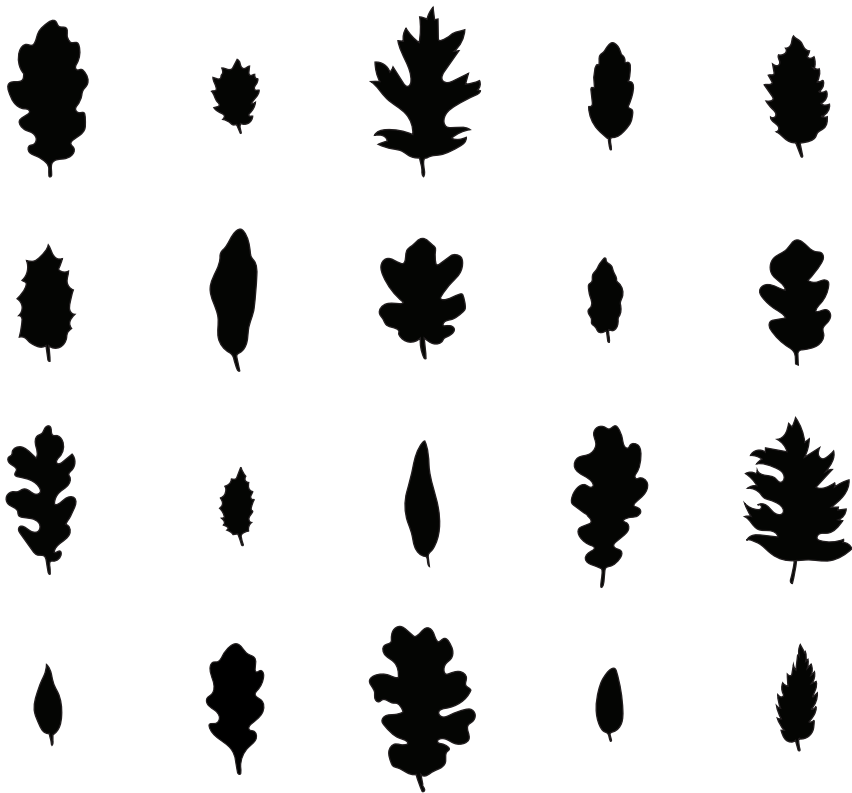


Tree Oaks of California

A Field Guide



Written and Illustrated by
Joshua Zupan

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What Are Oaks Anyway?

The oaks represent a large and diverse group of tree and shrub species found across the Northern Hemisphere. They make up the genus *Quercus*, known worldwide for its great diversity of forms and adaptability to many different habitats. Some oak species grow into tall, magnificent trees living for hundreds of years while others form low-lying, sprawling shrubs. Some are deciduous, dropping their leaves during winter or drought. Others are evergreen, retaining their leaves year round. Oaks are well regarded for their plasticity under different environmental conditions and for their ability to hybridize with seeming ease.

An oak tree can be recognized from other trees by a number of characteristics. Most notably the presence of acorns, a fruiting body unique to oaks and one other closely related species in the genus *Notholithocarpus*. Oaks are also monocious, meaning both male and female flowers will occur on each individual plant. The acorn-producing female flowers grow singularly or in small groups among twigs while the pollen-producing male flowers are clustered on hanging catkins where their pollen is spread by wind. The leaves of an oak can occur in a variety of shapes across species and even within species. Their margins can be entire, lobed, serrated, or toothed.

Oaks constitute a crucial component of many ecosystems, providing resources and habitat for animals and humans alike. Their acorns are a major food source for birds, squirrels, mice, and other wildlife. They're also a source of food and shelter for hundreds of insect species who rely on them during their larval phase. Indigenous peoples in California have been utilizing acorns as a food source for thousands of years to make flour and meal. The strong hardwood of oaks is a major source of lumber for furniture and carpentry, and the high concentration of tannins in their barks are used for tanning animal hides.

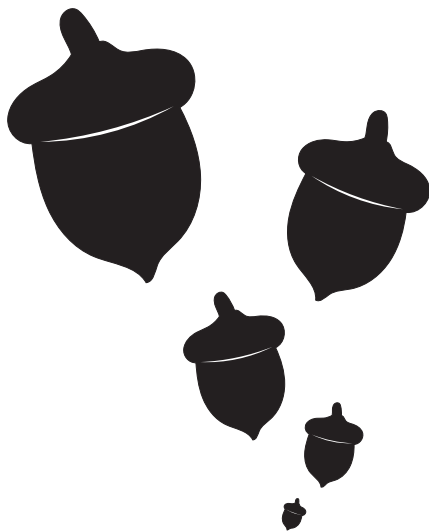
Oaks have evolved to play critical roles in the health of their habitats. Research has shown that oaks are a keystone species, meaning their presence maintains a higher level of biodiversity and bolsters the strength of the ecosystems they dwell in. In addition, many of California's oak species are fire adapted and drought tolerant, providing much needed shade and shelter where other plants cannot.

Oaks are an invaluable group of plants for their countless ecosystem services, the resources they provide to people, and their quiet strength and elegance.



Using This Field Guide

Due to the great evolutionary success and diversity of oaks, they can be found almost anywhere in California excluding some desert and high altitude montane regions. There are 19 oak species native to California, 9 that are trees, 7 that are shrubs, and 3 that are typically shrubby but can also be tree-like. This guide focuses solely on the 9 tree species by outlining their key identifying characteristics, similarities, and differences. This includes but is not limited to: leaf shape and margin, leaf size, leaf color, tree size, information on phenology and habitat, and range maps.



Oaks are typically identified by their leaves but keep in mind that there can be different shapes, sizes, and margins within a single species and even on a single tree. To account for this, small leaf silhouettes are included, illustrating a variety of forms that may be seen. But even these cannot cover the entire breadth of oak leaf morphology and in some cases, additional resources may be necessary to reach a confident identification.

Always take into consideration what time of year it is (e.g. deciduous oaks may be completely bare during winter or drought), look-alike species (e.g. Tanoak or Poison Oak), and the use of common names (e.g. *Q. garryana* typically goes by the name 'Oregon White Oak' but may also be called 'Garry Oak', 'Oregon Oak', 'Brewer Oak', or 'Post Oak').

Identifying oaks, or any plants for that matter, is an exercise in observation. While this guide and many others may be useful tools on the path to learning about plants, the best and truest way to grow your botanical knowledge is to get outside and observe plants in their natural habitats, over and over again. My hope for this guide is that it can be used as an inspiration, an excuse, and a tool for users to do just that. Now go jump in a pile of leaves, smell some bark, and climb a tree.

Taxonomic Ranking of The Oaks

Kingdom

Plantae (Plants)

Eukaryotic, photosynthetic organisms with rigid cell walls.

Phylum

Tracheophyta (Vascular Plants)

Plants with a vascular system.

Class

Magnoliopsida (Dicots)

Seed plants that produce an embryo with a paired cotyledon and net-veined leaves.

Order

Fagales (Beeches, Oaks, Walnuts, and Allies)

A group of woody, flowering plants, primarily distinguished by their flowers.

Family

Fagaceae (Beech Family)

A family of trees and shrubs that are chiefly monoecious and distinguished by their flower morphology.

Genus

Quercus (Oaks)

A genus of hardwood trees and shrubs that are monoecious and produce fruits known as acorns.

Section***Lobatae* (Red Oaks)**

Group within the genus *Quercus* that includes oaks with bristle-tipped leaves and whose acorns mature in the fall after two growing seasons. Acorn cup scales are flat.

Section***Quercus* (White Oaks)**

Group within the genus *Quercus* that includes oaks without bristle-tipped leaves (usually rounded lobes), and whose acorns mature in the fall after one growing season. Acorn cup scales are knobby.

Section***Protobalanus* (Golden-cup Oaks / Intermediate Oaks)**

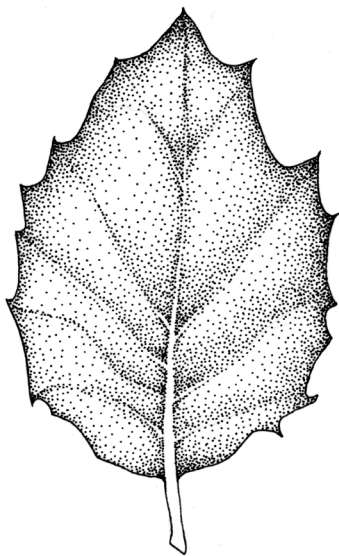
Group within the genus *Quercus* that includes oaks that typically resemble White Oaks (sect. *Quercus*) but whose acorns mature in the fall more than a year after flowering. Acorn cup scales are covered by a yellow fuzz.

Coast Live Oak

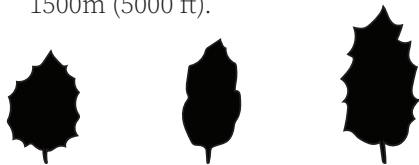
Quercus agrifolia

Leaves: Evergreen. Leaves are generally widely elliptical to round. Margins are spine toothed or weakly spine-toothed and can be rolled under. Spines extend from leaf veins. Leaves are 2.5 cm to 7.5 cm (1 in to 3 in) in length, on average. The upper leaf surfaces are dark green while the lower surfaces are pale green.

Trees: Small to medium sized trees. Trees are 8m to 24m (25 ft to 80 ft) in height. Short trunks with dense, wide spreading, hemispherical crowns. In chaparrals, trees can take on shrubby forms. Bark is dark gray, thick, and relatively smooth with wide furrows.



Habitat and Range: The Coast Live Oak grows along the majority of California's coastline from Mendocino County to Baja California. This species thrives in coastal environments on the slopes above the immediate shoreline. It is mostly found on the coastal side of the Coast Ranges but can also be found on the inland side along riparian areas. This species grows on drier, well drained soils below 1500m (5000 ft).



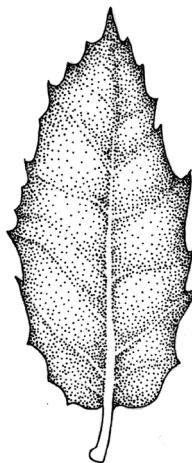
Interior Live Oak

Quercus wislizeni

Leaves: Leaves are oblong to elliptical and generally flat. Margins are spine-toothed to entire and have acute to pointed tips. Leaves are 2 cm to 5 cm (1 in to 2 in) in length. The upper leaf surfaces are generally dark green and shiny while the lower surfaces are light green to yellow-green and shiny.

Trees: Small to medium sized trees. Mature trees are 9 m to 23 m (30 ft to 75 ft) in height. Trunks are typically short with broad spreading branches. Crowns can vary from dense and round to open and irregular, depending on habitat. Bark on younger trees is smooth and gray, becoming darker and more fissured with age.

Habitat and Range: The Interior Live Oak is common on dry slopes below 1500 m (5000 ft) on much of California's foothills and valleys. It is prevalent in the Sierra Foothills, Coast Ranges, and southern California mountains where summers are hot and dry and winters are cool and wet. This species can be found in woodland and chaparral ecosystems with other trees, particularly Blue Oaks (*Q. douglasii*).

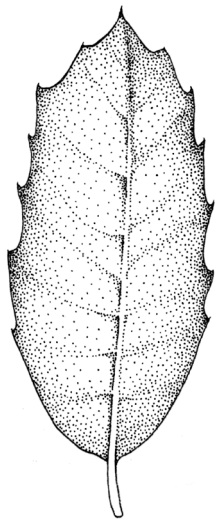
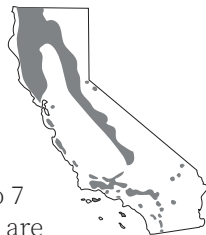


Canyon Live Oak

Quercus chrysolepis

Leaves: Leaves are elliptical to ovate (egg-shaped). They are typically flat and leathery as well. Margins may be entire or spine-toothed. Leaves are 2.5 cm to 7 cm (1 in to 2.5 in) in length. The upper leaf surfaces are dark green while the lower leaf surfaces are yellow-green to pale-green and covered in fine, golden or silvery hairs.

Trees: Small to medium sized trees, typically 6 m to 15 m (20 ft to 50 ft) in height. Trunks and crowns vary greatly depending on habitat. Can grow with a single trunk or multiple trunks, with a well rounded crown or irregular crown, and as a sturdy tree or shrub. Bark is grayish brown and smooth to slightly furrowed.



Habitat and Range: The Canyon Live Oak grows on California's canyon walls, cliffs, and rocky outcrops from southwest Oregon to Arizona and Baja California. It can be found on the exposed slopes, foothills, and mountains of the Sierra Nevada's, Coast Ranges, and Transverse Ranges, from just above sea level to 2700 m (9000 ft).



Engelmann Oak

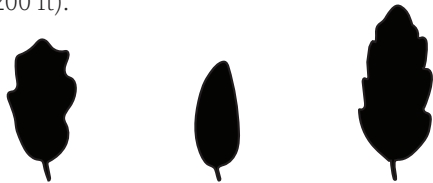
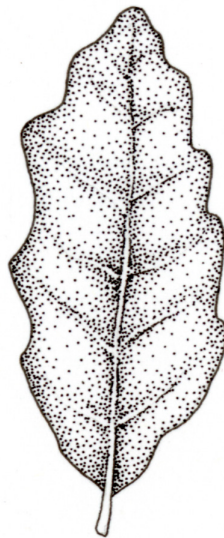
Quercus engelmannii

Leaves: Leaves are oblong to obovate. Margins range from entire to wavy to wavy-dentate. Leaves are 2 cm to 7 cm (1 in to 3 in) in length. The upper and lower leaf surfaces are dull blue-green, similar in color to the leaves of the Blue Oak (*Q. douglasii*).



Trees: Small to medium sized, single-stemmed trees. Mature trees are 5 m to 25 m (16 ft to 80 ft) in height but are typically under 8 m (25 ft). Trunks tend to be short with crooked branches that may reach the ground. Crowns are irregular, sparse, and loosely rounded. Bark is light gray, thick, and furrowed.

Habitat and Range: The Engelmann Oak range is restricted to a relatively small area in Southern California, largely as a result of urban development and habitat destruction. Most remaining trees are found in the open oak woodlands and interior foothills of San Diego County. Some small remnant populations can also be found in Orange County, Riverside County, and Baja California. It can be found at elevations below 1300 m (4200 ft).

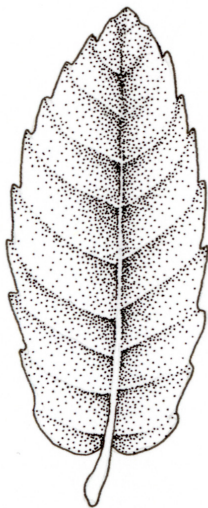


Island Oak

Quercus tomentella

Leaves: Leaves are oblong to ovate (egg-shaped). Margins are entire to fine-toothed with tip acute to obtuse or abruptly pointed. Leaves are 5 cm to 9 cm (2 in to 3.5 in) in length. The upper leaf surfaces are dark green while the lower leaf surfaces are dull brownish-green. The lower surfaces of young leaves are covered with fine hairs called tomentum that wear away with age.

Trees: Small trees, generally 7 m to 12 m (25 ft to 40 ft) in height. When growing in sheltered areas, trees form full, rounded canopies but when exposed to wind and sea spray they are noticeably irregular and bent. Bark is grayish-brown, scaly, and furrowed.



Habitat and Range: The Island Oak is the rarest of all California tree oaks, found only on five of the Channel Islands (Anacapa Island, San Clemente Island, Santa Catalina Island, Santa Cruz Island, and Santa Rosa Island) and Guadalupe Island, part of Baja California. This species will tolerate poor soils and intense winds but prefers moist sites on north-facing slopes and along stream beds, or on exposed hilltops and ridges. The Island Oak grows at elevations below 600 m (2000 ft).



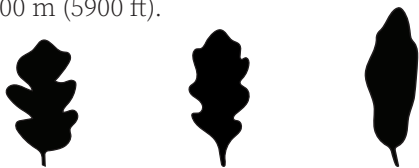
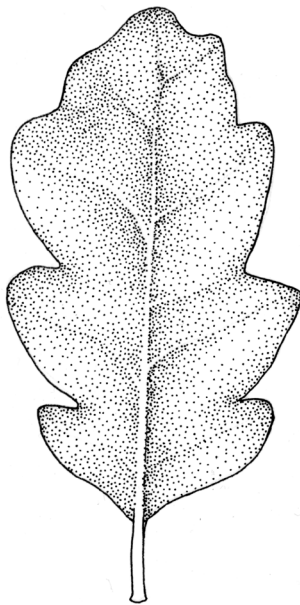
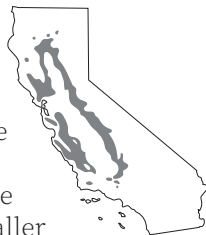
Blue Oak

Quercus douglasii

Leaves: Leaves are oblong to obovate. Margins range from entire to wavy to lobed. Relative to other lobe-leaved oaks (Valley Oak [*Q. lobata*] and Oregon White Oak [*Q. garryana*]) Blue Oak lobes are noticeably smaller and more irregular. Leaves are 3 cm to 10 cm (1 in 4 in) in length. The upper leaf surfaces are blue-green and the lower leaf surfaces are pale bluish.

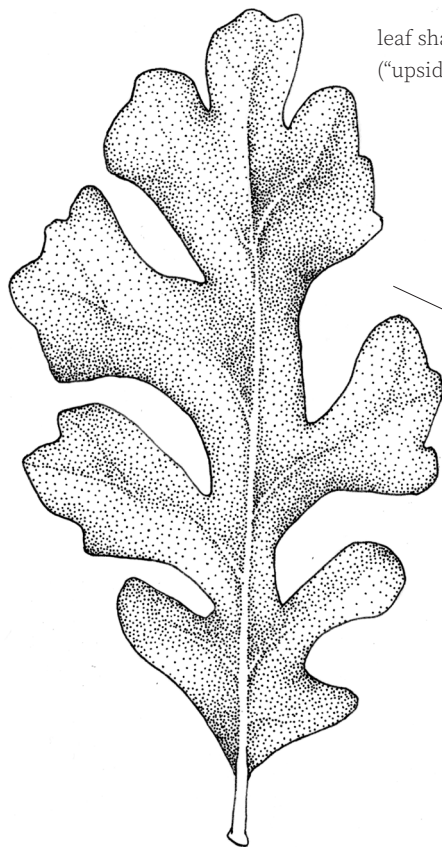
Trees: Small to medium sized trees, 6 m to 20 m (20 ft to 66 ft) in height. Trunks are typically short with wide spreading, crooked branches and dense, round canopies. Bark is light gray and checkered into thin scales.

Habitat and Range: The Blue Oak can be found on hot, dry foothills along interior valleys where they form Oak savannas or woodlands. Found only in California, this species can be found on the foothills of California's many mountain ranges where it's drought-tolerance and shade-intolerance come in handy. The Blue Oak is commonly associated with other oak species. It grows from near sea level to 1800 m (5900 ft).



Valley Oak

Quercus lobata



leaf shape obovate
("upside down egg")

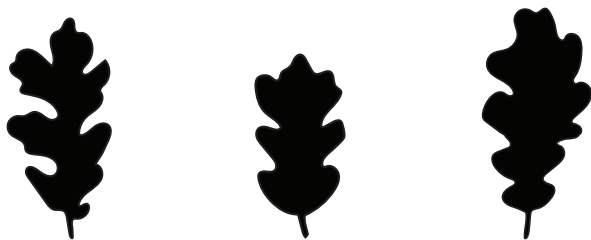
deep lobes that extend
more than half the
distance from lobe tip to
midrib

generally 6 - 10 lobes
per leaf

Leaves: Leaves are obovate. Margins are deeply lobed, hence the species name lobata. There are typically 6 to 10 rounded lobes on a leaf with sinuses that generally reach greater than half the distance from lobe tip to midrib. Leaves are 5 cm to 12 cm (2 in to 5 in) in length. The upper leaf surface are shiny and dark green while the lower leaf surfaces are pale green.

Trees: Medium to large sized trees, typically 9 m to 27 m (30 ft to 90 ft) in height but the largest recorded individual stands over 170 ft tall. This species is the largest oak in California, with short and stout trunks, and crooked, spreading branches. Crowns are dense and broadly rounded. Bark is light gray, thin, and scaly. The bark of older trees will grow deeply checkered.

Habitat and Range: The Valley Oak grows on moist valley floors and foothills where it forms riparian woodlands and savannas. It is typically found inland, all around California's Central Valley, Sierra Nevada Foothills, and Coast Ranges. This species is known for its impressive roots, preferring deep alluvial soils where it can tap into the water table. It can be found at elevations below 1700 m (5600 ft) but most often occurs below 600 m (2000 ft) to sea level.

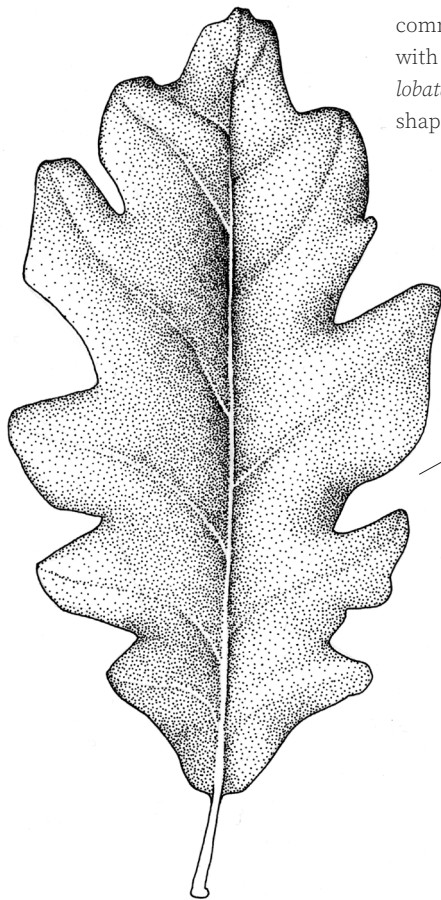


Oregon White Oak

Quercus garryana



commonly confused
with Valley Oak (*Q.*
lobata) due to similar
shape and margin



lobes do not extend as
deeply as those on *Q.*
lobata

Q. garryana leaves are
generally larger than *Q.*
lobata leaves

Leaves: Leaves are elliptical to obovate. Margins are lobed with rounded or broadly angular lobes. Sinuses do not go as deep as those of the Valley Oak (*Q. lobata*). Leaves are typically 5 cm to 15 cm (2 in to 6 in) in length. The upper leaf surfaces are dark green, shiny, and leathery, while the lower leaf surfaces are light green.

Trees: Small to medium sized trees, generally 7 m to 25 m (22 ft to 80 ft) in height. Open growing trees grow lower to the ground with short trunks. Trees with more competition grow longer, straight trunks with narrow crowns. Bark is white-gray, thin, and finely fissured.

Habitat and Range: The Oregon White Oak can be found as far north as British Columbia but extends into California at the southern end of its range. It grows most commonly in woodlands and coniferous forests along the north and central coastal ranges or the foothills of the Cascade and Sierra Nevada ranges. This species prefers areas with warm summers and freezing winters. It grows from near sea level to 1800 m (5900 ft).

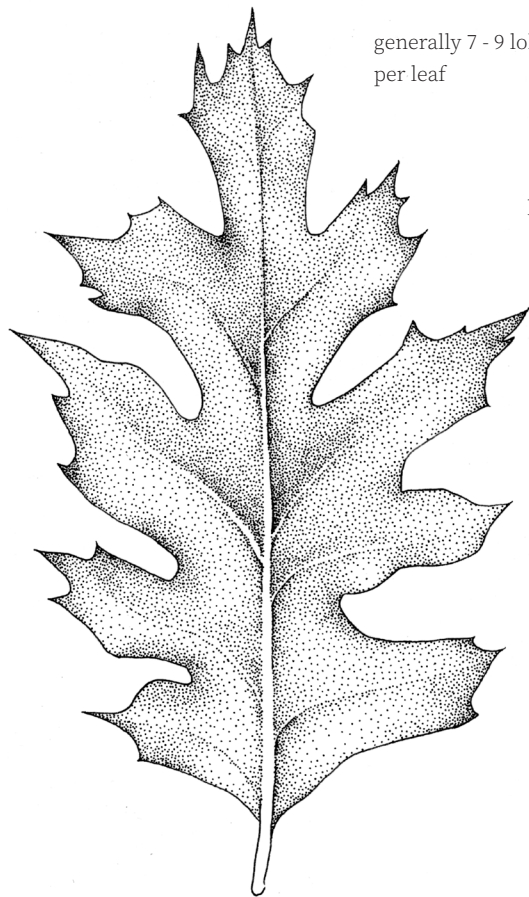


California Black Oak

Quercus kelloggii



generally 7 - 9 lobes
per leaf



bristle-tipped lobes

California Black Oak (*Q. kelloggii*) leaves are easily distinguishable thanks to their bristle-tipped lobes, large size and surface area, and striking color changes in the fall

Leaves: Deciduous. Leaves are elliptical to obovate. Margins are lobed with rounded or broadly angular lobes. Sinuses do not go as deep as those of the Valley Oak (*Q. lobata*). Leaves are typically 5 cm to 15 cm (2 in to 6 in) in length. The upper leaf surfaces are dark green, shiny, and leathery, while the lower leaf surfaces are light green.

Trees: Small to medium sized trees, generally 7 m to 25 m (22 ft to 80 ft) in height. Open growing trees grow lower to the ground with short trunks. Trees with more competition grow longer, straight trunks with narrow crowns. Bark is white-gray, thin, and finely fissured.

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Additional Resources

Books

Oaks of California

Pavlik, Bruce M, et al. *Oaks of California*. Cachuma Press, 1991.

The Sibley Guide to Trees

Sibley, David Allen. *The Sibley Guide to Trees*. Alfred A. Knopf, 2009.

Trees and Shrubs of California

Stuart, John D, and John O Sawyer. *Trees and Shrubs of California*. University of California Press, 2001.

Websites

Jepson eFlora

(<https://ucjeps.berkeley.edu/eflora/>)

Calscape - California Native Plant Society

(<https://calscape.org/>)

UC Oaks

(<https://oaks.cnr.berkeley.edu/oak-tree-species-id-ecology/>)

