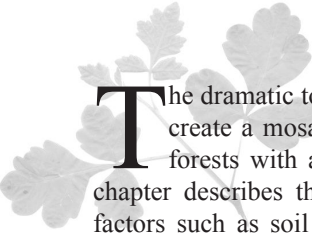


# Plants



The dramatic topography and varied geologic strata of the Quail Ridge Reserve create a mosaic of grasslands, woodlands, chaparral, and closed canopy oak forests with a rich mixture of trees, shrubs, native grasses, and herbs. This chapter describes the plant communities of the Reserve, and how environmental factors such as soil type, slope, and aspect interact to influence plant distribution across the landscape.

Like all of the California Floristic Province, the Quail Ridge peninsula has a Mediterranean climate with hot, dry summers and cool, wet winters. The peninsula lies in a pronounced rain shadow in the Inner Coast Range, with average annual precipitation of about 70 cm (27.4 inches) and summer heat that reaches 40°C (104°F). As in all Mediterranean-climate regions, the woody vegetation is dominated by trees and shrubs with small, leathery leaves that minimize water loss. Most of the herbs are ephemeral spring annuals.

Quail Ridge's most outstanding botanical feature is its abundance of native perennial bunchgrasses. In most of California's lowland habitats, exotic annual grasses from the Mediterranean region have displaced the native perennials. Perhaps because of Quail Ridge's historical isolation from human impacts, and perhaps for other reasons, its vegetation has an unusually high component of native grasses.

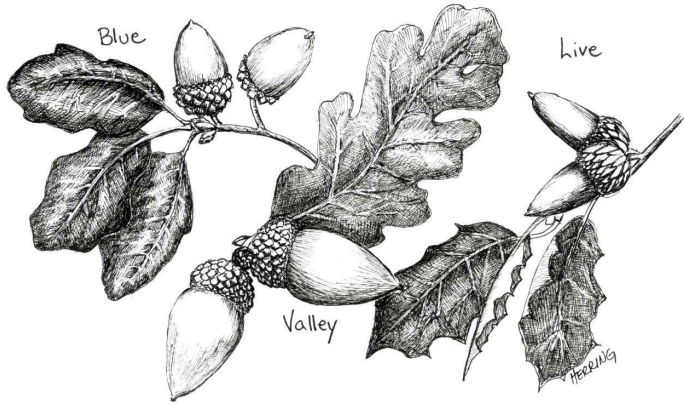
Our vegetation map (Map 4, Thorne et al. 2004) is a detailed map of plant communities of Napa County for use in conservation decision-making. We will refer to plant communities as "alliances" and "associations", using the nomenclature of Sawyer and Keeler-Wolf (1997), *A Manual of California Vegetation*. Appendix 1 gives more detailed descriptions of alliances and associations, including some that have been newly described. Species nomenclature follows *The Jepson Manual: Higher Plants of California* (Hickman 1993). A species list for the Reserve can be found in Appendix 2.

## Woodland and Forest

Six woodland communities have been identified within the Reserve: the Interior Live Oak, Interior Live Oak - Blue Oak, Mixed Oak, Blue Oak, and Valley Oak Alliances, and the Foothill Pine/Mesic Non-serpentine Chaparral Association. The first five of these are dominated by five species of oaks including two evergreen and three deciduous species. The evergreen oaks are interior live oak (*Quercus wizlizeni*), with grayish, furrowed bark and hard, spiny, shiny green leaves, and the rare oracle oak (*Q. xmorehus*), a hybrid between interior live oak and black oak. The deciduous oaks include black oak (*Q. kelloggii*), with deeply furrowed dark bark and bright green, deeply lobed leaves with bristle-tipped teeth, blue oak (*Q. douglasii*) with scaly, grayish bark and small, rounded, drought-resistant, bluish green leaves, and valley oak (*Q. lobata*) with thick, furrowed bark and rounded, lobed, dark green leaves.

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Relatively mesic, north-facing slopes, particularly in the south portion of the Reserve, support stands of the Interior Live Oak Alliance, co-dominated by interior live and black oaks with a closed canopy. They occupy about 32.5% of the Reserve. The shady understory in these



Leaves and acorns of three oak species.

areas contains delicate spring wild flowers such as milk maids (*Cardamine californica*), varied-leaf nemophila (*Nemophila heterophylla*), hound's tongue (*Cynoglossum grande*), shooting stars (*Dodecatheon hendersonii*), and iris (*Iris fernaldii*). Also in the understory are luxuriant native bunchgrasses including California and Idaho fescues (*Festuca californica* and *F. idahoensis*) and California melic (*Melica californica*). The woody component of the Interior Live Oak community includes many of the shrubs found throughout the peninsula, such as toyon (*Heteromeles arbutifolia*), manzanita (*Arctostaphylos manzanita*), and ceanothus (*Ceanothus oliganthus*).

The Interior Live Oak Alliance intergrades in many areas with the newly defined Interior Live Oak - Blue Oak Association (20.2% of the Reserve). In general, this community occupies areas that are slightly drier than the live oak-black oak dominated areas, and slightly steeper than the Blue Oak Alliance areas.



Blue Oak (*Quercus douglasii*) woodland

The most mesic area of the Reserve, Decker Canyon and its tributaries, supports the only patch of Mixed Oak Alliance (2.1%), in this instance dominated by valley oaks in the riparian areas. Mixed with the stately valley oaks are redbuds (*Cercis occidentalis*), California buckeyes (*Aesculus californica*), occasional big-leaf maples (*Acer macrophyllum*), all entwined in wild grape (*Vitis californica*) and pipevine (*Aristolochia californica*). Blue and black oaks are mixed with the valley oaks in this area.

In some of the wettest areas of Mixed Oak, the understory is lush with maidenhair fern (*Adiantum jordanii*), bedstraw (*Galium boreale*), and hedge nettle (*Stachys ajugoides*). In the more open areas, large individuals of both poison oak (*Toxicodendron diversilobum*) and skunkbrush (*Rhus trilobata*) mix with native and exotic grasses. Snowberry (*Symphoricarpos* spp.) is also common.

Compared with the forest-like, closed canopies of the Live Oak and Mixed Oak areas, the Blue Oak Alliance (14.9%) is more of a woodland, with widely-spaced, generally fairly small blue oaks and few other woody species. Patches of Blue Oak Alliance occur primarily in relatively flat areas or ridge tops and often have beautiful relictual stands of purple needlegrass (*Nassella pulchra*), blue wildrye (*Elymus glaucus*), and small fescue (*Vulpia microstachys*), in addition to the ubiquitous wild oats (*Avena fatua*) and bromes (*Bromus hordeaceus* and *B. diandrus*), as an understory. Many lovely spring forbs grace the slopes as well – these include baby stars (*Linanthus* spp.), yarrow (*Achillea millefolium*), climbing bedstraw (*Galium porrigens*), and woodland stars (*Lithophragma affine* and *L. parviflorum*). In many areas the Blue Oak community grades into Interior Live Oak - Blue Oak. This community covers large areas near the north tip of the peninsula.

A small patch of another woodland community is found in the northeastern part of the Reserve – the Foothill Pine/Mesic Non-serpentine Chaparral Association (0.4%). This is a unit that was defined during the vegetation mapping of Napa County and is characterized by gray pines (*Pinus sabiniana*) as emergents from non-serpentine chaparral.

Nearby, in the canyon bottoms both east and west of the Reserve, there are patches of habitat that map as Valley Oak. The bottomland, riparian habitat in which the alliance is found is characteristic. Valley oak is commonly mixed with blue or black oak in this alliance.

### Grasslands

Large areas of blue oak woodland and open grassland are covered with well-established individuals of three species of needlegrass, *Nassella pulchra*, *N. cernua*, and *N. lepida*. Cool, damp, north-facing slopes under interior live and black oaks support luxuriant stands of fescue (*Festuca californica* and *F. idahoensis*). California melic and blue wildrye (*Elymus glaucus*) thrive in slightly mesic areas with overstory trees. Many native forbs also thrive in the grasslands of the Reserve, often offering spectacular spring displays of lupines (*Lupinus nanus*). As in nearly all of California, much of the grassland is either dominated by or has a significant proportion of



Purple needlegrass  
(*Nassella pulchra*)

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exotic annual grasses. Bromes (*Bromus diandrus*, *B. hordeaceus*, and *B. madritensis*), false brome (*Brachypodium distachyon*) and wild oats (*Avena fatua*) comprise the majority of the exotic grass biomass, but there has been recent encroachment by aggressive and problematic grasses such as medusahead (*Taeniatherum caput-medusae*) and barbed goatgrass (*Aegilops triuncialis*). In addition to the native forbs, the grasslands also include many non-native dicots such as filaree (*Erodium* spp.), burclover (*Medicago polymorpha*), and yellow starthistle (*Centaurea solstitialis*).

The majority of the areas of grasslands that appear on the vegetation map occur on south- and west-facing slopes. Some are adjacent to chaparral, and some appear within woodland areas where the tree cover decreases. The California Annual Grasslands Alliance covers only 1.0% of the Reserve. Only one small area on the Reserve, which was bulldozed during the 1992 fire, appears as the weedier “Upland Annual Grasses” community on the vegetation map. This community covers less than 0.01% of the Reserve.

Over the past 10 years, the Reserve staff has actively controlled goat grass, medusahead, and yellow starthistle with herbicides. Many, but by no means all, of the recent invasions by these species have occurred along roadsides, making populations both visible and treatable. Populations in the steep, remote portions of the Reserve will be much harder to control, but offer some evidence of whether control measures are necessary.

There is a small area of Wet Meadow Grasses Superalliance on Bureau of Reclamation land east of the Reserve. This is probably associated with an artificial pond adjacent to a creek bottom.

### Chaparral

Three types of chaparral occur within the Reserve: the Chamise, Chamise - Wedgeleaf Ceanothus, and Scrub Interior Live Oak Alliances. Although these grade into one another, in general the north and east-facing slopes and ridge tops support the more speciose scrub oak chaparral. The same areas support chamise - wedgeleaf chaparral on southerly and westerly trending slopes, and pure chamise is found on ridgetops and south and west slopes.

Although all of these communities tend to occur in xeric areas, pure chamise (*Adenostoma fasciculatum*) claims the driest areas (12.5%). Chamise has needle-like leaves that are extremely drought



**Chamise** (*Adenostoma fasciculatum*)

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resistant. It is well-adapted to fire by its ability to resprout very quickly from the root crown as well as to reproduce prolifically from seed. The area of the Reserve that burned in 1992 shows almost no sign of disturbance in 2013.

With a canopy comprising 70-80% cover and very little understory, it is the least diverse community on the Reserve. The lack of understory plants beneath chamise has been attributed to a variety of causes over the years, including allelopathic exudates from the chamise (Muller et al. 1968), lack of seed sources (Sweeney 1956), low moisture and nutrient levels as a result of competition with chamise roots (Christensen and Muller 1975), and herbivory by mammals (Bartholomew 1970; Mooney and Dunn 1970; Swank and Oechel 1991). Many of these factors play a role in the scarcity of understory cover, but the most compelling seems to be herbivory. The dense thicket of shrubs provides cover for rabbits and many small rodents that harvest and eat whatever grasses and forbs manage to germinate near the canopy.

Scrub oak chaparral (9.2%) contains a mix of several species in various proportions. As the name implies, two major components of this community are the shrub form of interior live oak (*Quercus wizlizeni* var. *frutescens*) and the scrub oak (*Q. berberidifolia*). Especially attractive in the spring, this superalliance also includes flowering ash (*Fraxinus dipetala*), toyon (*Heteromeles arbutifolia*), California bay (*Umbellularia californica*), California buckeye, birchleaf mountain mahogany (*Cercocarpus betuloides*), and pitchersage (*Lepechinia calycina*), all twined with wild virgin's bower (*Clematis lasiantha*). The species composition appears to be related to aspect and moisture availability.

The understory of the scrub oak chaparral harbors a mix of small forbs, lilies, and ferns. Twining brodiaea (*Dichelostemma volubile*), Diogenes' lantern (*Calochortus amabilis*), shooting star (*Dodecatheon hendersonii*), hedge nettle (*Stachys ajugoides*), and goldback fern (*Pentagramma triangularis*) are some of the natives in this diverse understory.

In many areas scrub oak chaparral interdigitates on the ridges with the Chamise - Wedgeleaf Ceanothus Alliance, which comprises 7.2% of the Reserve. In general on the northwest-southeast trending ridges on the west side of the peninsula, the scrub oak occupies the north and east facing slopes, and the chamise - wedgeleaf ceanothus the south and west facing slopes. In this community, as depicted on the map, the co-dominants appear to be a variety of shrubs including scrub oak, toyon, ceanothus (*Ceanothus oliganthus*), birch-leaved mountain mahogany, and interior liveoak. Wedgeleaf ceanothus (*Ceanothus cuneatus*) is uncommon.



Virgin's bower (*Clematis lasiantha*)

