RESTORING FIRE AS AN ECOLOGICAL PROCESS

ISSUE STATEMENT

Fire is a natural ecological process in the Sierra Nevada, equal in ecological significance to floods, volcanic eruptions, hurricanes, and other natural disturbances (Lindenmayer and Noss 2006). The Sierra Nevada experiences a mixture of fire severities ranging from low to patches of high severity in the mixed conifer region (McKelvey and Busse 1996, Collins et al. 2007) to largely high fire severity in chaparral-dominated ecosystems (Sugihara et al. 2006). The variety in burn severity across the landscape provides important ecological benefits to the forest including: preparing the seedbed for germination, cycling nutrients and replenishing minerals, modifying conditions promoting wildlife habitat and forage, creating structural heterogeneity, minimizing disease and pathogens, and reducing or increasing fire hazard (Kilgore 1973).

Fire in the Sierra has shaped forest structure and composition for centuries (Skinner and Stephens 2004, Sugihara et al. 2006). It is a natural and essential disturbance process in maintaining long-term ecological function of the flora and fauna, soil nutrient recycling, structural diversity, and composition throughout the Sierra Nevada. Human activities such as logging, livestock grazing, fire suppression (Hutto 2005, Stephens et al. 2009), increased development (Sierra Nevada Alliance 2007), and stricter air quality regulations (California Air Resources Board, CCR Title 17) have altered the natural fire regimes in the Sierra forests creating an overabundance of live and dead fuels. As a result, the Sierran ecosystems are at greater risk from the effects of uncharacteristic fires[1] in areas that would have historically burned more frequently and at lower intensities. Estimates of the area burned prior to the 1800s in California range from 4.5 to 12 percent each year (Stephens et al. 2007). In contrast, about 0.2 percent on average was affected by managed fire each year in the Sierra Nevada during the period 2001 to May 2009 (Silvas-Bellanca 2011). Continuing to exclude fire from the Sierra Nevada poses a great threat to the health and resiliency of each ecosystem.

Today's forests are often not in a condition that can be safely burned. In some cases, the dense accumulation of small trees and other ladder fuels needs to be reduced through mechanical treatments prior to the application of fire. However, it is important to note that mechanized treatments alone generally do not reduce the level of surface fuels (Graham et al. 2004) and cannot replace fire and its ecological role on forested landscapes. Studies have found fire to be highly effective in treating surface and ladder fuels, whereas mechanical treatments alone are considerably less effective (Stephens and Moghaddas 2005). While such treatments are designed to reduce extreme fire effects, they can be ineffective under severe weather conditions because high surface fuel loads remain on site following treatment (Safford 2008). Mechanized treatments need to be carefully designed to meet conservation and restoration objectives in the short and long term (North et al. 2009). Limiting disturbance in sensitive areas, retaining important forest structure and creating structural heterogeneity are all important concepts to address when designing mechanical fuel treatments.

The forest plan revision process is the opportunity to address directly the strategic use of fire on the landscape, and suppression to manage for multiple benefits of natural resources and human communities. Promoting the strategic use of fire will allow low, moderate, and high severity fire effects in the Sierra Nevada creating a more natural, healthy, and resilient landscape. In the coming years, it will be critical to enhance the ecological role of fire on a larger scale than the current management program.

[1]Uncharacteristic fire – an increase in wildfire size and severity compared to that which occurred within the historic range of variability. The historic range of variability is a condition that will inform managers, but may not be the desired outcome.

POLICY ACTIONS NEEDED

Proposal for Revision to Forest Plan Direction

A. Desired Condition *The following statements represent the desired future condition of the landscape and may not reflect the current conditions.*

Desired Condition F-1. Planned and unplanned ignitions are managed to promote fire as an ecological process to increases the resiliency and a range of diverse habitat.

Desired Condition F-2. Planned and unplanned ignitions produce a range of beneficial effects within the natural range of variation for each fire-adapted landscape.

Desired Condition F-3. Post-fire environments provide a range of beneficial effects that include all stages of forest development.

Desired Condition F-4. Human structures and areas close to human communities are resilient to catastrophic loss.

Desired Condition F-5. Interagency and inter-governmental planning occurs across boundaries to promote fire as an ecological process on a landscape level.

B. Objectives

Objective F-1. By Year 10 of the forest plan, treat annually 1.5% of the total national forest land base with planned and/or unplanned ignitions.

Objective F-2. Manage planned and unplanned fires to maximize ecological benefits to the affected landscape. Manage all wildland fires using strategies and tactics commensurate with protection of human health, safety, and natural and cultural resource values. Utilizing existing interagency wildland fire planning procedures, analyze risks and complexities for all ignitions in order to determine which can be successfully managed for ecological benefit while responding to human safety, versus those that should be suppressed (e.g., Sequoia and Kings Canyon Fire and Fuels Management Plan (NPS 2005).

Objective F-3. Fire behavior in the Community Zone[2] (CZ), along major transportation routes, and close to other key infrastructure is limited to surface fire with a low potential for crown fire.

Objective F-4. The biological legacies and heterogeneity associated with a variety of fire effects occur in post-fire environments at levels that reflect desired conditions and the natural range of variability.

Objective F-5. All land allocations in the forest plan specifically address how planned and unplanned ignitions will be used to increase forest resilience and provide ecological benefits for multiple habitat types.

Objective F-6. Fire plans promote the use of planned and unplanned ignitions and should be completed for each national forest by Year 5 of the forest plan.

Objective F-7. Plan and implement appropriate treatments to reduce the threat to values from uncharacteristic fire and to restore or maintain ecological values.

C. Standards

Standard F-1. All projects proposed in fire-adapted plant communities must tier to existing fire plans and include an unplanned ignition management plan for land allocations that are outside the Community Zone.

Standard F-2. Project planning documents address the following:

- Fire risk and hazard assessment,

[2] Community Zone: The area at risk from wildfire directly adjacent to houses or communities and generally not exceeding 0.25 miles from a community.

- Identification of sensitive areas and protective actions to implement during fire suppression actions,
- Identification of sensitive smoke areas, and mitigations for smoke,
- Identification of operationally logical and ecologically appropriate planned fires' perimeters during NEPA analysis to allow fire operations the most flexibility to accomplish acres; planned fire acres should not be bound to harvest boundaries within projects,
- Desired condition statements that identify the acceptable range of fire effects and post-fire conditions and affirmatively identify the desired low, moderate, and high severity fire effects and their ecological benefits,
- Identification of conditions that would necessitate post-fire treatment actions,
- Beneficial accomplishments of fire that can be measured by quantitative objectives.

Standard F-3. Project proposals modifying vegetation to increase fire resiliency must identify the post-treatment management requirements to maintain fire resiliency over time.

Standard F-4. Fire suppression efforts avoid damaging the natural resources at risk. Placement of fire lines, the use of back-fire techniques, and other ground disturbing techniques shall be informed by critical resource maps and with input from zone ecologists and deployed in a manner that poses the least impact to existing resources while still meeting the need to achieve fire suppression.

Standard F-5. Each Ranger Unit will have completed fire plans and annual burn plans ready for burning windows and with maps that include:

- Identification of areas where managed fire is highly possible if opportunities were to arrive.
- Higher elevation areas without structures or high levels of public use.
- Cultural resource areas needing protection.
- Key plant communities in need of burning.
- Sensitive species nesting or denning periods.
- Areas of recent past fires which act as control areas on rate of spread.
- A minimum of 3,000-5,000 acres per year with environmental analysis (NEPA) to support prescribed fire.

D. Regionwide Land Allocations

Table IV.A-1. Land allocations related to fire and fire management concerns.

Land Allocation	Definition	Management Objective
Community Zone (CZ)	The area at risk from wildfire directly adjacent to houses or communities and generally not exceeding 0.25 miles from a community; may include access roads and other infrastructure to support community.	Create defensible and resilient conditions to protect human life and property. Reduce fuel hazards within 300 feet of structures to significantly limit wildfire effects within this zone. Reduce fuel hazards adjacent to roads providing egress from structures. Suppression would be fire management response
All other land allocations	See Section III.A. for other land allocations	See Section III.A. for other land allocations

Recommended Actions at the National Forest Level Not Directly Addressed in the Forest Plan

- Ensure that there is an adequate staffing level with the appropriate qualifications to implement increased levels of managed fire during the fall and spring.

- Increased staffing from November to May to provide adequate staffing for fuels reduction activities such as prescribed burning, pile burning, limbing and thinning of trees <6" in late fall or winter at the proper pace and scale.

- Agency administrators will train, qualify, and certify available personnel for local fire needs, and interagency fire management priorities (WFEC 2009).

- Develop for the public a consistent message with uniform language about the role and ecological importance of fire to increase the understanding of the associated risks and benefits.

- Each National Forest shall commit fire staff to key community fire planning efforts in each county adjacent to the national forest to support "Firewise" community fire planning and projects in the community zone.

Recommendations for New Regional Direction or Policy

- Focus a large percentage of allocated funds from the Regional level to the National Forest level to treatments that will increase resilience and forest health while enhancing wildlife habitat with the use of managed fire. Projects should be prioritized based on meeting these objectives stated above since they are interrelated.

- Use the analysis completed to determine the allocation of funds from the Region to each national forest. Allocate funds to treat areas of the highest priority first (near communities and wildland urban interface areas).

- Fire management policy and Forest Service leadership supports biodiversity and ecosystem function through the use of prescribed burning and natural fire (Odion et al. 2009).

- Fire Management Plans and Land/Resource Management Plans establish flexibility, which will allow managers to more easily designate fires, regardless of ignition source, as an ecologically and appropriate use of fire for resource benefit.

- Apply the definitions of "managed fire" and "uncharacteristic fire" presented in this conservation strategy to fire planning and management in Region 5.

- Promote interagency and inter-governmental planning (WFEC 2009).

- Encourage landscape scale planning across jurisdictional boundaries (WFEC 2009).

- Using adaptive management, conduct internal reviews of the fire management programs to determine the following: consistency of policy implementation, effectiveness of interagency coordination, and progress towards ecosystem resiliency.

- During this forest plan revision cycle forests should use the recommendations in Hood (2010) to protect rare large tree structures that have missed several fire cycles.

Additional Recommendations

- Develop a pilot project with agencies and stakeholders to implement a managed burn on a landscape scale (>10,000 acres) that closely mimics fire behavior and fire return intervals associated with different slope positions, aspect,

and slope steepness, and create diversity among species (Sherlock 2007, North et al. 2009).

- Establish a Prescribed Fire Council for the southern Sierra Nevada region that is modeled after the Northern California Prescribed Fire Council (http://www.norcalrxfirecouncil.org/) as a mechanism to promote the use of fire as an active management tool and to create a shared learning environment for agencies, practitioners and other stakeholders.

- Evaluate the barriers to implementing prescribed or managed fire by national forest and create strategies to overcome those barriers.

- Compare smoke production for recent years, including extreme years, with estimates of smoke produced from managed fire over the same or more area. Use this information to evaluate opportunities to use managed fire to reduce the burden of smoke.

- Design and implement an active public awareness program that highlights the role of fire in the forest ecosystem and the importance of treating the excessive accumulation of fuels. Focus the educational program on local residents of the wildland urban interface, nearby communities, and those likely to be affected by drifting smoke.

- Promote the land allocations for community zone allowing for planned and unplanned ignitions to be used with more flexibility.

- Using adaptive management, conduct interagency reviews of the fire management programs to determine the following: consistency of policy implementation, effectiveness of interagency coordination, and progress towards ecosystem resiliency.

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