

Fire Management for Rare Plants and Animals

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Abstract. Wildfire threats to Tecate cypress and the California spotted owl are discussed. These species require some level of protection from wildfires in order to ensure their long-term conservation.

Keywords: Corridors; fire suppression; spotted owl; Tecate cypress.

Introduction

Rare plants and animals in southern California are increasingly confined to designated reserves and insular public lands. Adjacent land uses can alter natural fire regimes and affect fire management decision-making. Land managers should consider the effects of fire regimes on rare plants and animals, and fire management should be consistent with conservation goals. We use Tecate cypress in the northern Santa Ana Mountains and California spotted owls in the western San Bernardino Mountains as examples of rare species which could be adversely affected by human-altered fire regimes.

Tecate Cypress

Tecate cypress (*Cupressus forbesii*) is a closed-cone conifer occurring at a few sites in southern California and Baja California (Vogl et al. 1977, Skinner and Pavlik 1994). Mature trees are killed by fire but the stand is regenerated as seedlings establish in the post-fire environment. It requires fire to reproduce, but is vulnerable to over-frequent fire, and is locally eliminated if fire recurs before young plants produce seed (Zedler 1977). Dunn (1987) predicted that short fire intervals (1-25 years) would eliminate Tecate cypress from a site, moderate intervals (26-39 years) would probably eliminate it after an extended period (i.e., several fire intervals), and long intervals (≥ 40 years) should maintain populations at present levels. He rec-

ommended that "All management proposals for Tecate cypress populations should be geared toward maintaining fire frequencies within this range."

The State of California has purchased a Tecate cypress reserve at Coal Canyon, upslope from the Riverside Freeway (State Route 91) and a proposed residential development. The freeway and future development are likely sources of anthropogenic fire which could spread to the reserve at intervals much less than 40 years. Thus, existing and proposed uses on adjacent lands present a challenge to fire management in the reserve.

California Spotted Owl

California spotted owls (*Strix occidentalis occidentalis*) occur in montane forests in southern and central California. In southern California, montane forests are interrupted by unsuitable habitat (e.g., shrublands on lower mountain slopes) and, increasingly, by lands converted to human uses (Verner et al. 1992). Spotted owls can travel long distances through unsuitable habitat, and are sometimes seen far-distant from known populations (Garret and Dunn 1981). Low-elevation riparian forests may once have provided "corridors" between insular mountain ranges, but they have been heavily impacted in southern California (Bowler 1990). We are aware of no fully intact riparian corridors between southern California mountain ranges. Spotted owl numbers in the San Bernardino Mountains are in severe decline (Noon and McKelvey 1992, LaHaye et al. in press) and the region-wide "metapopulation" is largely dependent on populations in the San Bernardino Mountains and San Gabriel Mountains.

Cleghorn Canyon, in the western San Bernardino Mountains, supports breeding spotted owls in canyon live oak—bigcone Douglas-fir forests. Suitable habitat occurs nearly to the canyon floor, and is nearly contiguous with riparian habitat in Cajon Pass and Lone Pine

Canyon in the eastern San Gabriel Mountains. Thus, Cleghorn Canyon is well-positioned for owl dispersal between two nearly-isolated mountain ranges. Habitat connectivity at Cleghorn Canyon may be critical to region-wide spotted owl conservation. The site is a candidate U.S. Forest Service Research Natural Area, due largely to its potential function as a "wildlife corridor" (Tierra Madre Consultants 1994).

Canyon live oak—bigcone Douglas-fir forest resists wildfire but burns occasionally in stand-replacement fires (McDonald and Littrell 1976, Minnich 1980). Bigcone Douglas-fir cavities, shade, and vertical structure are important to spotted owl nesting habitat; it resprouts after fire but is killed by the most severe fires. Post-fire stands resemble chaparral for some 30 years before developing a closed forest canopy (Minnich 1980). Ages when stands become suitable for spotted owl breeding are unknown.

Canyon live oak—bigcone Douglas-fir forest at Cleghorn Canyon is upslope from the I-15 Freeway and adjacent to chaparral. Thus, spotted owl habitat is susceptible to frequent anthropogenic fire which would reduce its habitat suitability for many years, affecting potential dispersal between the San Bernardino Mountains and San Gabriel Mountains.

Fire Management Considerations

Long-term habitat management at both sites will require imposition of a managed fire regime designed to match requirements of rare species (e.g., Zedler 1982, Parker 1989). Near-complete fire exclusion is compatible with Tecate cypress and spotted owl demographics, but is an unrealistic goal. Wildfire will occur, and pre-fire planning should endeavor to minimize resource damage from unwanted fire.

Retaining Tecate cypress in the Reserve will necessitate fire management to (1) exclude fire until enough cypress seed accumulates to ensure stand regeneration, and (2) limit the spread of unwanted fire to minimize long-term damage to cypress populations.

Retaining suitable spotted owl nesting and dispersal habitat at Cleghorn Canyon will require (1) maximizing intervals between stand-replacement fires, (2) limiting spread of unwanted fire to retain dispersal habitat, and perhaps (3) preventing fire during most extreme conditions by planning fire during less extreme conditions.

Barriers to fire spread: Fire management should consider "greenstrip" vegetation (Pellant 1989) at each site's interface with freeways or future development to minimize likelihood of anthropogenic fire ignition or upslope spread to critical habitat. Nord and Green

(1977) assess some plants' suitability for such a greenstrip in southern California.

Pre-fire planning: Managers should prepare fire fighting plans in advance of wildfire. Pre-fire plans should identify sites where tractors or hand crews can work without damaging seed beds or soil resources and should provide specific strategies to prevent fire spread from ignition sites into critical habitat areas. During a fire, land managers must have access to the Incident Command System to provide input to firefighting strategy and assure that the pre-fire plan is implemented.

Managed fire regime: Since wildfire cannot be completely avoided, managed fire should be permitted under specific weather and vegetation conditions. Without such a policy, moderate-intensity fire will be extinguished under the suppression policy and only the most severe fires will escape suppression.

At both sites, fire management should recognize two or three management phases for post-fire vegetation development:

1. *Full suppression:* For a period after wildfire, recovering vegetation should not return. Fire exclusion and full suppression of fires that do occur is the most appropriate management strategy. For Tecate cypress this period is about 40 years. It is longer in spotted owl habitat.
2. *Let-burn:* Second, there should be a period where a "let burn" policy allows unsuppressed fire under specific conditions.
3. *Prescribed burning (?):* A third phase, during which prescribed fire might be needed, might also be recognized. Conceivably, these sites could go unburned for many years, even under a "let burn" prescription. This is unlikely given their locations adjacent to freeways. Even so, prescribed burning should be considered as a management tool if needed.

Work on Tecate cypress demography provide suitable guidelines for a site-specific fire management plan (Zedler 1977, Dunn 1987). In spotted owl habitat, we recommend managing oak forests and shrub lands at Cleghorn Canyon for fire intervals of at least 100 years (probably longer), and retain at least 30% of its acreage in mature condition at all times. Weatherspoon et al. (1992) recommend avoiding prescribed fire as a management tool for spotted owl habitat, and instead recommend using prescribed fire in adjacent chaparral to reduce the likelihood that chaparral wildfire might spread into canyon live oak bigcone Douglas-fir for-

ests, destroying spotted owl habitat. We concur with this recommendation, but caution against implementing a fire regime in chaparral that would convert it to non-native grassland; perhaps *increasing* the threat of fire in spotted owl habitat.

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Literature Cited

- Bowler, P.A. 1990. Riparian woodlands: an endangered habitat in southern California, pp. 80-97. In A.A. Schoenherr (eds), *Endangered plant communities of southern California*. Southern California Botanists, Fullerton. Special Publication No. 3.
- Dunn, A.T. 1987. Population dynamics of the Tecate cypress, pp. 367-376. In T.S. Elias (ed), *Conservation and management of rare and endangered plants*. California Native Plant Society, Sacramento.
- Garrett, K. and J. Dunn. 1981. *Birds of southern California: status and distribution*. Los Angeles Audubon Society, Los Angeles. 408 p.
- LaHaye, W.S., R.J. Gutiérrez, and H.R. Akcakaya. Spotted owl metapopulation dynamics in southern California. *Journal of Animal Ecology*. In press.
- McDonald, P.M. and E.E. Littrell. 1976. The bigcone Douglas fir-canyon live oak community in southern California. *Madroño* 23:310-320.
- Minnich, R.A. 1976. Vegetation of the San Bernardino Mountains, pp. 99-125. In J. Latting (ed), *Symposium proceedings: plant communities of southern California*. California Native Plant Society, Sacramento, Special Publication No. 2.
- Nord, E.C. and L.R. Green. 1977. Low-volume and slow-burning vegetation for planting on clearings in California chaparral. USDA Forest Service, Pacific Southwest Forest and Range Experiment Station, Research Paper PSW-124. 41 p.
- Noon, B.R. and K.S. McKelvey. 1992. Stability properties of the spotted owl metapopulation in southern California, pp. 187-206. In J. Verner, K.S. McKelvey, B.R. Noon, R.J. Gutiérrez, G.I. Gould, Jr., and T.W. Beck (eds), *The California spotted owl: a technical assessment of its current status*. USDA Forest Service, Pacific Southwest Forest and Range Experiment Station, General Technical Report PSW-GTR-133.
- Pellant, M. 1989. The cheatgrass-wildfire cycle—are there any solutions? pp. 11-18. In E.D. McArthur, E.M. Romney, S.D. Smith, and P.T. Tueller (eds), *Proceedings—symposium on cheatgrass invasion, shrub die-off, and other aspects of shrub biology and management*. USDA Forest Service, Intermountain Research Station, General Technical Report INT-276.
- Skinner, M.W. and B.M. Pavlik. 1994. *California Native Plant Society's inventory of rare and endangered vascular plants of California*, (Fifth edition). California Native Plant Society, Sacramento. Special Publication No. 1. 338 p.
- Tierra Madre Consultants. 1994. Cleghorn candidate research Natural Area: ecological survey and bioregional analysis. Unpublished draft report prepared for USDA Forest Service Pacific Southwest Forest and Range Experiment Station, Berkeley, California. 87 p.
- Verner, J., K.S. McKelvey, B.R. Noon, R.J. Gutiérrez, G.I. Gould, Jr., and T.W. Beck. 1992. Assessment of the current status of the California spotted owl, with recommendations for management, pp. 2-26. In J. Verner, K.S. McKelvey, B.R. Noon, R.J. Gutiérrez, G.I. Gould, Jr., and T.W. Beck (eds), *The California spotted owl: a technical assessment of its current status*. USDA Forest Service, Pacific Southwest Forest and Range Experiment Station. General Technical Report PSW-GTR-133.
- Vogl, R.J., W.P. Armstrong, K.L. White, and K.L. Cole. 1977. The closed-cone pines and cypresses, pp. 295-358. In M.G. Barbour and J. Major (eds), *Terrestrial vegetation of California*. John Wiley & Sons, New York.
- Zedler, P.H. 1977. Life history attributes of plants and the fire cycle: a case study in chaparral dominated by *Cupressus forbesii*, pp. 451-458. In H.A. Mooney and C.E. Conrad (eds), *Proceedings of a symposium on the environmental consequences of fire and fuel management in Mediterranean ecosystems*. USDA Forest Service, General Technical Report WO-3.