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Combining Silviculture and Landscape Architecture to Enhance the Roadside View

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Abstract

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On a high-quality site in the mixed conifer forest of northern California, understory and overstory vegetation along a 3-mile paved county road were manipulated to enhance the view for the traveler. Traditional silvicultural cutting methods and landscape architectural techniques were blended to give contrast and variability to the vegetation along both sides of the highway. Understory vegetation (hardwoods, shrubs, forbs, graminoids, ferns, conifer seedlings); saplings (hardwoods, conifers, shrubs); and trees (California white fir, sugar pine, coast Douglas-fir, incense-cedar, California black oak, ponderosa pine, and Pacific dogwood) were sampled before logging, after logging, after brush disposal, and 6 years later in 10 distinct visual segments along the road and in a control (untreated area). Measurements included density, foliar cover, height, basal area, and basal area growth. Plant diversity also was quantified. Major findings were that although the hardwoods and shrubs obscured about 25 percent of the view 6 years after brush disposal, the view is still vastly improved over what it was before. And with careful logging and other vegetation management, the roadside stand can yield both pleasing scenery and timber.

Retrieval Terms: landscape management, mixed conifer forest, northern California, plant community dynamics, stand growth, view enhancement

The Authors

Philip M. McDonald is a research forester, Pacific Southwest Research Station, Silviculture Laboratory, USDA Forest Service, 2400 Washington Ave., Redding, CA 96001.

R. Burton Litton, Jr., now retired, was a research landscape architect at the Pacific Southwest Research Station, Berkeley, Calif., and is professor emeritus of landscape architecture, University of California, Berkeley.

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R. Burton Litton, Jr.

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In Brief

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Retrieval Terms: landscape management, mixed conifer forest, northern California, plant community dynamics, stand growth, view enhancement

All too often, the forest roadside zone is a hands-off zone for timber harvest. Activities there are easily seen and subject to the traveler's scrutiny and positive or negative response. But this zone contains trees that are a valuable commodity, and scenery that is a valuable amenity. The two need not conflict. The zone also contains numerous shrubs and small trees that grow to the edge of the highway and limit the variability and contrast needed for a pleasing visual experience. In addition, the dense stand is a fire waiting to happen in the sense of being a large amount of fuel near a source of ignition (a burning cigarette from a passing motorist) with a fuel ladder straight to the top of tree crowns. And if the highway twists and turns, dense stands of trees impede visibility of oncoming traffic. Plainly, the typical forested roadside stand in northern and central California could use some forest management. But how to extract trees, remove view-blocking shrubs and smaller trees, provide pleasing scenery, and not lose the inherent character of the forest landscape? A critical question involves cost. Society has stated many times that it wants an enhanced esthetic quality to the forest (and roadside zone), but the question of how to cover the cost of making it attractive and maintaining that attractiveness is seldom addressed.

We quantified the initial cost in a previous paper (McDonald and Litton 1987). Enhancing the view and initiating forest management in the roadside zone with very careful logging and shrub removal techniques cost \$81,379. When allocated to the 176 acres in the travel influence zone, the cost was \$462 per acre or \$27,126 per mile for work on both sides of the 3-mile roadway in the study. About 5 million board feet of timber and 160 cords of fuelwood were harvested with a value of about \$450,000.

Research questions also abounded. How much of what species of vegetation came back after cutting? Was the species makeup the same? What happened to the remaining trees: did they die, did they grow? Answering these and other questions was the purpose of this study.

We began with a team made up of a research silviculturist, a research landscape architect, and National Forest foresters and crews. We also solicited input from the public before the study began. And we talked to the logger about the potential to unlock the roadside zone for timber yield. We got "one of the best logging jobs ever seen" according to several knowledgeable timber sale specialists.

We also gained some knowledge about plant community and stand dynamics. In terms of plant diversity, the harvesting and shrub removal operations had no major effect. Total number of plant species increased slightly, and no alien species were found. In the understory, the density and foliar cover of hardwoods, shrubs, forbs, graminoids, ferns, and conifer seedlings more than doubled between the before-logging and 6-years-after-brush-disposal plant communities. Density in the highest shrub-volume category after 6 years was 86,400 plants per acre; in the medium category, 51,121 per acre; and in the low category, 30,880 plants per acre. A major contributor to density was a ubiquitous forb. Corresponding heights of view-blocking hardwoods ranged from 3.9 to 11 feet. By the end of the study, we judged that about 25 percent of the view that we created had been compromised by vegetative regrowth.

In the overstory, many trees remained in the roadside zone—115 per acre; and much basal area also was present—253 square feet per acre. Almost 53 percent of the trees and 27 percent of tree basal area were removed in logging and brush disposal. In spite of this reduction, no species gained or lost more than 7 percent of stand density or more than 5 percent of total stand basal area. And no diameter class gained or lost more than 13 percent of trees or 11 percent of basal area. Ingrowth of new trees greater than 3.5 inches in diameter at breast height was in balance with mortality. Six-year basal-area growth of residual trees ranged from 7 to 10 percent for the high, medium, and low before-logging basal-area categories and 4 percent in the control (untreated area).

Overall, the removal of merchantable trees and unmerchantable trees and shrubs was best characterized as “gentle.” The traveler could tell that some vegetation had been removed, but the overall impression of the landscape was retained. Most important, the view was much improved over that before logging and brush disposal in spite of vegetative regrowth in places. And the forest roadside zone yielded some timber and became less prone to wildfire.