially unaltered by human activity under specific, prescribed conditions. These conditions have become increasingly restrictive and arbitrary from an ecological perspective. Driving the prescribed natural fire management perspective are considerations for the availability of suppression forces in the event of blow-up conditions, inside and outside park socio-economic and aesthetic concerns, and perceived and extant air quality regulations.

Examples of management protocols that may compromise the integrity of natural fire regimes (and potentially impact individual species) include those designed to control:

1. the number of fires permitted to burn simultaneously (locally, regionally, or nationally)
2. the number of acres or miles of perimeter allowed to burn at one time
3. the potential of fire to cross political boundaries to areas with nonconforming use
4. interference with visibility and/or aesthetic environments
5. criteria pollutant standards (PM10, CO)
6. threats that projected intensities may exceed controllability by resources on hand or immediately obtainable
7. the number of organized personnel not committed to ongoing fires
8. certification and monitoring procedures and frequencies.

Successful application of the protocols is likely to have its greatest effect upon the most significant fires from an ecological perspective: those with a potential to burn over a long period of time, burn intensively during a portion of that time, and burn over extensive areas. Stand-replacing fires will rarely be sanctioned. Given sufficient time, the integrity of the natural fire regime (its array of timing, intensity, extent, and periodicity) may be compromised. The status of individual species may be unwittingly jeopardized. The dubious notion that "any fire is better than no fire" emerges as the common denominator of the natural fire management perspective. The oxymoron "prescribed natural fire" becomes a literal description of the natural fire program.

## **PRESCRIBED FIRE MANAGEMENT**

Prescribed fire is defined as the planned use of human-ignited fire to achieve specific, measurable objectives. Objectives may be ecological (i.e., reduce extent and amount of fuel buildup caused by fire suppression, alter nonnatural structure/composition of vegetation, mimic natural fire regime, maintain habitat of a sensitive species), administrative (i.e., reduce fire hazards near developed areas or political boundaries), or sociocultural (i.e., maintain historic landscape, mimic land management practices of previous cultures).

Superimposed on the specific objectives of a prescribed burn is the inherent liability associated with a management-ignited fire. Controllability is an essential and limiting element in any prescription. The notion of liability may also be projected to the aesthetic and economic environment of visitors, park and local residents, concessioners, and local business persons. Thus, the field of management objectives considered for prescribed fire is generally conservative.

Most prescribed burns are conducted under cool or moderate conditions, and in areas or at times where visitors and economic interests are least affected by such a fire. Ecological considerations are often secondary. The season in which prescribed fires are conducted often deviates from the seasonal array dictated by a natural fire regime. The timing of fires may affect the survivorship potential of individual plant species and/or affect community dynamics in such a way that the status of a species may be threatened. Prescribed fire programs may unwittingly create a state of "endangeredness" for individual species.

## **WILDFIRE**

Wildfires are most simply defined as unwanted fires – fires that are incongruent with management objectives. Wildfires are frequently, but not necessarily, human caused. Timely and aggressive action is taken to suppress wildfires. The policy of suppressing unplanned, man-caused fires is consistent with process-oriented protection of sensitive plant species, provided that natural fires are permitted to burn or prescribed fire is applied in such a way that it mimics the natural fire regime. Threats to sensitive plant species in the management of wildfires are less likely to be derived from policy than from the physical impacts of suppression actions.

Wildfires threaten sensitive plants in several ways:

1. Physical disturbance of sensitive plant species during suppression activities (i.e., line construction).
2. Direct consumption by fire. Direct consumption of sensitive plant species is not generally problematic if wildfires are infrequent and vegetation is fire adapted. An exception might be species confined to duff layers such as *Pityopus californicus* (C3c). Consumption of sensitive plant species by wildfire in communities not adapted to fire or that have had their fuel or fire regimes altered by management practices or invading alien plant species is frequently deleterious. Numerous species of the Hawaiian Islands (i.e., *Kokia drynarioides*, *Colubrina oppositifolia*, *Alphitonia ponderosa*, *Pittostorium terminalioides*) have been negatively influenced by wildfire.
3. If wildfires occur with sufficient frequency to alter the natural fire regime, individual plant species may be threatened.

## **MITIGATING ACTIONS/RECOMMENDATIONS**

The following recommendations attempt to minimize potential endangerment of individual species caused by fire management protocols. No attempt to address the role that national parks will play in protecting individual species from process-driven endangerment is presented.

### **Assertions/Predisposition**

1. Acknowledge the important role that natural fire regimes play in determining the status of individual plant species. Acknowledge that intense, stand-replacing fires in altered ecosystems are positive ecological influences and are essential for maintaining the ecological integrity of wildland park resources.

2. Clearly state that smoke from naturally ignited fire is a natural phenomena in wildland s. A compromise of visual range and other aesthetic values by smoke from natural or fire is analogous to fog, rain, or clouds and should be periodically anticipated by visitors, , and concessioners as part of the natural environment that is to be preserved.
3. Clearly assert that removing human presence (visitor or employee) from health-threatening circumstances (elevated PM10 or carbon monoxide levels) is a viable and perhaps preferable management option when the alternative is to suppress an ecologically significant natural or prescribed fire.
4. Accept a greater degree of risk of fire spreading to adjacent areas.

### **Actions**

1. Increase efforts to develop cooperative agreements with adjacent landowners to accept natural and prescribed fires from park areas. Increase NPS commitments to manage such fires on private/state/federal lands.
2. Where appropriate, develop in-park (or negotiate out-of-park) buffers where vegetation age, structure, density, or available fuel is managed to limit natural or prescribed fires from escaping care zones. It is important that buffers themselves do not impair ecological processes by acting as a barrier to the movement of animals or as a corridor for the influx of non-native species. Buffers may need to be established within wilderness boundaries.
3. Monitor the effects of prescribed fire regimes on vegetation. Implement long-term research and/or monitoring programs to assess the influence of management regimes on sensitive species.
4. Dedicate a portion of nationally available fire fighting forces for management of naturally occurring fires in wildland areas. Eliminate the need to classify natural fires as wildfires when resources aren't available to control them on a daily basis irrespective of local conditions, the location of the fire, or the behavior of the fire.
5. Establish a policy to make possible the reclassification of wildfires to prescribed natural fires when temporary resource shortages is the principal reason for classifying a naturally ignited fire in a wildland area as a wildfire.
6. Produce sensitive species maps that can be given to prescribed burn bosses and wildfire incident commanders. Emphasize through the superintendent's or manager's delegation of authority to an incident commander that the protection of sensitive plant populations is as important (if not more so) as protecting structures and other property. Resource advisors familiar with sensitive plant locations should be assigned to all incident management teams.