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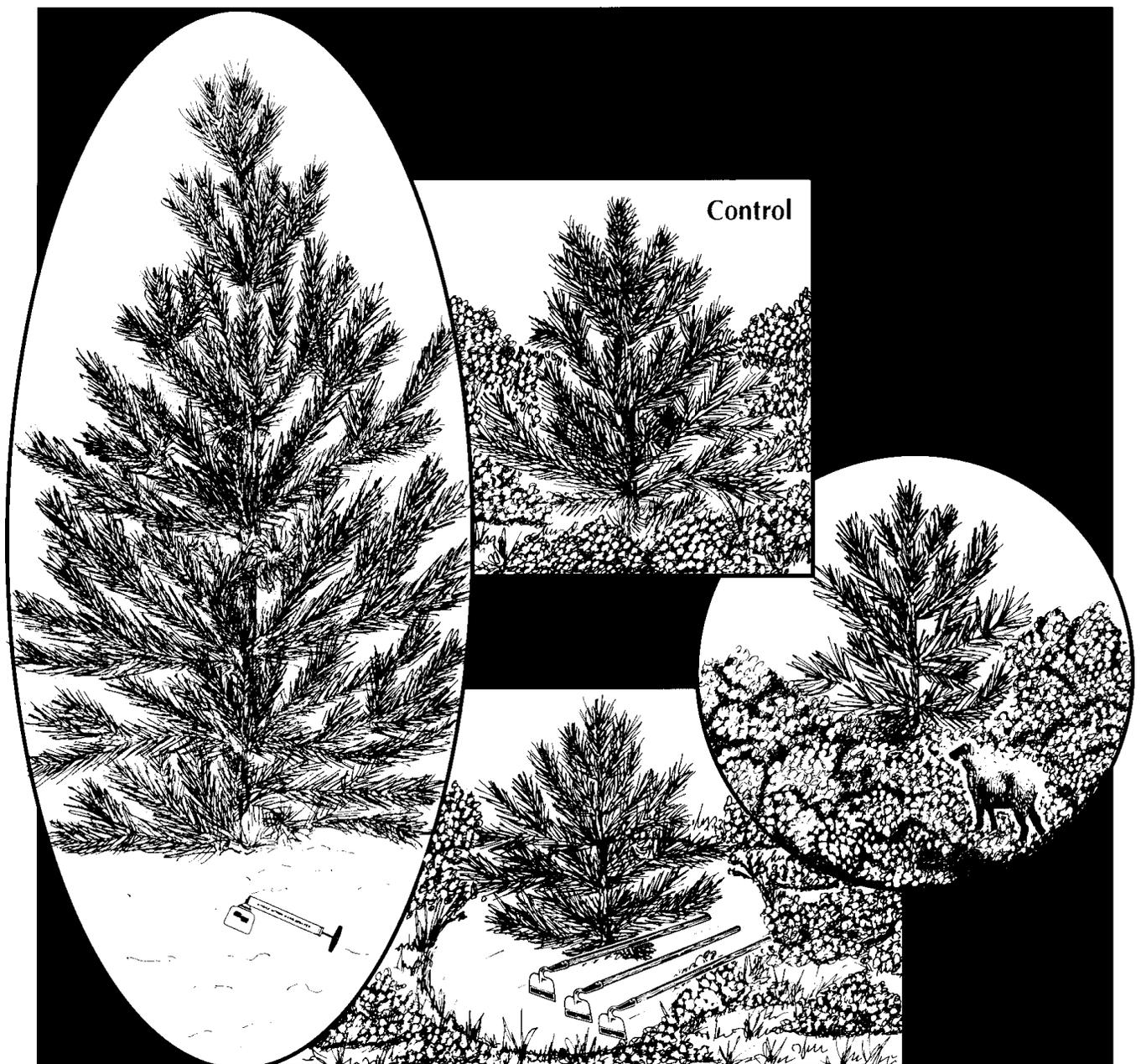


# Vegetation Trends in a Young Conifer Plantation after Grazing, Grubbing, and Chemical Release

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**Abstract**

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A 3-year-old Jeffrey pine (*Pinus jeffreyi* Grev. & Balf.) plantation in northern California was released by grazing with sheep for 5 years, manual grubbing for 3 years, and applying a herbicide 1 year. These treatments plus an untreated control provided an opportunity to evaluate density and developmental trends for the pine, shrub, and grass components of the plant community during 1986-1994. Creating a near free-to-grow condition by applying Velpar herbicide modified the plant community by controlling the shrubs, reduced cheatgrass in the second and third years, and caused mean pine diameter, foliar cover, and height to be significantly greater than counterparts in all other treatments. Grazing caused two significant, but opposing changes in the plant community. Nipping of twigs by sheep stimulated foliar cover of snowbrush to more than three times that of similar plants in the control. Grazing significantly reduced greenleaf manzanita cover. Grubbing a 4-foot radius around pine seedlings, and grazing with sheep did not increase Jeffrey pine development relative to the control. Because of this ineffectiveness, the efficacy of grazing as a silvicultural tool is questioned and suggestions for its betterment are presented.

*Retrieval terms:* density, development, grasses, pines, sheep, shrubs

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## In Brief

A major development in managing natural resources is the increasing emphasis on ecosystems and the many species in the plant community. Much needs to be learned about the shrubs, forbs, and grasses that currently have no recognized value. Key to this need is the realization that each species has intrinsic worth, not necessarily for wood or wood products, but as food for wildlife, to fulfill the variety and contrast requirements of pleasing scenery, or as components in ecosystems that the manager wishes to sustain or enhance. This study, conducted in northern California in 1986-1994, provides some knowledge on the species composition and early development of a pine plantation and the plant community that ensued after a wildfire. An untreated control, manual grubbing, herbicide application, and grazing with sheep provided a wide range of treatments and an opportunity to study the density and development of planted pines, shrubs, forbs, and grasses in a natural and manipulated condition.

The early natural plant community that developed after the wildfire was composed of snowbrush, greenleaf manzanita, several grasses, and more than 20 forbs. Planted Jeffrey pines and invading cheatgrass soon became major components of this community. By study end in 1994, total plant density in the control was more than 189,000 plants per acre, 97 percent of which were cheatgrass. Total foliar cover was 49 percent, a proportion that recognizes the small contribution to aboveground biomass typical of grasses.

For treated plots, plant density and cover varied significantly. If the treatment was the soil-active herbicide, Velpar, applied to the full 0.5-acre plots, plant competition was reduced and the pines developed significantly better in diameter, foliar cover, and height than seedlings in other treatments. Less competition for critical site resources, and specifically a low number of shrubs and grasses for the first 3 years, are the likely reasons. When the treatment was manual grubbing a 4-foot radius around Jeffrey pine seedlings for the first 3 years of the study, the density of greenleaf manzanita and forbs was larger than in any other treatment, although not significantly so. Development of pine seedlings in the grubbed treatment did not differ significantly from counterparts in the control.

For grazed treatments, little effect of foraging by sheep for the first 5 years of the study was found. Of note was that the sheep actually stimulated snowbrush plants to develop significantly more cover than in any other treatment. More cheatgrass resided in grazed plots although it did not differ significantly among treatments. Pine seedling development in grazed plots did not differ significantly from seedlings in the control.

Because results from this and another grazing study in northern California showed no significant improvement in pine seedling development, the use of grazing as a silvicultural release tool should be questioned. As currently practiced, grazing with sheep does not meet critical tenets of vegetation management. Competing vegetation is not being manipulated soon enough or strongly enough to be effective. Some suggestions for enhancing grazing as a silvicultural release tool are presented.

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