TREE NOTES

CALIFORNIA DEPARTMENT OF FORESTRY AND FIRE PROTECTION

Pete Wilson
Governor
State of California

Harold R. Walt
Director

Douglas Wheeler
Secretary for Resources
The Resources Agency

NUMBER: 7 JUNE 1990

Keeping Native California Oaks Healthy

Bruce W. Hagen

Forest Pest Specialist, Forest Pest Management Program, P. O. Box 820, Santa Rosa, CA 95402-0820

Oak trees in the residential landscape are often seriously damaged or killed during the construction and/or landscaping phase of development. Decline and early death may also stem from inappropriate landscaping and irrigation practices. Damage often takes years to become evident, and by the time the tree shows signs of decline it is usually too late to help.

Oaks and Summer Water

Once established, native oaks require little or no supplemental irrigation. In fact, they do best in non-irrigated soils. This is because oak roots, particularly those originating at the base of the trunk (root crown), are susceptible to root-disease fungi when exposed to prolonged moisture during the summer (Figure 1). These fungi are normally inactive in dry soil, but proliferate under the warm, moist conditions created when frequent summer water is applied. (Other species of trees are less susceptible to these fungi because they have evolved where summer soil moisture is high.) Oaks weakened by the loss of roots or root function are particularly susceptible to root pathogens and other pests. Frequent summer irrigation, particularly near the root crown, is likely to cause root decay which, over time, may destroy the roots, killing the tree or causing a hazardous situation. Therefore, irrigation for lawns, ground covers or other ornamental vegetation should be avoided or, at the very least, kept well away from the trunk. The common notion that younger oaks can adapt to frequent irrigation is incorrect. Young or newly planted oaks in irrigated situations often show signs of decline after 15 to 20 years.

Oak Roots

The roots of mature oaks grow predominantly within the upper three feet of soil. Most of the roots responsible for the uptake of water and minerals are concentrated within 18 inches of the surface. Few roots grow deeper than three feet. Although the roots typically radiate well beyond the periphery of foliage (drip line), much of the active root system is within the drip line (Figure 1). Roots are sensitive to environmental change (soil compaction, grade change, increased moisture, paving). Oak roots like those of most trees, are associated with beneficial fungi that resist pathogens in the soil and aid in the absorption of water and minerals. These fungi are easily killed by changes in soil conditions.

Common Problems That Occur During Construction and Landscaping

Life-supporting roots are frequently severed during construction or damaged by other construction practices that change the existing soil environment. The frequent irrigation of lawns and ornamental vegetation commonly planted under oaks after construction, leads to decay and progressive root loss. The net effect is reduced water and mineral uptake. This typically causes die-back and decline over one to many years. Few people associate this decline with construction or landscaping because the symptoms often develop gradually. Most of these trees will die or fall prematurely unless prompt remedial action is taken.

Activities That Damage Roots and Disturb the Soil Environment

Grade change. This involves either the addition or removal of soil within the drip line. Excavation can sever roots, while the addition of fill soil may suffocate them. Fill soils can also impede water infiltration and soil drainage, leading to drought conditions or waterlogging.

Trenching. Trenches dug for utility or irrigation lines within or across the drip line cut essential roots. This impairs the tree's ability to obtain water and essential elements, which may cause death, die-back, or gradual decline. It can also impede drainage and root development.

Pavement. Impermeable soil coverings such as asphalt or concrete restrict the amount of air, water, and minerals available to the roots. This impairs root growth and function, and can ultimately lead to their death.

Soil compaction. Frequent traffic, both human and livestock, and the operation and parking of heavy vehicles within the drip line, squeeze soil particles together, thus eliminating much of the natural air space. This reduces the infiltration and storage of water and air, inhibiting root growth and the uptake of water and minerals.

Drainage changes. Grade changes that cause water to collect around a tree, especially near the trunk, are harmful. Likewise, a grade change that diverts a source of water that the tree depends on may cause drought stress.

Soil contamination. Avoid storing and discarding harmful chemicals or materials such as, herbicides, petroleum products, building materials, or waste water near oaks.

Herbicides. It is best to avoid using systemic or soil active herbicides under landscape trees. If herbicides are to be used within the root zone follow label recommendations.

Root Loss. The degree to which oaks tolerate root loss depends on species, age, health, climate, soil depth, soil structure, and soil moisture. In general, the damage caused by a 15 to 30 percent loss of roots is negligible to moderate, respectively. A root loss in excess of 50% is considered to be harmful. A single three foot deep trench at the drip line along one side of a tree will remove approximately 15 percent of the roots. A similar trench made midway between the drip-line and the trunk will sever approximately 30 percent of the roots. Trenches made within 10' of large oaks are usually very damaging.

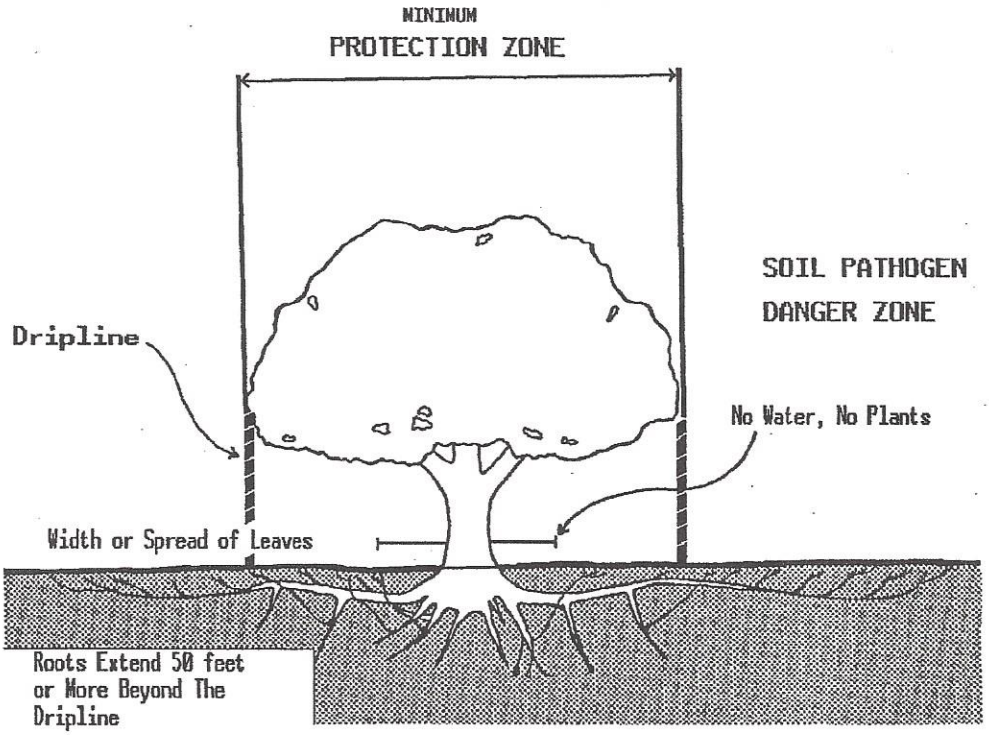


FIGURE 1.

Preventing Problems

Avoid injuring the roots or altering the soil where they grow, particularly within the drip line. Keep this area undisturbed and free of water-demanding ornamental vegetation such as lawns, ground covers, and shrubs like rhododendrons, azaleas, and camellias. Do not remove the leaf mulch unless there is a fire hazard. This organic material conserves water, provides nutrients as it decays, improves soil structure, decreases soil pH, and reduces soil temperature extremes. If turf is present beneath oaks, discontinue watering within the drip zone. If this is impractical, plug, alter or redirect sprinklers to prevent water from hitting the trunk or wetting the soil within 10 feet of the tree's trunk. Although not necessary, you may wish to remove the dying turf. In either case, cover the exposed soil surface or turf with 2 to 4 inches of organic mulch.

Appropriate Landscaping. If ornamental vegetation must be planted under old, established oaks, minimize its use. Keep the area within the drip zone relatively open. Use plants as accents rather than as ground covers. Extensive landscaping will disturb much of the root system and compete for available water and minerals. Select plants that tolerate shade and drought, and plant no closer than 10 feet to the trunk (Figure 1). Avoid all planting under declining oaks. Trees that have sustained construction damage will require several years to recover before landscaping.

Watering. As a general rule, native oaks should not be irrigated. One exception, however, is during drought years. If the winter is unusually dry, supplemental watering in the spring can complement natural rainfall. Water the soil from halfway between the trunk and the drip line to 10-15 feet beyond, allowing water to penetrate the soil to a depth of 18 to 24 inches. It may be necessary to water for 4 to 6 hours to get water to this depth. Keep water at least 10' away from the trunk. The length of time will vary based on the rate of water flow, method of irrigation (soaker hose, sprinkler, etc.), area covered, rate of water penetration, and topography. You

United States
Department of
Agriculture

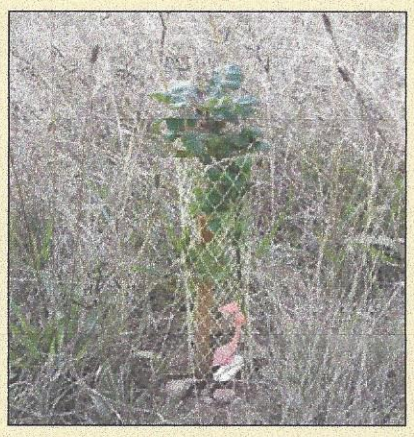
Forest Service

Pacific Northwest
Research Station

General Technical
Report
PNW-GTR-804
February 2010

Planting Native Oak in the Pacific Northwest

Warren D. Devine and Constance A. Harrington



No matter how much effort is put into an oak planting, it is realistic to expect that some of the seedlings will die. Sometimes seedlings die as a result of unforeseen circumstances such as flooding, wildfire, rodent damage, or even unplanned mowing operations. For perspective, when oaks reproduce in nature, most of their acorns never even become seedlings, and most of the seedlings that become established die before they become saplings. For the purposes of this guide, an oak is considered to be "established" after it has grown large enough so that mortality from animal damage or summer drought is unlikely. An established oak has consistent height and diameter growth each year and is taller than its neighboring vegetation. When planting oak, it is not unusual to have 10 to 25 percent mortality in the first 2 years and a similar amount of mortality over the next 5 years. A practical approach is to plant two to three times as many trees as are ultimately desired in the stand. Trees can always be removed later (or, with great effort, transplanted) if too many become established.

The planting approach described here focuses a relatively large amount of effort on individual seedlings to maximize survival rate. One reason for this approach is the relatively high cost of native oak seedlings compared to, for example, Douglas-fir seedlings. Another reason for the intensive approach is that many people planting native oak seedlings are planting a relatively small number of them and have a strong interest in seeing the majority of them survive and mature.

Where to Get Oak Seedlings

Nursery Seedlings

Native bareroot and container-grown oak seedlings are produced by an increasing number of commercial nurseries in California, Oregon, Washington, and British Columbia. Some of these nurseries also carry larger seedlings, saplings, and even small trees. Usually, the price of quality nursery seedlings is less than it would cost to grow them yourself. Seedling prices differ depending on size, age, and whether they are sold in a container or bareroot. Native oak seedlings are in high demand; therefore, it is important to begin contacting nurseries well in advance of when the seedlings will be needed.

Most nurseries will have several seedling stock types available. These may include bareroot seedlings (grown in a nursery bed), plugs (seedlings grown in narrow containers), and containerized seedlings (sold in their pots). Seedlings of different ages may also be available, price increasing with age. Owing to natural genetic variation throughout a species' range, oak seedlings may grow best if they are planted in the same region from which the acorns were collected (e.g., the Puget Sound Area, the Willamette Valley, the Columbia River Gorge).

Give Them Room! Spacing Trees Correctly

May 21, 2018 | Posted by Dave G | Evergreen Trees, Flowering Trees, Guides, Informative, Ornamental Trees, Privacy Trees, Shade Trees | 0 comments

A drive around any older neighborhood will quickly show you giant trees right up against houses, blocking windows, damaging foundations and drains, and making rooms dark and gloomy. Bad decisions about planting distances are easy to find, so why are they made?

The biggest single reason for poor tree placement is the way we see plants as cute and small, and our wish to surround our homes w green. But the consequences, in removal costs, damage, insurance claims, and in the forced cutting down of heritage trees, are seriou Trees take time to grow, and many can and do grow large, so when planting a tree it really is worthwhile to take some time, and use a measure tape, when choosing that planting spot. Don't get caught out 20 years from now by a hasty choice of tree species, or plantin spot.

Remember: Roots Spread Wide

There is a common idea that the roots of trees extend to the 'drip line', the place where the foliage ends. The image of the root-system being an upside-down version of the branches is very wrong, because for almost all trees **the roots extend 1.5 to 3 times the height of the tree**. A sixty-foot tree will therefore have some roots over 150 feet from the trunk, but those outermost roots are small feeding roots – usually not the large structural roots that cause damage.

The depth of roots, on the other hand, is much less than the height, although this is affected by the soil. Deep, sandy soil allows roots to penetrate downwards 10 or 20 feet, but many soils have hard clay or rock just a few feet down, and that effectively prevents deeper rooting – as is seen when a tree blows over in a storm.

Consider What Tree It Is

How far the roots will spread, and how badly they might affect drains and foundations, depends not just on the ultimate height of the tree, but on what kind of tree it is. The most well-known of these aggressive trees is the weeping willow, but all willows that grow larg

can be a problem. Other trees with similar habits include cottonwood, aspen and any other **poplar trees**, **silver maple**, Norway map black locust and American elm. These trees should be planted 100 feet from any buildings, drain pipes, sewers or swimming pools. D forget to consider your neighbors home and pipes too.

On the other hand, most conifer trees – like **spruce**, **Thuja** and **pine** – have more fibrous, shallow root systems that rarely cause problems. That is why they are popular choices for lawn specimens, hedges and screens. But just because they don't create damage doesn't mean they won't get too big for your garden, and evergreens are especially bad for blocking light.

Think About the Hidden Future Costs

Planting trees too close to a building – your own or your neighbors, or a property line, can end up costing you plenty of money. So cai choosing a tree that is too large for your property. The removal of large trees, especially in confined spaces, is expensive. So is rippin sewer lines and replacing them. If your tree invades your neighbor's lines, or damage their foundations, you will be left facing the bill its repair. Tree experts can pin-point, through root examination, exactly which tree is doing the damage, and you may not like what th find. Neighbors can force you to remove a tree that is, or could, be damaging – at your expense.

Tree trimming to remove dangerous over-hanging branches is expensive too and may need to be done regularly. Many people plant trees, thinking they can leave any problems to future owners, but trees that are, or could become, dangerous problems will reduce th re-sale value, so you do end up paying for your own mistakes.

How Much Room Should I Allow?

With all these considerations, when you are looking for trees to plant, look at the final sizes listed for them and then get out into the garden with a measure, to see how much room you really have, considering all the things we have talked about here. Look at the plac you were thinking of planting and consider the following distances.

To protect foundations, sewers and drains, allow the following spacings:

***Small trees**, such as flowering dogwoods, magnolia, or smaller conifers* – allow 10 feet.

***Medium-sized trees**, such as **fruit trees**, birch trees, or larger Japanese maple* – allow 20 feet

***Large-trees**, like sugar maple, oaks, Gingko, or flowering pear* – allow 30 to 50 feet

***Large, aggressive trees** like poplars, silver maple or willows* – allow 100 feet

Distance From Buildings and Other Trees

There are other factors worth considering when planting near your home, besides protecting foundations. First there is visual scale. A typical two-story home, with a pitched roof is 20 to 25 feet tall. Many trees, evergreen or deciduous, will grow 60 to 80 feet tall, and ri alongside your home that is going to look pretty silly. Besides that, overhanging branches can break, causing roof damage, or if the w tree comes down in a storm it will demolish most of your home. Far better to plant trees that grow no more than 40 feet tall within a feet radius around your home. Keep those larger trees further away, where you can see and admire their beauty, without any risk.

Consider too the width of the tree. As a rule of thumb, if you half the width listed for a mature tree, that should be the minimum dist away from the house – even then the branches will in time touch the windows. So a better rule would be two-thirds of the listed widt That is also a good rule for spacing trees apart, if you want them to retain their individual identity. Trees planted close together make nice forest, but that may not be the garden style you had in mind!

Think About Light

If you are planting a larger tree, where will the shadow fall? Roughly speaking, a tree will cast a shadow equal to its height by mid-afternoon in mid-summer. That shadow will be to the south-west of the tree. In winter the shadow will be much longer, which is why evergreens are not good choices near a house. On the south side of your home, a deciduous tree may cast welcome, cooling shade ir summer, and let warming sunshine through in winter – a much better choice.

Don't Be Put Off Planting Trees

All of this doesn't mean you shouldn't plant trees – with all the joy and beauty that brings. It does mean you should choose wisely. To we have many smaller versions of full-size trees available, plus all the trees that stay small naturally. There are many, many good cho available, depending on your circumstances, so plant away – just give some thought before you do it. If you really do want a specimer a giant redwood in your courtyard garden, there is always bonsai!

SFGATE HOME GUIDES

How Far Apart Do You Have to Plant Live Oak Trees?

With the potential to live as long as 200 years, live oaks (Quercus virginiana) are evergreen trees that grow approximately 24 inches every year. Because this oak variety has a large canopy and root system, you need to place these trees strategically and distance them from other plants and structures. These shade-producing trees prefer U.S. Department of Agriculture plant hardiness zones 8 through 11.

Ideal Spacing

Although your live oaks may be immature specimens now, you should space them according to their mature height -- live oaks grow to a staggering 80 feet tall. As a result, their spacing needs to be no less than 40 feet. The space beneath the tree, such as within the drip line, is the most important area to keep clear. Planting shade-loving plants under each tree only increases stress for all the plants involved. If possible, maintain an even larger space between trees to increase sunlight penetration and natural resource availability.

Root Spread

One of the main reasons for strategic spacing is root spread. With such a tall height, live oaks grow many shallow, horizontal roots extending well past the drip line. The top 24 inches of soil provides nutrients, oxygen and moisture for the tree's feeder roots -- water moves into the roots as it carries critical elements for growth. If you space the trees too closely, these natural resources become limited, causing one or multiple trees to suffer dieback from poor nutrition or moisture loss. Your spacing also helps the trees remain firmly anchored in the ground. Large roots having little room to spread cannot support the limbs and foliage above -- your tree may topple in high winds or a strong rainstorm.

Canopy Diameter

Live oak canopies span almost 100 feet wide in proper conditions. Because they do not lose leaves like a deciduous tree, they easily shade the surrounding area significantly. If you plant your trees too closely together, one tree suffers from poor energy production.