

Native Oaks and Proper Irrigation

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CLWM, CLIA

December 2021



Native Oaks

Oftentimes, native plants die in non-native landscape situations due to a number of factors, due primarily to improper irrigation, or improper irrigation practices.

While many native plants can withstand over-watering for a period of time during establishment, most cannot, and many eventually show signs of over-irrigation by dropping leaves, wilting and turning yellow along with other symptoms that look similar to not having enough water.

Hence the cycle of over-watering

continues to the detriment of the plant or landscape. While we have discussed proper irrigation practices for standard landscape situations, or ones where the plants are not drought tolerant or sections of the yard that have large turf areas, native plants and those that are more xeric in nature, do not need tropical amounts of water.

And of the native plants, native trees are the most valuable and can be the most heartbreaking to lose from poor irrigation scheduling. Areas where development meets native habitat is usually called the urban/wildland interface, and in many cases, native trees are sometimes incorporated into the landscapes of homes or common areas. Local ordinances can protect native stands or groves of these trees, or by requirements on the development to try and preserve the natural community of trees for the benefit of the residents, or by state and local law. **If the trees are left in place and not irrigated or the root area not covered in hardscape, sidewalks or roads, many of these majestic trees survive and provide the benefits of carbon sequestration, absorption of carbon monoxide and release of oxygen, control of erosion through roots anchoring soil and reducing impacts from heavy rain.**

Trees absorb oxygen through their leaves, and the cells within those leaves, which in turn they use to create energy and some carbon dioxide, as we do. This CO₂ is then released back into the environment. But, the amount of carbon dioxide that trees emit is dwarfed by the amount that they can store. Some species of larger, mature trees can provide a day's supply of oxygen for up to four people.

According to the Arbor Day Foundation, in one year a mature tree will absorb more than 48 pounds of carbon dioxide from the atmosphere and release oxygen in exchange. **While most native trees can get by on natural rainfall, some years there is not enough and many stress from the effects of drought.**

Both drought and insects have claimed hundreds of thousands of native trees in California over the last decade. Many in the local forests, some in the oak woodlands and grasslands that are left and many in yards, city parkways and parks in Southern California. One of the most prominent native trees in the area is the Coast Live Oak or scientifically called *Quercus agrifolia*.

Many of these trees have evolved to withstand periods of drought, but non-native insects from other countries or even other parts of the US can attack these trees, like the gold-spotted oak borer, killing them during a drought, where they otherwise would have survived. Some trees are able to survive a year or two of below normal rainfall but will be killed or damaged by prolonged or repeated droughts. Long-term weather records indicate that 5-year drought periods are not uncommon in California and many of the live oak trees in Southern California are more than a century old. It is reasonable to assume that this species has evolved with certain mechanisms that can withstand adverse impacts of even long term droughts. Of the trees that have died, many were in shallow soils with south or west facing exposures where the sun and heat last longer during the day. In these instances, some infrequent summer irrigation could have saved them if they were in yards or slope areas of parks. In nature, they would become deadfall that eventually decay to provide soil nutrients. In other cases, too much water from your irrigation system could have also killed them.

Many of the areas that make building a home so inviting are also the same places where native trees have established due to the local climate, soils and hydrology. Once any of those change, the establishment and growth of native trees can also change and cause whole groves to die or decline if soil moisture is completely absent in the summer.



Large, mature coast live oak suffering from past drought stress.

Proper Irrigation

Proper irrigation of both native established trees and those planted by homeowners and land managers can mean the difference between a large, healthy tree and one that falls over in a storm or dies decades later from rot. All native plants have evolved around certain environmental conditions that make them adapted to the local weather. Climate is the overall conditions in a large geographical area, such as most of Southern California has a Mediterranean climate. Weather on the other hand is the outside condition at a certain point in time. Such as the weather today will be sunny and 75, with an afternoon breeze. Climate changes over longer periods of time, such as summer vs winter. With the weather, today can be sunny and tomorrow it's raining.

So planning for the weather that will be occurring during the week helps determine what amount of water will be needed and when. In the winter, most native trees and shrubs will not need any supplemental water. Not only would you waste time and money watering plants that don't need it, some plants can die if their roots are wet too long. A sagebrush plant would not be growing in or right next to a creek or pond that floods its roots. Likewise, a cottonwood or willow would not likely be growing in the middle of the desert unless there was an adequate water source.

Coast live oaks can withstand long periods of dry weather, but they do need deep watering or rainfall events to wet the soil down to the point where the tree can use that soil moisture during the summer and fall when evaporation is greatest. Mature oaks can root in deep soils by up to 6 or 8 feet in ideal conditions, and root spread can sometimes be beyond the canopy, so watering right around the trunk or just along the dripline of the canopy is not usually enough.

In a study by UC Cooperative Extension, researchers found that most established oak trees can benefit from some infrequent summer water, applied at the right location at the right time. "Under periods of prolonged drought, supplemental irrigation of established oak trees may prevent their decline and death. If irrigation water is applied well away from the tree root crown area but within the tree rooting zone, even frequent summer water application is not be detrimental to established oak trees." (UC Cooperative Extension, Nov 1993).

Now that we have established that some summer water can be beneficial, and with newly planted trees, necessary, the amount and timing of that water needs to be determined. As with any plant, the larger the size, the more water they use. Some native plants go summer dormant and watering them like ornamental plants can kill them. Trees bought from a nursery that have been grown on regular water can tolerate summer irrigation to get them established. Some oaks have even been planted in lawns, but many do not do well, and after decades of turf irrigation, suddenly die, or fall over in wind storms. It is not advisable to plant live oaks in lawn areas. Other trees that can tolerate regular lawn watering can be planted there. If you already have an oak tree in a lawn, keep the turf at least 10 feet away from the trunk and try not to spray the truck directly with sprinklers. Adjust the system to water the area under the canopy where the roots are as much as possible.

Native oaks are best installed in planter areas, open landscape areas or locations that can be mulched or interplanted with other native plants. And coast live oaks get big. One of the largest is located on the Pechanga Indian Reservation near Temecula and is estimated to be over 1,000 years old and has a trunk diameter at breast height (DBH) of about 20 feet, making it one of the oldest and largest oak trees in the western United States.

When planting a small, 5 or 15 gallon oak, proper planting helps get the tree established and also helps with irrigation. You can hand water these trees if you don't have an irrigation system by building a basin around the tree, with the planting hole being about 2x the width of the rootball, but the same depth. Newly planted and younger trees require more frequent irrigation. Initially upon planting, build the berm so it's inside edge is just above the edge of the root ball to direct water above and into the soil of the root ball.

As the tree becomes established, move the berm out to the edge of the drip line, and continue to widen as the tree matures. The basin can also be used with an irrigation system such as drip. Don't use a turf spray system for lawns that waters only a few minutes a day since it is not sufficient to get water down into the rootzone. For young trees, filling up the basin at least a couple times per week during the summer and fall should provide enough water as they mature and establish.



If using a drip, two or three drippers of at least 4 gallons per hour should be placed near the tree and used to fill the basin. This should be done based on the texture of your soil. If you have clay, you may need to water longer, less frequently. If sand, water shorter periods, more often. A rule of thumb for drippers on small newly planted oak trees is three times per week at 30 minutes per irrigation if using 2, 4gph drippers at 25psi in the summer. This is based on a water application rate of 2 in per week. If using a hose, fill the basin at 3x per week, filling it twice each time and allowing the water to percolate into the soil before filling it a second time. In the second summer, this may only need to be done 2x per week.

After the tree is established, usually after the third year, you can replace the drippers with micro sprayers that cover the rootzone more completely. This helps to water the anchor roots that are deeper in the soil as well as the secondary surface roots so that water is not concentrated near the trunk or in one spot under the tree. Micro sprinklers can be of the spray or spin type and should be at least 10 gallons per hour or more. Water should cover most of the area under the canopy to be effective. In the photo, yellow arrows indicate edge of tree canopy and red circle is wetted area of micro sprinkler. As the tree grows, the sprinkler area can be increased or you can add another sprinkler to cover more area. Once established, trees can be irrigated longer, less often.

A 15gph micro sprinkler would need to run approximately 60 min, 2-3 times per month, allowing the soil to dry out between irrigations on mature trees. For large trees, irrigation during excessively hot or dry periods also helps to reduce leaf drop and drought stress but should only be done once or twice a month so that the tree is not killed accidentally from overwatering. Avoid watering the trunk directly on mature trees as this can increase chances of fungus development and crown rot. Watering tubes can also be used, but need to be at least 18" deep and placed at two or three locations around the tree, about 24-36" from the trunk. Do not water in the winter or early spring as rains should be sufficient to keep the tree alive. These techniques will help you establish new oak trees as well as keeping stately, mature trees alive during drought. For more information, go to RCRCD.org for details on tree planting and care.