

**California Wildlife Habitat Relationships System
California Department of Fish and Game
California Interagency Wildlife Task Group**

Blue Oak-Foothill Pine

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Vegetation

Structure-- This habitat is typically diverse in structure both vertically and horizontally, with a mix of hardwoods, conifers, and shrubs. The shrub component is typically composed of several species that tend to be clumped, with interspersed patches of Annual Grassland. Woodlands of this type generally have small accumulations of dead and downed woody material and relatively few snags, compared with other tree habitats in California. Most existing stands of this type are in mature stages, with canopy cover ranging from 10 to 59 percent, and dbh ranging from 2.5 to 30 cm (1 to 12 in). Size class 6 depends on a sparse overstory of foothill pine above a lower canopy of oaks, as canopies of blue oak seldom exceed 15 m (50 ft) in height. Individual trees seldom exceed 125 cm (49 in) dbh, and exceptionally may reach 30 m (100 ft) in height.

Composition-- Blue oak and foothill pine typically comprise the overstory of this habitat, with blue oak usually most abundant. Stands dominated by foothill pine tend to lose their blue oak, which is intolerant of shade (P. M. McDonald, pers. comm.). In the foothills of the Sierra Nevada, tree species typically associated with this habitat are interior live oak and California buckeye. In the Coast Range, associated species are the coast live oak, valley oak, and California buckeye (Griffin 1977). Interior live oak sometimes dominates the overstory, especially in rocky areas and on north-facing slopes at higher elevations (Neal 1980).

At lower elevations, where blue oaks make up most of the canopy, the understory tends to be primarily annual grasses and forbs. At higher elevations where foothill pines and even interior live oaks sometimes comprise the canopy, the understory usually includes patches of shrubs in addition to the annual grasses and forbs. Shrub species include *Ceanothus* spp. Mariposa manzanita, whiteleaf manzanita, Parry manzanita redberry, California coffeeberry, poison-oak, silver lupine, blue elder, California yerba-santa, rock gooseberry, and California redbud.

Other Classifications-- This type is referred to as Blue Oak-Foothill Pine by the Society of American Foresters (Eyre 1980) and Parker and Matyas (1981), and as Blue Oak-Foothill Pine Forest by K uchler (1977). Neal (1980) gives an excellent, short description of the type, and a more complete description can be gleaned from Griffin (1977) in his discussion of California's oak woodlands.

Habitat Stages

Vegetation Changes-- 2-5:S-D;6. Succession presumably proceeds from annual grasslands directly to tree stages at lower elevations, where a shrub layer is usually sparse or absent. At higher elevations, shrubs and trees regenerate together.

Duration of Stages-- Secondary succession beginning with disturbed soil is rapid during early stages, with annual grasslands giving way to shrubs within 2 to 5 years. However, stands of mature shrubs adequate to provide habitat for those wildlife species requiring them take longer to develop approximately 10 to 15 years. The conifers grow more rapidly than the hardwoods, maturing into relatively large trees even within 30 to 40 years, judging from the photo series taken at the San Joaquin Experimental Range in Madera County (Woolfolk and Reppert 1963). Most of the meager information on growth rates of blue oaks comes from sites in northern and central California. They generally grow slowly at all ages. Blue oaks in Nevada, Shasta, and Placer Counties showed little or no growth in height after they reached 65 cm (26 in) dbh (McDonald 1985)(No McDonald 1985 in Habitat Lit Cite.). The age at which they normally begin producing acorn crops is unknown (M. McClaran, pers. comm.), but it likely takes several decades. Concern has been expressed for the long-term existence of this habitat (Holland 1976), because "little regeneration has occurred since the late 1800s, as livestock, deer, birds, insects, and rodents consume nearly the entire acorn crop each year. Of the few seedlings that become established a large proportion are eaten by deer" (Neal 1980:126). Furthermore, the absence of grazing livestock does not generally result in regeneration (White 1966), because many other animals eat acorns and seedling oaks. Moreover, introduced grasses are subject to burning, may compete directly with seedling oaks for light and nutrients, and may be allelopathic to the oaks. The general absence of secondary successional stages of these woodlands has precluded detailed study of their composition or rates of change.

Biological Setting

Habitat-- As Griffin (1977:386) points out, "oak woodland seldom forms a continuous cover over large areas. It is a major item in a mosaic including valley grassland...and chaparral...with strips of riparian forest." This mosaic is reflected in the character of the understory in stands of BOP woodlands. At lower elevations, these woodlands merge with Annual Grasslands, Blue Oak Woodlands, and Valley Oak Woodlands. The Annual Grasslands actually extend into the woodlands as a ground cover where not shaded by shrubs. The Blue Oak Woodlands differ from the BOP type in lacking a conifer component and usually in lacking a shrub component.

At upper elevations, BOP habitats merge with extensive stands of Mixed Chaparral in most localities, although in some places the Ponderosa Pine type grows at an elevation low enough to form a mixed ecotone with Mixed Chaparral and BOP.

Wildlife Considerations-- BOP woodlands provide breeding habitats for a

large variety of wildlife species, although no species is totally dependent on them for breeding, feeding, or cover. In the western Sierra Nevada, for example, 29 species of amphibians and reptiles, 79 species of birds, and 22 species of mammals find mature stages of this type suitable or optimum for breeding, assuming that other special habitat requirements are met (Verner and Boss 1980).

Most species breed during late winter and early spring a factor to consider when planning management activities. Snags are less common, and hence less critical to wildlife, in this than in other forest types. Most species of cavity-nesting birds, for example, use living oaks. The cavities are often in scars where limbs have broken from the trunk or a main branch and have developed a level of decay that makes them more easily excavated by primary cavity nesters.

According to Olson (1974), blue oaks produce an abundant seed crop every 2 to 3 years and bumper crops every 5 to 8 years; however, McClaran (pers. comm.) questions that such a clear cycle of acorn production has been confirmed. In any case, acorns are an important food resource for many species of birds (Verner 1980a.) and mammals (Barrett 1980).

Physical Setting

The habitat occurs in a typically Mediterranean climate hot, dry summers and cool, wet winters. Most precipitation falls as rain from November through April, averaging from 51 to 102 cm (20 to 40 in) within the primary range of blue oak (McDonald 1985). The frost-free growing season ranges from 150 to 300 days, with January minima averaging 1 C (30 F) and July maxima averaging 32 C (90 F) (McDonald 1985). Soils are from a variety of generally well-drained parent materials, ranging from gravelly loam through stony clay loam. Soils rich in rock fragments are typical (McDonald 1985).

Distribution

The range of this habitat (well described by Neal, 1980) generally rings the foothills of the Central Valley, between 150 and 915 m (500 and 3000 ft) in elevation. The Pit River drainage in the Cascade Range and the foothills of the Klamath Mountains mark the approximate northern limit. The habitat is nearly continuous in the western foothills of the Sierra Nevada, except for a gap of 96 km (60 mi) between the Kings and Kern Rivers, where foothill pine is missing. The distribution extends south into the Liebre Mountains of northern Los Angeles County and the drainages of Piru Creek and Santa Clara River in Ventura County. It is discontinuous in the Coast Range west of the Central Valley from Ventura to Mendocino Counties. And it extends westward to within 16 km (10 mi) of the coast in a few places (Griffin 1977, Neal 1980).

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