

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

Coastal Oak Woodland

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Vegetation

Structure. Coastal oak woodlands are extremely variable. The overstory consists of deciduous and evergreen hardwoods (mostly oaks 4.5-21 m (15 to 70 ft) tall sometimes mixed with scattered conifers. In mesic sites, the trees are dense and form a closed canopy. In drier sites, the trees are widely spaced, forming an open woodland or savannah. The understory is equally variable. In some instances, it is composed of shrubs from adjacent chaparral or coastal scrub which forms a dense, almost impenetrable understory. More commonly, shrubs are scattered under and between trees. Where trees form a closed canopy, the understory varies from a lush cover of shade-tolerant shrubs, ferns, and herbs to sparse cover with a thick carpet of litter. When trees are scattered and form an open woodland, the understory is grassland, sometimes with scattered shrubs. The interrelationships of slope, soil, precipitation, moisture availability, and air temperature cause variations in structure of coastal oak woodlands. These factors vary along the latitudinal, longitudinal and elevational gradients over which coastal oak woodlands are found.

Composition. Composition of both overstory trees and understory of coastal oak woodland varies and reflects the environmental diversity over which this habitat occurs. In the North Coast Range south to Sonoma County, coast live oak often does not dominate. Where Oregon white oak, California black oak, canyon live oak, madrone and interior live oak dominate, the habitat is generally considered Montane Hardwood (MHW).

From Sonoma County south, the coastal oak woodlands are usually dominated by coast live oak. In many coastal regions, coast live oak is the only overstory species. In mesic sites, trees characteristic of mixed evergreen forests mix with coast live oak, such as California bay, madrone, tanbark oak, and canyon live oak. On drier, interior sites, coast live oak mixes with valley oak, blue oak, and foothill pine.

Typical understory plants in dense coast live oak woodlands are shade tolerant shrubs such as California blackberry, creeping snowberry, toyon, and herbaceous plants such as bracken fern, California polypody, fiesta flower, and miner's lettuce. In drier areas where oaks are more widely spaced, the understory may consist almost entirely of grassland species with few shrubs, although a diversity of shrubs can occur under and between the trees with a sparse herbaceous cover. Where coast live oak woodlands intergrade with chaparral, species such as greenleaf manzanita, chamise, gooseberries, currants, and ceanothus species form the understory. Where the habitat intergrades with coastal scrub,

typical understory species are bush monkeyflower, coyote brush, black sage, and California sagebrush.

From Ventura County south, floristic changes occur in coastal oak woodlands. There is little change in introduced species of forbs and grasses, but the native shrubs and herbs are more typical of southern California. The dominant trees of the southern oak woodlands are Engelmann oak, coast live oak, interior live oak, and California walnut. These occur in various mixtures, depending on location. Engelmann oak, a semi-deciduous white oak, is an ecological homologue of blue oak and replaces it in southern California. Interior live oak usually occurs at higher elevations in the interior mountains, often associated with rock outcrops. Coast live oak grows in moister sites, especially near the coast, but extends farther inland in southern California than it does elsewhere in its range. It often forms mixed stands with Engelmann oak in the foothills of the Peninsular Ranges. California walnut is locally dominant, with coast live oak between Santa Barbara and Orange Counties (Jepson 1910, Wieslander 1934 a, b, Swanson 1967). Coulter pine is sometimes a component of the coastal oak woodlands in mesic sites of southern and central California.

Other Classifications. Coastal oak woodland, as treated here, combines diverse oak-dominated vegetation types into one. For example, this habitat or portions of it are included in the Northern Oak Woodland, Southern Oak Woodland and Foothill Woodland of Munz (1973)(No Munz 1973 in Habitat Lit Cite.) and of Griffin (1977); the Southern Oak Forests of Küchler (1977); the Coast Live Oak and Engelmann Oak of Parker and Matyas (1981); the Southern Oak Woodland, Northern Oak Woodland and California Coast Live Oak Forest of Cheatham and Haller (1975); the Coast Live Oak and Engelmann Oak of Paysen, et al. (1980); the California Coast Live Oak and Mixed Forest Land of the Society of American Foresters classification (Eyre 1980); the Deciduous Forest Land, Evergreen Forest Land and Mixed Forest Land of the U.S.G.S. system (Anderson et al. 1976); and the Coastal Live Oak Woodland, Northern Oak Woodland and Southern Oak Woodland of Holland et al. (1983) and Holland and Keil (1987).

Habitat Stages

Vegetation Changes--1;2-5:S-D. Like other oak woodlands in California, successional trends in the COW have not been studied and remain largely unknown. Some species of deciduous oaks have not successfully reproduced for over 60 years (White 1966, Brooks 1971, Griffin 1971, 1976, Fieblekorn 1972, Snow 1972, Holland 1976). Evergreen oaks have been more successful and as a result appear to be gaining dominance in some areas (Griffin 1977). In other locations, it appears that coast live oak is being replaced by California bay as a result of grazing pressures and lack of successful regeneration (McBride 1974).

Jepson (1910), Cooper (1922), and Wells (1962)(Wells 1962 not in Habitat Lit Cite.) suggested that Indian burning in the past was important in maintaining some open stands of coastal oak woodland. Natural and manmade fires may still be important in some areas. Southern oak woodlands have apparently experienced an increase in

periodicity of fires in recent years. Studies indicate that Engelmann oak and coast live oak are able to survive most fires (Snow 1979).

Most coastal oak woodlands are comprised of medium to large trees with few seedlings and saplings, especially in heavily grazed areas. Regeneration of most oaks in the coastal oak woodlands has not been studied thoroughly, but it is generally considered that they do not have the serious regeneration problems found with blue oak and valley oak. However, Engelmann oak is not adequately reproducing itself for reasons similar to those of blue oak.

Duration of Stages-- Coastal oak woodlands are comprised of slow growing, long-lived trees, so succession requires a long time. The actual time is variable and depends on local environmental conditions. Development of mature, large trees requires 60 to 80 years, and most of the trees of the coastal oak woodlands are at least this old. The best information available on succession in oak woodland, is historical. Since the Mission Period (1769-1824) and especially during the last century, marked changes have occurred in the coastal oak woodlands of California due to the introduction of domestic grazing animals and accompanying land management practices. The change in herbaceous understory from perennial species to aggressive, introduced annuals may have resulted in young oaks being out-competed for limited supplies of nutrients and moisture (Twisselmann 1967, Holland 1976). These changes have resulted in retrogressive succession in which well-developed oak woodlands regress to open woodlands or savannas and eventually to disturbed grasslands. Even ubiquitous pioneer shrubs fail to become established as successfully in disturbed grassland. Woodcutting has also had an impact and in local areas has created "stump-prairies" because oaks have not successfully reinvaded after removal (Wells 1962). Land clearing and urban expansion have also destroyed extensive stands of coastal oak woodland.

Biological Setting

Habitat-- Coastal oak woodlands are common to mesic coastal foothills of California. The woodlands do not form a continuous belt, but occur in a mosaic closely associated with MCH, CSC and AGS. Where moisture conditions are more favorable, such as north facing slopes and canyons, or higher elevations, COW grades into MHC or sometimes MCN habitats. From the coast toward the hotter, drier interior portions of the north and south coast range, COW grades into foothill woodlands (BOW), forming indistinct ecotones where the two overlap.

Wildlife Considerations -- Coastal oak woodlands provide habitat for a variety of wildlife species. Barrett (1980) reports that at least 60 species of mammals may use oaks in some way. Verner (1980) reports 110 species of birds observed during the breeding season in California habitats where oaks form a significant part of the canopy or subcanopy. Quail, turkeys, squirrels, and deer may be so dependent on acorns in fall and early winter that a poor acorn year can result in significant declines in their populations (Shields and Duncan 1966, Graves 1977, Schitoskey and Woodmansee 1978). Therefore,

many wildlife managers are concerned over the continuing loss of coastal oak woodland habitats as a result of man's activities.

Physical Setting

Coastal oak woodlands occupy a variety of mediterranean type climates that vary from north to south and west to east. (The climate becomes hotter and drier toward the south and east.) Precipitation occurs in the milder winter months, almost entirely as rainfall, followed by warm to hot, dry summers. Near the coast, the summers are tempered by fogs and cool, humid sea breezes. Mean annual precipitation varies from about 100 cm (40 in) in the north to about 38 cm (15 in) in southern and interior regions. Mean minimum winter temperatures are 2 to 7 C (29 to 44 F), and the mean maximum summer temperatures are 24 to 36 C (75 to 96 F). The growing season ranges from six months (180 frost-free days) in the north to the entire year in mild coastal regions to the south. The soils and parent material on which coastal oak woodlands occur are extremely variable. In San Luis Obispo County alone they are found on over fifteen different parent materials ranging from unconsolidated siliceous sand to diatomaceous earth to serpentinite to volcanic ash and basalt (Wells 1962). Coastal oak woodlands generally occur on moderately to well-drained soils that are moderately deep and have low to medium fertility.

Distribution

Coastal oak woodlands occur in the coastal foothills and valleys from Trinity to Humboldt counties south through the coastal regions of the northern and southern coast range, the transverse and peninsular range of southern California. They extend beyond the counties of southern California into coastal Baja California, where they reach their southern limit (Griffin and Critchfield 1972). They occur at elevations from just above sea level near the immediate coast to about 1525 m (5000 ft) in the interior regions, especially in southern California.

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