

BEST PRACTICES FOR REGENERATION OF CALIFORNIA BLUE OAK (*QUERCUS DOUGLASII*)

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PURPOSE AND SCOPE

In the 1900s, rangeland managers often cleared, removed, and burned trees from heavily wooded pastures to increase forage production for cattle grazing. Forestry and rangeland managers are now interested in restoring native rangeland. However, successful regeneration strategies for California blue oak (*Quercus douglasii*) are not well documented in scientific literature. The objective of this demonstration was to test and identify effective management strategies, including seedling source, shelter type, and vegetation control, for seedling growth and survival of California blue oak. This study was implemented to observe the most effective regeneration practices through annual monitoring and to develop a best practices module over time to share with community and industry stakeholders.

METHODS

Approximately 6,000 individual planting sites on 17.8 ha of previously cleared rangeland were prepared for this demonstration. Planting sites were spaced in rows 5.5 m apart and equipped with a gravity fed irrigation system to supply 2 L of water per hour once per month during the dry season. Acorns were harvested on site and stored until planting. Additionally, seedlings were procured from a local nursery to be planted during phase one. All seedlings and acorns were initially sheltered with a 46 cm plastic cone once planted. When seedlings exceeded the cone height, cones were removed, and the seedlings were placed into one of several shelters. Vegetation between and among tree rows was managed through herbicide application and mowing. Individual sites were monitored once per year, to assess survival of seedlings, shelter type, and seedling heights.

FINDINGS AND IMPLICATIONS

After 4 years of planting, maintenance, and data collection, approximately 64 percent of all seedlings survived. Although intensive, several management strategies tested appear to aid in the survival and success of blue oak seedlings. One of the primary setbacks to natural blue oak regeneration is predation by

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browsers, and small rodents (McCreary 1990). Implementing several varieties of shelter to young seedlings, including various Tubex (Tubex, South Wales, UK) and 4-foot-tall wire cages, provided protection for seedlings compared to cone shelters. Seedlings sheltered with a Tubex exhibited rapid vertical growth, and seedlings in a cone or cage appeared larger in diameter. The average height of a seedling sheltered in a Tubex was 1.5 m compared to 0.9 m when sheltered with a cage. In addition to shelter, vegetation management played a critical role in survival of the seedlings by decreasing habitat for small rodents around planting sites. However, 41 percent of overall seedling deaths (786 seedlings in 2023) were still attributed to gophers and voles. This demonstration has implications for landowners who are interested in restoring oaks on native rangeland and provides a starting point for management strategies in both small- and large-scale regeneration. The Sierra Foothill Research and Extension Center plans to execute additional oak regeneration projects at this site and utilize it as a hands-on space for workshops and demonstrations in the future.

LITERATURE CITED

McCreary, D.D. 1990. Native oaks—the next generation. *Fremontia*. 19(3): 44–47.