

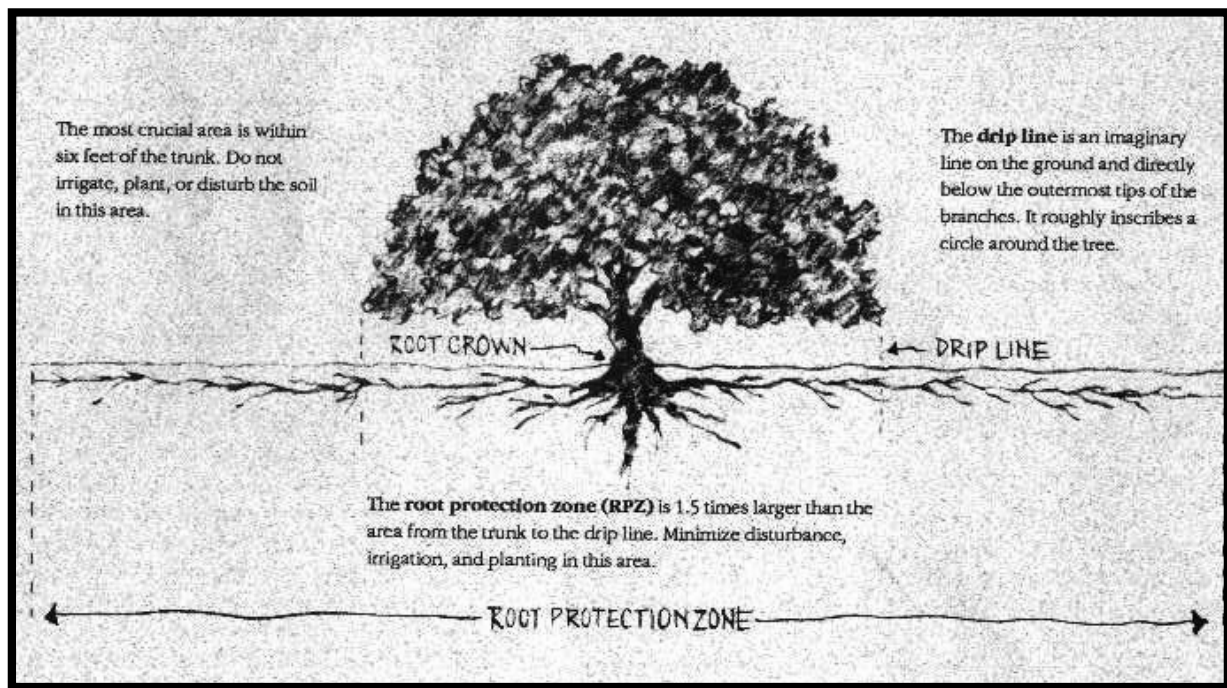
Care of California's Native Oaks

Bulletin of the California Oak Foundation

Native oaks, when young trees, are very tolerant of their environment and make excellent and adaptable landscape assets. The mature native oak is an invaluable part of our environment but does not tolerate many changes once established.

Architects, builders, homeowners, and others should be very careful in fitting their plans with these magnificent giants. Any substantial change in the mature oak's environment can weaken or kill an oak, even a healthy specimen.

A good rule of thumb is to leave the tree's **root protection zone (RPZ)** undisturbed. This area, which is half again as large as the area from the trunk to the dripline, is the most critical to the oak. Many problems for oaks are initiated by disturbing the roots within this zone.



A Word About Roots

Our native oaks have developed survival adaptations to the long, dry summers of most of California. Primary to this survival is the development and characteristics of its root system. When an acorn first sprouts, there is rapid root development and very little growth above ground.

This initial root is a tap root extending deep underground for dependable moisture. In fact, the tree's first few years are focused on establishing a deep sustaining root system. Once this has happened, greater foliage and above-ground growth takes place.

As the oak grows, the tap root is outgrown by an extensive lateral root system that spreads horizontally out from the trunk to and well beyond the dripline, sometimes as much as 90 feet. For

a mature oak, this horizontal root system is the primary supporter of the tree for the rest of its life. It includes the important fine roots, which absorb moisture and nutrients. Most of the root system occurs within the top three feet of soil. In shallower soil the root system is concentrated in an even shallower zone, typically one to two feet below the surface.

As the oak matures, particularly in areas naturally dry in summer, deep-growing vertical roots form off the laterals, usually within ten feet of the trunk. These sinker roots exploit deeper soil moisture and add stability to an increasingly massive tree.

By the time a mature oak has established its elaborate root system – so well designed for its environment and particular site conditions – it has lost the vigor of youth. It is less tolerant of change and can less easily recover to support a fully developed living structure.

To protect a mature oak, pay particular attention to drainage, and avoid filling, trenching, or paving near its root zone.

Fill Around Oaks

Soil and other materials placed on top of the natural soil level, called fill, are usually compacted. They make the soil less permeable, thereby restricting or prohibiting the exchange of gases and movement of water. Excessive moisture trapped by fill can also cause root and crown rot. Because there is no guarantee that fill can be safely added around an oak tree, it is best to avoid tampering with the natural grade, or to leave the natural grade within the root zone alone and use retaining walls.

Drainage

Poor drainage is a common cause of oak tree deaths, since adequate drainage is critical to ensure a proper balance of moisture, air, and nutrient to grow and survive. Too much moisture, particularly in the warm months when natural conditions are dry, can smother the roots and encourage the proliferation of crown and root rot fungi.

Another moisture threat to oak roots is presented by barriers such as concrete foundations and footings, streets, and swimming pools downhill of oaks. These structures can dam underground water, causing water to back up into a tree's root zone and drown it.

Trenching

Trenching is an often-overlooked cause of tree death. Trenching usually occurs when underground utilities are installed. Digging a trench for utilities within the RPZ of an oak can sever a significant portion of a tree's roots. Often, several trenches are opened by separate utilities. This multi-trenching is particularly destructive since it impacts a greater portion of the root system.

If utilities must impinge on the root protection zone of a native oak, the trench should be dug by hand, avoiding roots, or utilities bored through the ground at least three feet below the surface.

Paving

Paving can cause the same problems associated with soil compaction. Paving, such as asphalt and concrete, prevents water from soaking into the soil and impedes the exchange of gases between roots, soil, and the atmosphere. In addition, paving usually requires excavation to create a stable base and to allow for depth of paving material. This process compacts the soil and damages roots.

Decking placed on piers is much more compatible with mature oaks than paving.

Care of Established Oaks on Home Grounds

Oaks on home grounds require certain conditions to survive and prosper. Activities of concern to the homeowner are planting near oaks, irrigation and feeding, pruning, installation of home improvements, and disease and insect infestations.

Most native oaks in California evolved and prospered in an environment typified by a cool, moist winter and a hot, dry summer. Under natural conditions, surface soils are wet during the cooler months and become dry by summer. Natural vegetation growing beneath oaks flourishes during the winter and spring and dies by early summer, creating the well-known golden-brown landscape of California's valleys and foothills.

Native oaks, however, remain green because their thick, leathery leaves and other adaptive features reduce their water use. The homeowner should attempt to approximate the natural environment in which these magnificent trees are originally found.

Planting Near Oaks

Only drought-tolerant plants that require no summer water should be planted around old established oaks, and they should be planted no closer than six feet from the base of the tree. Do not plant exotic grasses, ivy, azaleas, rhododendrons, or any other vegetation that needs summer irrigation. Such plants develop thick mats of roots and thus inhibit the exchange of air and water the established oak has grown used to.

There are a number of plants, some of which are native to California, that can be grown beneath oaks. For an extensive listing of compatible plants useful for landscaping around oaks, contact the California Oak Foundation.

In place of plants, other types of ground cover can be used to landscape beneath oaks. When installed properly, cobbles, gravel, and wood chips are good examples of ground covers that do not interfere with the roots' ability to obtain oxygen and appropriate moisture.

Irrigating and Fertilizing

Native oaks usually do not require irrigation as they are well adapted to dry summer conditions. Healthy oaks are even able to survive the excessively dry summers sometimes brought on by California's variable climate. But if an oak has been compromised, as when impervious surfaces have been placed in the RPZ, occasional water may be helpful if done properly.

Oaks should be irrigated only outside of the RPZ. Under no circumstances should the ground near the base of a native oak be allowed to become moist during warm weather periods. Moist, warm soil near the base of a mature oak promotes crown and root rot.

Irrigation, if done, should be by the “deep watering method,” which consists of a slow, all-day soaking only once or twice during the summer dry period. Frequent, shallow watering not only encourages crown and root rot, it also results in the growth of ineffective shallow roots near the surface, a needless waste of the tree’s energy.

If oaks need supplemental watering, it is best to apply the water at times that lengthen the normal rainy season, so the normal dry period in the middle to the end of summer is preserved. For example, additional irrigation would be appropriate in May and September, while leaving the area under the tree dry in July and August.

Mature oaks usually need little or no supplemental fertilization. Light fertilization may be appropriate in landscaped situations to replace nutrients supplied by leaves and other litter that normally accumulates under an oak in its native environment. If leaves are allowed to remain under trees, they eventually break down and supply nutrients.

Fertilization should only be done if growth is poor. Fertilizers should be applied to the entire RPZ, ideally in late winter or early spring. Trees that have recently undergone severe pruning or root damage should not be fertilized for at least six months.

Often, when an oak tree shows yellowing leaves, one thinks it lacks nutrients. Generally, this is not the case. More likely, the tree is suffering from root or crown rot. When an oak appears unhealthy, consult a certified arborist to determine the cause.

Pruning

Excessive pruning or thinning of limbs may expose interior branches to sun damage, may stimulate the tree to produce succulent new growth that is subject to mildew, and, in some cases, may cause a decline in vigor or may kill a tree. *Only dead, weakened, diseased, or dangerous branches should be removed.* Necessary pruning should be done during the winter dormant period for deciduous species and during July and August for evergreen species. Recent research has shown that tree paint, wound dressings, and sealing compounds do more harm than good.

Pruning should be performed by a certified arborist according to the pruning standards of the Western Chapter of the International Society of Arboriculture.

Home Improvement

The installation of home improvements should be done with caution when oaks are located nearby. Trenching severs roots, and impervious surfaces placed over roots may result in the death of the oak. A swimming pool placed downhill of oaks can act as a dam and cause an oak to drown in saturated soil.

Great caution should be taken and a certified arborist consulted before proceeding with improvements that impact on the root protection zone of any valued native oak.

Diseases

When growing under natural conditions, native California oaks are relatively tolerant of most diseases. However, they are subject to several problems when disturbed or hampered by frequent summer watering.

The two oak diseases most often encountered in irrigating settings are crown rot and oak root fungus. Both attack trees weakened by disturbance or improper care.

Crown Rot

This is one of the most common and serious diseases of oaks in home plantings. Infected trees decline slowly over a period of years. The disease, caused by a microscopic fungus, is made worse by saturated soil and poor soil aeration.

Symptoms of this disease are a general decrease in tree vigor, twig die-back and wilting, abnormally yellow leaves, and formation of lesions on the bark accompanied by oozing of dark-colored fluid.

In most cases people notice crown rot too late for successful treatment. However, if the disease is caught in the early stages a tree can be saved. Comprehensive treatment is best left to a qualified expert. The following measures usually benefit the tree:

- 1) Remove lawn and other plants that require summer irrigation from within the RPZ.
- 2) Remove soil and all other debris that has accumulated against the trunk.
- 3) Do not water within the RPZ during the summer except under unusual conditions when advised by a certified arborist.
- 4) Improve drainage around the tree, and make sure all water drains away from the trunk.

Oak Root Fungus

This oak fungus, also known as *Armillaria* root rot, is found in the root systems of most oaks in California. Our oaks experience little damage from this fungus under natural, dry summer conditions. However, when oaks are watered in the summer or weakened by other impacts, the tree can suffer damage from the fungus.

Symptoms shown by an infected oak include die-back of branches and yellowing and thinning of foliage. The fungus itself may appear as a white, fan-like growth with rhizomorphs and mushrooms.

Prevention of damaging conditions is the only sure action that can be taken against this disease. Avoid summer irrigation near oaks. Prevent mechanical damage to major roots or root crown. As with crown rot and other tree diseases, it is recommended that a certified arborist be consulted.

Mistletoe

This parasitic plant grows on the branches of many oaks and can cause structural weaknesses that make branches more vulnerable to breakage. Its sticky seeds are spread from one tree to another by birds. The seeds germinate under favorable conditions, and rootlike structures find their way through the bark, ultimately becoming attached to the oak and tapping into the water-and-mineral-conducting tissues of the tree.

Small infestations can be controlled by removing the mistletoe and cutting back the oak's bark around the spot where the mistletoe stem entered the oak branch. Major infestations are difficult to control, however, and an arborist specializing in oaks should be consulted.

Other diseases

The health and vigor of oaks can also be compromised by a number of other afflictions that are not discussed here. Since 1980, for example, die-back and decline, particularly among the coast live oak (*Quercus agrifolia*), has been observed in widespread areas of California. Several fungi may be involved in this condition, and treatments are still experimental. Seek professional advice whenever you notice serious, unexplained decline in your oaks.

INSECTS

Innumerable insects find their livelihoods in the branches and leaves of oaks, usually without much consequence to the healthy tree. The oak gall, for example, is a harmless swelling of leaves and twigs in reaction to enzymes released where a wasp lays its eggs. Some galls are large and round, others resemble small wads of fuzz, stars, or tops; one, which looks like a tiny seed, falls from leaves in the late summer and occasionally jumps into the air like a Mexican jumping bean.

Some infestations, however, can cause serious damage. Insects such as pit scales (which appear as pinhead-sized scales on the bark of twigs), oak moth and other leaf-eaters can weaken oaks, making them susceptible to disease.

Whenever an insect infestation causes substantial leaf loss, changes in leaf color, twig die-back, sticky or sooty foliage and branches, or other significant changes in appearance, intervention may be required. Consult a certified arborist for assistance.

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The California Oak Foundation is dedicated to the conservation and perpetuation of California's native oak woodlands. The California Oak Foundation educates the general public and decision-makers about the importance of oak woodlands to California's wildlife habitat, watersheds, and quality of life through its newsletters, website, bulletins, books, symposia, and workshops.

Founded in 1988, the California Oak Foundation is a non-profit 501(c)(3) corporation that relies on memberships and donations to continue its work. Join us today and invest in the future of California's oak heritage.