

Stewardship of our Oak Woodlands by John Hopkins

A great many landowners up and down California are careful stewards, protecting and enhancing the overall health of their lands for both present and future generations. This article outlines what is involved in stewarding California's oak woodlands and oak savanna.

The main focus of this article is on key wildlife habitat quality variables, perpetuation of oaks, and protecting stream water quality. Birds figure more prominently here than other vertebrates because they are more easily seen.

Stewardship Goals

Key stewardship goals are to conserve and enhance natural resources, including the condition of vegetation, wildlife and water quality, and to ensure the long-term sustainability of any resource use, such as livestock grazing or firewood collection.

Habitat Variety and Wildlife

There are about 110 species of birds that breed in California's oak woodlands, although only a fraction of these are common. Another 60 or so species use oak woodlands outside the breeding season, either as winter visitors or as migrants. In addition, 105 mammal species, 58 amphibians and reptiles, and an estimated 5,000 species of insects use oak woodlands. There are also a variety of other trees, shrubs and flowering plants.

Which of these species appear on your property depends on your location, the oak species and woodland densities that you have, whether you have some critical habitat values, and the presence of other habitats such as grasslands and chaparral scrub. Your management approaches, including livestock grazing regimes, recruitment of young oaks, use of firewood, positioning and upkeep of roads, and use of prescribed fire, have fundamental impacts on the ecological health of your property and so affect which species you attract. Finally the size of your property and adjacent natural lands, the degree of development and linkages across the larger landscape of your region all affect which wildlife species can thrive on your property.

Different wildlife species use different types of oak woodland habitat, so a property with more than one type is likely to be richer in wildlife. For example, canyon live oak stands on moister, northern slopes are prime habitat for salamanders, which utilize the persistent layer of humus. Western fence lizards by contrast, like dry blue oak woodlands, as do birds like the white breasted nuthatch and the western bluebird. Other birds, such as Hutton's vireo and the orange crowned warbler, prefer interior live oak stands.

Some species will vary their habitat according to the time of year. Thus the Nuttall's woodpecker prefers blue oaks for breeding, but then utilizes additional trees species for the rest of the year.

Birds that glean insects from the foliage of deciduous blue and valley oaks must go elsewhere during the winter - some shifting to interior live oaks. Several bird species, such as the ruby-crowned kinglet and the hermit thrush, are winter visitors to blue oak woodlands, spending summers higher in the mountains.

Acorn woodpeckers are much more likely in an area where there are multiple species of oaks than if there is just one species, and they are only common when there are five or more species. This is partly because they rely heavily on acorns, and crops vary from year to year and species to species. Acorn woodpeckers have a number of granary trees, where they bore holes for storing acorns.

The density of oak trees will also impact wildlife. Stands that still have gaps in the canopy tend to be richer in wildlife than stands with a complete canopy. Oak savanna, with only scattered trees, is home to a variety of grassland birds that do not occur in oak woodlands.

Many oak woodland properties have a mosaic of woodland, savanna, grassland and chaparral scrub. All these habitat types are important, providing habitat for different species. Chaparral, for example, is excellent habitat for many small mammal species and some birds, while several songbirds and hawks utilize grasslands. In addition, a number of species use different types of habitat for different purposes. For example, they may feed in oaks, but use dense shrubs for cover.

Snags, Cavities and Downed Wood

The presence of standing dead trees, known as snags, cavities in trees, and downed wood lying on the ground is essential for attracting many wildlife species. Managing your oak woodland so that it provides these items now and into the distant future is important for maintaining ecological health.

Many oak woodland wildlife species, including a third of the birds, use snags. An oak woodland should have at least one snag per two acres to provide optimum wildlife habitat. A supply of older trees ensures that there will be a supply of snags in the years ahead. In some Sierra Nevada locations, north facing stands of interior and canyon live oaks provide nesting habitat for the California spotted owl. Here a very high density of snags, such as 14 per acre, appears helpful.

In addition, cavities in trees are essential nesting sites for a number of birds. Acorn and Nuttall's woodpeckers can make their own cavities, but most species, such as the western bluebird, rely on natural cavities, or holes made by woodpeckers. Older trees with large branches develop cavities and will have additional woodpecker cavities. Young trees usually do not have cavities.

Acorn and Nuttall's woodpeckers are keystone species because they make these cavities. Their presence provides a much greater likelihood of number of other species, in this case the various cavity nesting songbirds, breeding on your property. The European starling, in contrast, has a

negative impact on cavity nesting birds as it successfully competes for the nest sites. Starlings are more common near human development, so larger undeveloped properties are particularly useful for native cavity nesting birds.

Branches and smaller limbs fall down from time to time, especially from large old trees. Snags also topple eventually. These provide a supply of downed wood which is essential habitat for at least 80 oak woodland vertebrate animals, including many amphibians, small mammals and reptiles. It is important to wildlife that you retain this downed wood on your property and let it slowly decay, rather than clearing it all up to use for firewood.

Ensuring Recruitment of New Blue Oak Trees

While several oaks, such as the coast live oak, show no problem with the development of young trees, blue and valley oak stands have few or no saplings and young trees in many locations. This problem has existed since the end of the nineteenth century and there are locations where all the oak trees are medium or large sized and over 100 years old. By contrast, there was a low but continuous level of development of blue oak trees before the Gold Rush. If this situation is not corrected, the oaks will disappear eventually from many locations and be replaced by grasslands.

The causes of the failure of blue oak recruitment are complex and not fully understood. But it is clear that the successful transformation of an acorn into a small blue oak tree is a complex process that only takes place under certain conditions and is inhibited by various factors. And in many areas, the problem is not the production of seedlings from acorns, but the development of saplings and young trees.

Seedlings appear under or near to the parent blue oak trees. Seedlings are rare in open ground away from the oak trees, even though animals like the scrub jay could transport acorns there. These seedlings will not grow into saplings as long as they are shaded by mature trees. Instead they remain as small plants for a number of years, and ultimately die. But if the parent tree dies or is cut down, the seedlings respond to the additional light by growing into saplings. Eventually one or a few new oak trees develop under normal conditions. Saplings are most common in areas with 20 to 50 percent canopy cover. It can take 10 to 30 years for a blue oak to reach five feet in height, growing beyond the browse line and becoming a small tree rather than a sapling.

The maintenance of seedlings, and the growth of saplings under suitable conditions, is impacted by a number of factors. The non-native annual grasses which now dominate our landscape drain the soil of moisture and inhibit the establishment of seedlings. Heavy browsing by deer and some rodents will destroy seedlings. And heavy livestock grazing, especially when the animals have little green grass to eat and the oaks have leafed out, has the same effect.

Key steps for obtaining blue oak recruitment where canopy gaps occur include:

- Minimize livestock grazing in a recruitment area until saplings get above the browse level. Early season grazing will be much less of a problem;
- reduce seedlings' competition for moisture with annual grasses;

- light prescribed burns of grasses may aid saplings, which will resprout after fire, by reducing moisture competition and recycling nutrients.

A further complexity is that younger blue oak trees can regenerate after a fire, dying back and then resprouting from the base to give multi-trunk trees. Before European settlement fires occurred regularly because of lightning and Native American land management. In the early years after the Gold Rush there was a higher fire frequency in some areas, resulting in stands of regenerated oaks that are 120-140 years old. While prescribed burns were routinely used on ranchlands in the few decades of the 20th century, fire suppression has been the rule since the 1950s.

Artificial Blue Oak Recruitment

Some landowners may wish to aid nature by planting acorns or seedlings to obtain growth of new trees. Areas that have converted from oak woodland to grassland would seem to be prime targets for this approach, as new blue oaks will not grow here naturally. In some locations there are areas that were subjected to intensive removal of trees and shrubs and now suffer from soil erosion, leading to degraded land and degradation of streams.

However, the problems affecting natural recruitment of blue oaks will also impact your plantings. If you do wish to try, here are some key steps to follow.

- Use local acorns, and harvest them from trees when they are just starting to turn brown. This will ensure that you have acorns genetically suited to your site and that they have not been desiccated or partially eaten by insects. Store acorns in the fridge (not frozen) for up to a few months.
- Plant when the first significant winter rains occur.
- Using an auger, loosen the soil three feet below the surface to aid rapid root growth. Add some slow release fertilizer.
- Plant one or more acorns, one inch below the soil surface.
- During the first two growing seasons, treat the area for three feet around the seedling to remove annual grasses and weeds that would compete for moisture.
- Use a tree shelter sleeve to protect the seedling from browsing by wildlife and livestock. If livestock use the area, you will need to use a strong steel post to support the treeshelter.
- Irrigate occasionally during the first two summers.

Recruitment of Other oaks

Valley oaks also suffer from a lack of natural recruitment. In addition, California has lost virtually all of its presettlement, valley oak woodlands. So the development of young valley oak trees, expansion of remaining woodlands and establishment of new woodlands is extremely important.

Artificial planting of valley oaks in historic sites with rich bottom land soils is an effective way to re-establish valley oak woodlands.

Competition for moisture seems to be a major factor in lack of valley oak recruitment. Weed removal and some irrigation for the first two seasons improves success a great deal.

Coast live oaks will regenerate in woodlands, especially if there is a shrub understory, and also in shrubby areas. There is little recruitment of these oaks in grasslands. Other live oaks also do not have a recruitment problem at present.

Streams and Riparian Areas

Streams, creeks and their associated land vegetation are especially important for wildlife, with over 90 percent of oak woodland wildlife species using riparian areas. The condition of streams also impacts downstream properties. Riparian or streamside vegetation consists of trees and shrubs that are adapted to higher water tables and to periodic flooding. It often provides lush growth and is home to the widest array of wildlife species. And a lack of streamside or riparian vegetation will affect both your property and surrounding ownerships as it will reduce the stream's biota. Soil erosion sedimentation will impact downstream reaches of a waterway, including downstream property owners. Excessive water diversions will impair downstream water quality.

Riparian vegetation is absent or much reduced across much of California. Conservation and re-establishment of this ecosystem is one of the easiest ways to aid wildlife. The historic riparian vegetation on your property would depend on conditions. Small ephemeral, or even perennial, streams in hilly blue oak woodlands may have had very little riparian vegetation. Streams in flat valleys may have had much more extensive riparian areas, and also meandered to and fro across the landscape over time, creating a more complex and rich vegetative structure .

Riparian vegetation provides numerous benefits to streams. It provides habitat for wildlife that uses both water and terrestrial ecosystems. Examples are birds like the belted kingfisher and the green heron, and the all important aquatic invertebrates that provide food for fish. Many of these invertebrates use dry land, such as the stems of riparian plants, for part of their life cycle.

The streamside vegetation also provides shading for streams, which lowers summer temperatures, and a steady supply of nutrients, both important attributes for fish. Large logs falling into the stream provide an essential component of stream architecture in many areas – allowing formation of slow moving ponds and riffles, as well as providing habitat sites for invertebrates.

Riparian areas contain a rich mix of trees, including valley oaks, cottonwoods, willows, sycamores and box elder. There are also a variety of understory shrubs and vines like the California wild grape. Some riparian areas, especially after a recent flood disturbance, have willow scrub. It is important to protect areas of riparian vegetation on your property.

Riparian trees are fairly easy to plant. Valley oaks will grow from planted acorns. You can plant cut sections of young cottonwood stems in moist soil and they will root readily. Seedlings of other trees and shrubs will also establish readily.

Seasonal flooding is an important ecological process for riparian areas. It delivers fresh soil and nutrients and increases the vegetative complexity by destroying patches of vegetation. The seeds of several species, like cottonwoods, only germinate in fresh, bare silt after a flood. By having a mosaic of patches with different stages of plant growth in your riparian areas, you will provide habitat for additional species of wildlife.

Protection of streams from erosion and pollution is a key management action. Heavy livestock grazing that removes riparian vegetation and breaks down banks, eroding hillsides, and nearby roads and development all degrade streams and their water quality. Riparian vegetation protects the waterways from these impacts. A hundred foot vegetated buffer strip, for example, is sufficient to remove nearly all run-off pollution.

Managing Roads

The roads on your property can have a major impact on water quality of streams and ponds. Excessive run-off can cause soil erosion and even gulying. Road crossings of streams, even very small ephemeral water courses, will result in erosion if they are not designed well. In some areas of California the major water quality problem stems from roads punched into wildlands for access to new houses. Road design and maintenance issues are beyond the scope of this booklet. However you can obtain a very useful publication from the Mendocino County Resource Conservation District (see Further Reading.)

Grazing

Cattle grazing is prevalent on many of California's oak woodlands. Private ranchland is the mainstay of conserving the state's woodlands, grasslands and chaparral scrub. Ranchers up and down the state practice wise stewardship of their lands that maintains and enhances habitat quality, conserves soil, and protects water quality. *Grazing for Change*, a recent publication by the California Cattlemen's Association highlights a number of success stories (see Further Reading.)

Most working ranches are very large properties as it takes thousands of acres to have a degree of economic viability. Smaller properties can benefit from careful grazing through a leasing operation. The key is how grazing is managed. One successful approach in the American West is to utilize intensive but very short duration grazing, which requires frequent movement of cattle. In addition, as discussed above, it is important to avoid or minimize the impacts of cattle on streams and riparian areas. This will likely require the establishment of water troughs or stock ponds in upland locations.

Fire

Oak woodland property owners are well aware of the dangers of catastrophic wildfire. They know the importance of maintaining 100 foot defensible space around buildings. Two other fire

issues are reduction of catastrophic fire danger at the landscape level and use of prescribed burns. Annual grazing will help to reduce the fire danger by reducing the volume of grasses. Sometimes dense, old thickets of chaparral scrub need mechanical removing, although it is important to maintain this scrub ecosystem on the overall landscape as it is essential habitat for many wildlife species and many native plants.

It is important to distinguish between very hot burning catastrophic wildfires, which pose a huge threat to people and property and also cause ecological damage, and cooler, more frequent fires that provide ecological benefits and reduce the threat of catastrophic fire. Before the twentieth century periodic fires were the norm across much of the state and many California ecosystems are adapted to fire. Some plant species are fire dependent, with their seeds only germinating after a wildfire. Examples are the closed cone pine species of the coastal mountains and a variety of annual wildflowers like the fire poppy. Prescribed burns, set and managed by agencies like the California Department of Forestry and Fire Protection, can both reduce the threat of catastrophic fire and provide important ecological benefits.

Stewardship and Economics

Careful stewardship of your property that enhances wildlife values, protects the soil and allows suitable economic activity will increase the value of your property and provide for the well-being of future generations. If you wish to see the bulk of your property maintained in its natural state over the long term, you can explore establishment of a conservation easement on your land. This involves identifying a suitable conservation entity to whom you sell or donate the development rights for all or part of your land. Possibilities include local land trusts and the California Rangeland Trust, a non profit organization established by the California Cattlemen's Association to further conservation of the state's rangelands. Wise stewardship of your land, with enhancement of wildlife habitat, may well increase the value of a conservation easement.

Planning for Your Property and Getting Help

Setting your own goals and developing a long term management plan for your property is an important stewardship function. You can obtain a very helpful book from the Integrated Hardwood Range Management Program at the University of California, Berkeley (see Further Reading.) County University of California Extension Offices and your local office of the California Department of Forestry and Fire Protection can provide advice and assistance. The California Department of Fish and Game and the U.S. Department of Agriculture's Natural Resource Conservation Service have various programs to assist landowners, including various forms of financial assistance for habitat enhancement.

Working with Other Landowners

The larger landscape beyond your property is important for a variety of issues. These include water quality, reducing the danger of catastrophic wildfire, and conserving wildlife corridors and linkages. In many parts of the state there are cooperative activities such as watershed

management projects, involving the landowners of a given area. These projects allow for consensus based planning of enhancements and in some cases provide landowners with funding to carry out conservation activities. Contact your local Resource Conservation District for details on any cooperative projects in your area.

Further Reading

General

Bakker E (1984) *An Island Called California : an Ecological Introduction to its Natural Communities*. University of California Press.

Daily G, ed (1997) *Nature's Services : Societal Dependence on Natural Ecosystems*. Island Press.

Keator G (1998) *The Life of an Oak*. Heyday Books / California Oak Foundation.

Pavlik B.M. et.al (1991) *The Oaks of California*. Cachuma Press / California Oak Foundation.

Management

Tinnin P. (1996) *Guidelines for Managing California's Hardwood Rangelands*. University of California Integrated Hardwood Range Management Program.

Roads

Weaver W and Hagans D. *Guide for planning, designing, constructing, reconstructing, maintaining and closing wildland roads*. Mendocino County Resource Conservation District.

Grazing

Chaney E et.al. (1993) *Managing Change : Livestock Grazing on Western Riparian Areas*. U.S. Environmental Protection Agency.

Macon, D (2000) *Grazing for Change : Range and Watershed Management Success Stories in California*. California Cattlemen's Association.

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