

Black Oak Forest

VEGETATION ASSOCIATION: BLACK OAK FOREST

MAPPED SUBASSOCIATIONS: None

DATA CHARACTERIZATION

Black oak forest is difficult to map from aerial photography and may not be distinguished easily from mixed evergreen forest, broadleaved upland forests or oak woodlands. The limited occurrence of this Habitat in the Plan Area in the Agua Tibia Mountains may be an artifact of the difficulty in mapping. Black oaks occur elsewhere in the Plan Area, especially in the Santa Ana and San Jacinto Mountains, however, many black oak vegetation stands are considered co-dominant or sub-dominant rather than dominants. The distribution of black oak forest may not be well-understood in Riverside County.

BIOGEOGRAPHY

The black oak ranges from just north of Eugene, Oregon south through the Cascade and Klamath Mountains to Marin County. Scattered populations occur from the Santa Lucia Mountains south to the Transverse and Peninsular ranges where black oak becomes more common (McDonald 1990). The species extends into Baja California as well (McDonald 1990).

RANGE AND DISTRIBUTION WITHIN WESTERN RIVERSIDE COUNTY

An occurrence in the Cahuilla Mountains is described in the literature (Sawyer and Keeler-Wolf 1995). The MSHCP database contains only one occurrence in the Agua Tibia mountains, south of Wild Horse peak, in the southeastern region of the county. A total of nine acres of black oak forest are mapped in the Plan Area.

VEGETATION CHARACTERISTICS

The black oak forest Habitat type is dominated by large-sized, deciduous black oaks (*Quercus kelloggii*). The oak canopy may be continuous, intermittent or savanna-like and trees can reach heights of 40 m (Sawyer and Keeler-Wolf 1995). Shrub cover ranges widely and ground cover is sparse on grass (Sawyer and Keeler-Wolf 1995). The understory density of these areas is limited due to shade, heavy litter, tannins and allelopathic substances (Vogl 1976). Small pure stands of black oak at higher elevations may be the result of removal of conifers through intensive logging or crown fires (Thorne 1977).



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Black oak and ponderosa pine (*Pinus ponderosa*) appear to be associated closely over much of their Oregon and California ranges and may shelter seedling ponderosa pine, big-cone Douglas-fir (*Psuedotsuga macrocarpa*) or incense-cedar (*Calocedrus decurrens*) and may occur with Jeffrey pine and white fir as well (McDonald 1990). Black oak groves typically are associated with other hardwoods such as tanoak (*Lithocarpus densiflorus*), Pacific madrone (*Arbutus menziesii*), interior live oak (*Quercus wislizenii*), coast live oak (*Q. agrifolia*), Engelmann oak (*Q. engelmannii*) at lower elevations and Pacific dogwood (*Cornus nuttallii*), bigleaf maple (*Acer macrophyllum*), California bay (*Umbellularia californica*) and canyon live oak (*Q. chrysolepis*) at higher elevations (McDonald 1990; McDonald 1980; Sawyer and Keeler-Wolf 1995). Shrub associates include manzanitas (*Arctostaphylos* spp.), California-lilac (*Ceanothus* spp.), buckthorn (*Rhamnus* spp.), currant, gooseberry (*Ribes* sp.) and poison-oak (*Toxicodendron diversilobum*).

PHYSICAL ENVIRONMENT

Over the entire California range, the Habitat occurs between 60 and 2500 m elevation although Bakker (1971) states that this species rarely grows below 300 m (Sawyer and Keeler-Wolf 1995). Although the parent soil material may vary widely, black oak occurs on coarse-textured soils which generally are moderately to excessively drained (Sawyer and Keeler-Wolf 1995; McDonald 1990; McDonald 1980). For this reason, black oaks typically are found on thin soils with rocky slopes, however, stands of black oaks also may occur on various aspects and topographic areas (Sawyer and Keeler-Wolf 1995; McDonald 1990). The typical climatic environment of black oaks is hot, dry summers and cool, moist winters (McDonald 1990). Black oaks require an annual rainfall above 65 cm (Bakker 1971).

In southern California black oak grows well on deep sandy-loam soils derived from granitic rock (McDonald 1990). Within the Santa Ana and San Jacinto Mountain ranges in particular, black oaks occupy gentle slopes with deep soils often on north-facing slopes (Vogl 1976). These typically moist sites offer winter snows and frozen soils (Vogl 1976). Average rainfall in the southern California mountains varies widely, averaging 91 cm (McDonald 1990). In the San Jacinto Mountains, elevations for black oak reach 2,440 m (McDonald 1990).



ECOSYSTEM PROCESSES

Most black oaks in black oak forests show signs of past fires. The response of the trees depends on the type of fire and possibly the vegetation association. Mild crown fires cause recovering black oak trees to produce epicormic trunk sprouts, whereas, passing fires do not damage heavily most black oak trees because of their thick bark and therefore no response is necessary (Vogl 1976). More intense crown fires are very damaging to black oaks and ground fires are often fatal, as evidenced by one age-class stands of black oaks (McDonald 1990). However, in observing succession in a Jeffrey pine-black oak dominated setting McDonald (1980) contends that fires of nearly any intensity can be endured and act to encourage black oak re-sprouting and reproduction. A study of prescribed burns in a Jeffrey pine-black oak dominated area showed that the fires had little effect on trees but caused a significant reduction in shrub cover (Lathrop and Martin 1982). Seedling establishment and shrub resprouts following the burn were not significantly changed (Lathrop and Martin 1982). However, McDonald's (1990) study on black oak stands following a fire noted that shrubs generally do not form dense cover until a fire occurs, at which time they aggressively compete with black oak sprouts. In any case, black oaks seem well-adapted to fire but the frequency of severe fires may be important to this community. Prior to fire suppression activities, Vogl (1976) believes severe crown fires occurred approximately every 100 to 200 years and even surface fires were probably relatively infrequent.

THREATS

Because fire was prehistorically a limited occurrence within this community, the suppression of fires in adjacent fuel-types may result in exceptionally hot fires which may invade the otherwise fire-resistant black oak forest (Vogl 1976). Black oak is also susceptible to fungal infections including *Inontus dryophilus* and *Laetiporus sulphureus* (McDonald 1990). Air pollution has been shown to be damaging to black oaks in the San Bernardino mountains (McDonald 1990).

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Black Oak Forest

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