

RESTORATION



II



Restoration of Oak Woodlands¹

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Restoration is defined as bringing something back to a former or normal condition. Interest in the restoration of hardwood rangelands in California arose primarily because tree removal was changing the normal condition of many of these lands. Firewood harvesting, agricultural conversions, range clearing, and residential and commercial development were, and are, the main activities causing woodland loss. On some hardwood rangelands where mature trees were not being removed, there was concern that the woodland character of these lands would also eventually be altered because several species of native oaks were apparently not regenerating well. It was feared that without adequate regeneration, these wooded landscapes would convert to grasslands or brushy hillsides, and a whole suite of ecological values associated with these areas would be adversely affected.

At the time of the first Oak Symposium in 1979, research on oak regeneration and restoration was in its infancy. There were several papers in the Proceedings (Plumb 1980) that dealt peripherally with factors that may inhibit natural regeneration, and a paper on current practices for propagating oaks, but no reported studies on planting of oaks or the restoration of oak woodlands. During the second Oak Symposium in 1986, several papers specifically addressed the reasons for poor regeneration. By this time, researchers had started evaluating different approaches for planting acorns and oak seedlings. However, as reported in the Symposium Proceedings, (Plumb and Pillsbury 1987), early efforts to replant or restore degraded areas were difficult and often unsuccessful. The same factors that inhibited natural regeneration also prevented the establishment of artificially planted seedlings.

By the time of the third Oak Symposium at Davis, California, in 1990, interest and research in the natural and artificial regeneration of California oaks had expanded dramatically, and the emphasis had shifted from understanding what was causing poor natural recruitment to determining how to artificially regenerate oaks. An entire session, comprising 17 papers, was devoted exclusively to the regeneration and restoration of hardwood rangelands. These papers dealt with a wide range of subjects from how genetics and acorn size affect field performance to how to plant, maintain, and protect seedlings in the field. As reported in the Conference Proceedings, these studies indicated that artificially regenerating oaks was difficult, but seedlings could be successfully established if plantings were intensively managed. Browsing, herbivory, moisture competition, and acorn depredation were a few of the more common problems that could be overcome with sufficient site preparation, seedling protection, and seedling maintenance. These early research projects also focused almost exclusively on blue and valley oaks, the two species most commonly identified as regenerating poorly in portions of California.

The papers presented in the restoration session in this Symposium expanded on information from the Oak Symposium in 1990 and demonstrated that we have come a long way in developing successful approaches during the past decade.

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The two factors most critical to seedling survival—plant competition and animal damage—can be prevented through various weed removal and seedling protection practices. Although growth is often extremely slow in natural or "volunteer" seedlings, planted oaks can grow rapidly if well-adapted, vigorous plant material is used, and sufficient protection and maintenance are provided during and after planting. This provides an opportunity to get seedlings quickly to the sapling stage, where they will be less vulnerable to browsing pressures which can keep natural seedlings stunted for years.

The papers in this session also indicated that researchers are now interested in developing restoration strategies for more than just blue and valley oak and are evaluating practices for restoring California black oak, Oregon white oak, and coast live oak as well. Even though these species may be regenerating adequately over most of their range, there are situations in which specific factors are limiting their ability to replenish themselves. There is also interest in developing approaches that will work in a wide range of environments, from intensively developed urban landscapes, to isolated, wildland settings.

The challenge for the future extends beyond learning how to successfully plant a given species of oak on a given site. By and large we know how to do that now, although the approaches we have developed are still fairly costly and/or labor intensive. Because of this high cost, it is unlikely that private landowners will undertake large-scale restoration without some financial incentives or more cost-effective methods. In addition to lowering costs, what we need to understand better now is how to restore plant communities, including not only the trees, but associated understory plants as well. Beyond that, we need to know whether these communities can naturally reproduce and sustain themselves so that they will continue to provide habitat for the myriad of wildlife species dependent on them. This is no easy or short-term task. Future research, and the sharing of experimental findings through proceedings such as this, should help make this goal a reality.