

Rehabilitation of an Oak Planting Project on Cleared Rangeland Using Treeshelters and Grazing: A Ten-year Saga¹

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On a 2-hectare site at the Sierra Foothill Research and Extension Center near Marysville, California, 1,440 blue oaks (*Quercus douglasii*) were planted during 1990-91 in an attempt to re-vegetate an oak woodland that had been almost totally cleared for cattle grazing during the mid-1960s. This initial planting of acorns, 4-month old seedlings, and 1-year-old bare-root plants was aggressively depleted by mainly grasshoppers (*Melanoplus devastator*) and rodents (*Microtus californicus*). After 2 years we replanted areas that had experienced total mortality with treeshelter-protected acorns and seedlings. In another remediation effort we selected pairs of stunted survivor seedlings (average height 16 cm) and retrofitted one of each pair with a treeshelter to test if this would be an effective way to increase height growth and survival. In 1997 we divided our planted area into two parts separated by electric fence and grazed one part, leaving the other part ungrazed. This was an attempt to discourage rodent predation which continued to be exacerbated by dense annual grass cover resulting from the exclusion of grazing, which had been our practice when the project was initiated. Using cattle to reduce rodent cover also provided an opportunity to test the effect of grazing on our re-vegetation effort. Our remediations employing treeshelters have resulted in sapling-sized trees (average height of ungrazed vs. grazed = 2.1 vs. 1.9 m), while those unprotected remain in stunted condition (average height of ungrazed vs. grazed = 0.5 vs. 0.3 m). Cattle grazing for short periods in winter and spring has done only minor damage to treeshelters, minor to moderate damage to the oaks after each grazing exposure, and reduced rodent cover and rodent damage dramatically. There is now almost no rodent damage to oaks in the grazed area, but this benefit of grazing has been offset by lesser growth of our grazed trees. The cumulative impact of several years of minor browsing of trees in the grazed area has reduced their crown volume, as compared to the apparent larger crowns of our ungrazed trees, and probably results in the significantly smaller height and girth observed in our grazed trees.

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