MAINTAIN AND RESTORE OLD FOREST HABITATS AND ASSOCIATED SPECIES

ISSUE STATEMENT

Old forests are vital components of Sierra Nevada ecosystems. They provide habitat for associated flora and fauna, ecosystem services such as clean water and climate moderation, and they are areas of high social value. Most definitions are qualitative and describe late-seral or late successional stage forests dominated by large trees, malformed trees, snags, and downed logs. They contain more structural diversity within patches, diversity among patches, as well as continuity and wider distribution across the landscape compared to cut-over forests (USDA Forest Service 1998; Stephens and Gill 2005).

There are 22 at-risk vertebrate species and many rare plants such as terrestrial orchids that depend upon old forests (USDA Forest Service 2001a, Volume 4, p. E64). Large old trees provide these species food and shelter. The large canopies often found in old-growth stands provide thermal cover to spotted owls from cold spring storms during nesting (Verner et al. 1992). Older pines also tend to produce more abundant and frequent cone crops (USDA Forest Service 1998), which in turn support tree squirrels and their predators, such as goshawk whose reproduction closely follows the previous year's pine cone crop (Keane 1999).

Old trees provide important habitat structure individually and at the stand and watershed scale. As trees age and become more structurally complex, they develop ecologically important microsites such as cavities, forked tops, broken tops and mistletoe platforms, which provide habitat for many wildlife species (North et al. 2000; Zielinski et al. 2004). Even a single large tree in a young forest can support measurably greater vertebrate diversity than a younger stand by itself (Mazurek and Zielinski 2004). Trees with these elements are lacking in the Sierra Nevada and should be protected where they occur (North et al. 2009). Groups of large trees growing in 'clumps' (of 3 or more) close together also provide important microsite habitat, and should not be subject to stand density-related marking guidelines. Large trees occurred in groups historically and may not compete for water the same way younger trees do (Hurteau et al. 2007; North et al. 2007).

At the landscape scale, old forests should be managed for fire resilience, water quality, and habitat connectivity. The viability of species such as spotted owl and fisher depend on landscape-scale protection of old forests because these species require large home ranges dominated by dense, old forest habitat for nesting, denning and resting (Verner 1992; Zielinski 2004; North et al. 2009). These wide-ranging species are subject to habitat loss from logging and uncharacteristically large and severe fire (Verner et al. 1992; Spencer et al. 2008). Managed fire is an ideal tool to restore forest resilience to fire and drought, manage stand density, and maintain a heterogeneous spatial pattern that improves habitat quality.

There has been an alarming decline in U.S. forest cover in just the past decade. A recent study quantified global forest loss during 2000-2005, and found that the United States lost six percent of its forest cover (Hansen et al. 2010). Forest loss in North America exceeds that of Brazil, Russia, Indonesia and other countries (Ibid). Similarly, old-growth forests have declined in the Sierra Nevada since the 1860s (Franklin and Fites-Kauffman 1996). The most dramatic losses may have occurred in just the past 20–70 years. Old forest cover in the Sierra Nevada declined approximately 43 percent in just 50 years (Zielinski et al. 2005). During the 1980's the Forest Service was producing over 1 billion board feet of saw-timber annually from the Sierra Nevada, much of it in large old-growth trees. Today roughly 17 percent of forests in the Sierra exhibit late-successional characteristics (Franklin and Fites-Kauffman 1996; USDA Forest Service 2002; Barbour 2002). The amount of forest that has

never been logged is far less, perhaps less than five percent (Barbour 2000). Most of the remaining stands have been highly fragmented, with the majority of old growth found over 5,000 feet in elevation, in wilderness reserves, or in steep inaccessible canyons.

Climate change is another threat to old forests. Large tree mortality has doubled in the last 2-3 decades across the West (van Mantegem et al. 2009). This pattern is associated with increases in temperature and droughts, rather than fire history, stand density or insects (Ibid). Climate change only adds urgency to the need to stop old forest decline and fragmentation. Old forest adaptation to climate change depends on a regional restoration strategy with concrete, coordinated actions.

In 1992, public and political pressure forced the Forest Service to stop clear-cutting old growth trees. During the past 15 years, the agency has bolstered protection of its largest and oldest trees, but unfortunately current management guidelines for the Sierra Nevada still leave old forest ecosystems vulnerable to aggressive logging for a variety of reasons, including stand density reduction and financing the removal of smaller, less valuable brush and trees. Current Forest Service management plans for the Sierra Nevada rely on implementation of conservation strategies for species at risk that were never completed or implemented, and promised monitoring that was never accomplished. Maintaining landscape habitat connectivity is inappropriately left up to individual project managers and is rarely addressed at the project level. Furthermore, habitat networks for forest carnivores developed in the 1990s are not consistently being used. Old forest habitat connectivity is an essential part of old forest restoration that should be a higher priority in the region. This habitat should also be protected and managed to increase over time, free from economic pressure to serve as a source of funding. The Forest Service has generally backed away from treating old forest areas as ecological units deserving distinct ecological management, contrary to the best available science (USDA Forest Service and USDI Bureau of Land Management 1994, Franklin et al. 1996).

Restoration goals for these forests should allow natural disturbance agents to occur (Youngblood et al. 2006). Fire, insects and disease are key processes that help maintain important structure in old forests (Spies et al. 2006). A number of other authors describe natural disturbance regimes in old forests. Restoration plans should incorporate the natural range of variability for various functions and components of these systems.

Restoring old forests in the Sierra Nevada must also entail protection of the smaller cohorts of trees in the 20-30 inch diameter size-class to someday replace large trees, snags and logs. This becomes crucial in stands where the larger tree component has been logged and large trees, snags and logs are already missing from much of the landscape (North et al. 2007, North et al. 2009).

In summary, actions to protect and restore old forest conditions should be integrated with efforts to increase habitat connectivity, restore ecological processes such as fire disturbance and water purification, restore structural diversity, and reduce risk to species associated with old forests. There is great value in protecting large blocks of old forest habitat (USDA Forest Service 2001a, Volume 4, p. E-47), as well as remaining smaller patches and even individual trees. The best management strategy to maintain and expand old forests will prioritize delineation, connectivity, and explicit protection of structural elements at multiple scales (USDA Forest Service 1998). Disturbance regimes including fire, insect outbreaks, and disease are all important in creating complex forest structure (USDA Forest Service 1998). These processes should be allowed to operate within the natural range of variability. The forest plan revision is a strategic process to ensure lasting protection and proliferation of these rare yet essential habitats.

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 OF-1. Late-successional forests are well represented on the landscape and their distribution is driven by the range of variation of landscape patterns, disturbance processes, and interaction with climate change (Spies et al. 2006).

Desired Condition OF-2. Large, old decadent trees are well distributed throughout the landscape.

Desired Condition OF-3. Periodic disturbance resulting from natural events (fire, insects, disease, flooding) occurs at frequencies and scales that are appropriate for the vegetation type, soils, climate and geography of the site

Desired Condition OF-4. Late-successional forests are resilient to changing climatic condition, have the capacity to maintain natural ecosystem function, and provide a resilient carbon pool.

Desired Condition OF-5. The number of large snags and downed wood supports old forest-dependent species and protects and enhances soil productivity.

Desired Condition OF-8. Late successional and old-growth forests are inhabited by the full complement of species associated with or dependent upon these forests.

Desired Condition OF-9. High quality habitat for old-forest associated wildlife (such as California spotted owl, Northern goshawk, great gray owl, fisher, marten, Sierra Nevada red fox and wolverine) includes habitat to support their preferred prey species as well as mature forest to support productive breeding and rearing. Each of these species is well distributed throughout its historic range.

B. Objectives

Objective OF-1. Old forest emphasis areas are specifically designated and managed to protect and restore old forest conditions and support movement of associated species.

Objective OF-2. Stand-level structural definitions and density thresholds distinguish old growth that is maintained by frequent surface fires from more mesic or high-quality growing sites where old growth develops under long periods without fire (Spies et al. 2006 and 2004).

Objective OF-3. Ensure habitat connectivity for old forest associated species by managing large contiguous areas of late-successional forest linked by high capability habitat for dispersal (Franklin et al. 1996).

Objective OF-4. Fuel connectivity is interrupted by fuel reduction areas that create ecologically based heterogeneity to sustain old forest habitat for wildlife and promote resiliency of forests in the face of disturbance and climate change (Spies et al. 2006).

Objective OF-5. Identify areas for acquisition, exchange, or conservation easements to enhance connectivity of habitat for old forest associated species.

Objective OF-6. Maintain 50 percent of national forest lands in old forest conditions, with at least 30 percent of old forest patches providing dense, multi-layered canopy or other attributes appropriate to the forest type for old forest associated species.

C. Standards

Standard OF-1. Landscape analyses must specifically address the protection and restoration of old forest conditions and recommended actions are

integrated with efforts to increase connectivity, restore ecological processes, restore structural diversity, and reduce risk to species associated with old forests.

Standard OF-2. Create non-activity zones around snags and logs in active timber harvests to protect these ecological attributes and worker safety (Wisdom and Bate 2008).

Standard OF-3. Retain felled green or hazard trees as down wood when existing levels of down wood are below desired levels (e.g., sizes, amount, decay classes).

Standard OF-4. Limit access for firewood cutting to lessen snag loss in areas where snag standards are not met, and where valuable wildlife habitat should be protected (Wisdom and Bate 2008).

Standard OF-5. Implement the conservation measures in project level decisions for species at risk associated with old forests such as California spotted owl, goshawk, great gray owl, marten, fisher, Sierra Nevada red fox, and wolverine identified in Appendix A.

Standard OF-6. Identify old forest stands with continuous and dense fuel loading, and take measures to reduce fuel loads prior to reintroducing fire (Vosick et al. 2007).

Standard OF-7. Limit fuel reduction treatments in old forests or late-successional forests to reducing surface and ladder fuels with a focus on removal of shade-tolerant conifer trees (North et al. 2009).

Standard OF-8. In watersheds currently providing less than 20 percent suitable owl, goshawk and forest carnivore nesting and denning habitat, maintain all existing nesting/ denning habitat (USDA Forest Service 2001b) and do not degrade existing habitat conditions.

Standard OF-9. Land management activities in Old Forest and Connectivity (OFC; land allocation see Table IV.C-2) shall be designed to enhance, restore and not degrade high quality late-successional conditions.

Standard OF-10. On dry sites, maintain at least 40 percent canopy cover with at least 30 percent of treated forests retaining multiple canopy layers. On mesic sites, maintain at least 70 percent canopy cover with at least 30 percent of treated forests retaining multiple canopy layers. (USDA Forest Service 2001b).

Standard OF-11. Follow the vegetation management standards in the section on “Planning and Integration” (III.A., Standard PLAN-4).

Table IV C-1. Species associated with old forest habitats for which standards and conservation measures have been included in Appendix A.

Scientific Name	Common Name	Reason for Inclusion
Martes americana	American marten	Species at risk
Martes pennanti	Pacific fisher	Species at risk
Gulo gulo	Wolverine	Species at risk
Strix occidentalis occidentalis	California spotted owl	Species at risk
Strix nebulosa	Great gray owl	Species at risk
Accipiter gentilis	Northern goshawk	Species at risk
Dryocopus pileatus	Pileated woodpecker	Species of interest

D. Regionwide Land Allocations

Table IV.C-2. Land allocations targeting old forest systems and associated species.

Land Allocation	General Description	Management Objective
Protected Activity Center (PACs)	Designation around known nesting sites for California spotted owl (300 acres), northern goshawk (200 acres), and great gray owl (50-200 acres). Inclusion in PAC of area within 300 feet of structures is avoided.	Provide habitat conditions to support successful reproduction.
Home Range Core Area (HRCA)	Area around California spotted owl nest site and including the PAC. Size ranges from 600 acres to 2,400 acres depending on location in the Sierra Nevada.	Provide for high quality foraging habitat near to nest stands.
Forest Carnivore Den Sites	Den site buffer (700 acres for fisher; 100 acres for marten) designated around known maternal or natal dens.	Limit disturbance during denning (limited operating period). Retain habitat conditions that support denning. Limit vegetation management to reducing surface and ladder fuels to reduce fire risk until new science suggests otherwise. Restoration treatments do not remove larger WF/IC in these areas.
Old Forest and Connectivity (OFC)	Area in which old forest qualities are emphasized. Area critical to the movement and flow of species associated with all habitat types across the landscape. Designed as an adaptation to climate change and other stressors.	Restore ecological process where doing so does not threaten critical values. Maintain movement opportunities across the landscape.

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

- Restrict use of rodenticides at facilities approved under Special Use Permits and other Forest Service facilities.
- Work with state and county transportation agencies to improve wildlife passage on high use or high risk roads. Consider the following practices in a comprehensive program: 1) wildlife friendly road crossings, e.g., tunnels, culverts, overpasses; 2) vehicle speed control; 3) educational programs.
- Restrict outdoor feeding and free roaming of domestic pets at Special Use Permitted facilities and other Forest Service facilities.

Recommendations for New Regional Direction or Policy

- Evaluate the status and trend of old forest conditions since the Sierra Nevada Ecosystem Report (1996) by the end of 2012 (2009 RF letter). This forest ecology research summary should define the range of variability of stand density, mortality, as well as extent and intensity of natural disturbances (insects, disease, and fire of all intensities) in several common Sierra Nevada forest types.

- Forest plans shall incorporate analyses and recommendations from a science team evaluation of old forest associated species status and trends. Implement science-based conservation strategies for them before forest plans are finalized (2009 RF letter).

- Provide a framework for developing desired conditions for old forests for each forest to use in guiding plan development.

- Direct the adoption of an integrated and consistent approach to management of old forest types among national forests.

- Develop regional guidance for protecting old forest associated species and their habitat (including improving landscape connectivity).

- Develop regional guidance on snag retention and protection for green timber sales, salvage and hazard tree sales according to range of natural variability in old forests.

- Focus the allocation of funds from the Regional level to the national forest level on treatments that will increase forest resilience while enhancing wildlife habitat (same as fire section).

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

- Continuing education emphasizing emerging knowledge of forest ecosystems should be encouraged for land managers (Vosick et al. 2007).

Additional Recommendations

- State and federal forest managers and state and federal wildlife managers should design conservation measures together to retain key wildlife habitat features (Bunn 2007).

Table IV.C-3: Old Forest-Associated Species at Risk in the Sierra Nevada (USDA Forest Service 2001, USDA Forest Service 2007, California Department of Fish and Game 2011).

Species	Protection Status
American Marten	FSS, CSSC, MIS
Bald Eagle	FSS
Band-tailed Pigeon	SAR-M
Black Bear	SAR-M
California Condor	FE, CE, CFP
California Spotted Owl	FSS, MIS
Coopers Hawk	WL
Flammulated Owl	ACWL, BCC

Species	Protection Status
Fringed Myotis	CSSC / SAR-M
Great Gray Owl	FSS, CE
Harlequin Duck	CSSC
Horay Bat	CSSC / SAR-M
Long-eared Myotis	CSSC / SAR-M
Long-eared Owl	CSSC
Long-legged Myotis	CSSC / SAR-M
Mt. Pinos Sooty Grouse	CSSC
Northern Flying Squirrel	MIS
Northern Goshawk	FSS
Olive-sided Flycatcher	SAR-M, CSSC, ACWL
Osprey	WL
Pacific Fisher	FSS, FWBP, CSSC
Pallid bat	FSS
Sharp-shinned Hawk	WL
Sierra Nevada Red-fox	FSS, CT
Silver-haired bat	CSSC / SAR-M
Sooty Grouse	MIS, SAR-M
Townsend's/Pacific Western Big-eared Bat	FSS
Vaux's Swift	CSSC
Western Red Bat	FSS
Wolverine	FSS

FSS- R5 Forest Service Sensitive Species
SAR- USFS R5 Forest Service Species at Risk (M=moderate vulnerability, H= high vulnerably)
CSSC- California State Species of Special Concern
FE- Federally Endangered Species
WL- California Department of Fish and Game Watch List Species
MIS- Management Indicator Species
CT- California Threatened
FWBP- Federal "Warranted but Precluded"
CFP-California Fully Protected
AWCL- Audubon California Watch List Species

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