



## Redwood Barn Nursery

1607 Fifth Street Davis, California

### Making a more drought resilient landscape

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With about seven inches of rainfall in 2020-2021, and the entire state in severe drought, attention has turned again to landscape water use. Water districts vary as to drought resilience, based on the diversity and stability of their water supplies.

Presently Davis has switched from primarily surface (Sacramento River) water back to the water from deep wells that we used prior to the voter-approved water project that conveyed river water to Woodland and Davis.

We had been using about 70% river water and 30% well water since the water project came on line. Due to state restrictions on the availability of river water, those numbers have flipped to about 70% well water. That is coming from deep aquifers that are apparently recharged laterally over a very long period of time. Prior to the city's move to those deeper wells, our water came from a couple of dozen shallower wells; that water was more directly tied to current rainfall patterns. Those wells are still available but are not the primary source of water now.

Davis is drought resilient for water supply, having three different sources to tap into, but residents are being asked to conserve 15% of water use. That's very easy to do.

#### **The technical aspects:**

##### **ET rate.**

The evapotranspiration rate is a measure of how much water a plant theoretically needs. Plant species differ, so many years ago a standard measure was established: an area of tall fescue turf, mowed to 4 inches height in full sun. ET measures the water that evaporates from the soil surface and the water used by the plant as it transpires. You can find estimated or measured ET rates posted daily from CIMIS weather stations all over California

(<https://www.cimis.water.ca.gov/>).

On a typical summer day here, the ET rate is about .25". An inch of water is 0.62 gallons per square foot. So 1,000 square feet of that turf is theoretically using 155 gallons of water per day. Even watered more carefully it's about a gallon per square foot per week for a lawn.

##### **Landscape coefficients vs crop coefficients.**

Early uses of ET for irrigation scheduling were for agricultural crops, since reducing water below the measured ET rate can reduce yields. How do we apply this to landscapes, which are mostly plants grown for shade, flowers, colorful leaves, or other aesthetic characteristics?

Plants differ as to how much water they require to look good and grow well. Ferns and cactus have very different water needs. Adjustments to the ET rate have been developed, either by testing or observation by plant professionals, so you can assess what a particular plant actually needs in order to perform adequately.

Landscape designers and serious gardeners may be interested in the ongoing process of vetting landscape plants for water use. The Water Use Classification of Landscape Species (WUCOLS: <https://ucanr.edu/sites/WUCOLS/>) is a long-running project which has sorted thousands of species by water use, based on observations and experience of dozens of field horticulturists.



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*“A key strategy to increase efficiency is matching water supply to plant needs. By supplying only the amount of water needed to maintain landscape health and appearance, unnecessary applications that exceed plant needs can be avoided.”*

This data is very useful when designing a new landscape for grouping plants by their water needs. It's also pretty technical and a little overwhelming to the average person.

### **Watering based on ET rate**

Water plants in a manner that relates to current weather and site conditions. Water use is highest when it is hot or windy, is higher in full sun than shade, and is higher near reflective surfaces.

Gardeners grow flowers, pretty shrubs, vegetables and fruit trees – all of which are typically higher water users. In a drought, perhaps we can change our expectations from what is optimal to what is acceptable.

### **The SLIDE Rule**

A simpler method of determining your landscape's water need has been developed, and the research support for this can be found online for those who like that sort of thing: <https://ucanr.edu/sites/UrbanHort/files/217692.pdf>, cleverly called the Simplified Landscape Irrigation Demand Estimation, or SLIDE<sup>1</sup>.

Key quote:

*“Tree, shrub, and groundcover species growing in arid climates with a relatively dry growing season (e.g. areas with Mediterranean climates and many portions of the southwestern and intermountain west U.S.) typically need water in the amount of about 50% of ETo during the growing season in order to provide acceptable appearance and function.”*

Got that?

Most of the woody plants in your yard can get by (“acceptable appearance”) with water applied at about half the rate of the measured ET. When rainfall is abundant and there is no constraint on water use, we could increase irrigation to get better growth and appearance. But in a severe drought watering can be cut back more than most people think without adverse consequences. I'll take this one step further.

Most of the shrubs, perennials and ground covers, and young trees in your yard grow just fine with one thorough, deep soaking once per week. Most would be ok, if not optimal, with one deep soaking every two weeks.

Trees that are a few years old, and species of special concern, will be ok with one deep soaking every two weeks. Established trees benefit from a deep watering once a month. In years of average rainfall or higher, many trees need no additional watering.

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<sup>1</sup> Adopting the SLIDE Rule for watering

[https://ucanr.edu/sites/UrbanHort/Water\\_Use\\_of\\_Turfgrass\\_and\\_Landscape\\_Plant\\_Materials/SLIDE\\_Simplified\\_Irrigation\\_Demand\\_Estimation/](https://ucanr.edu/sites/UrbanHort/Water_Use_of_Turfgrass_and_Landscape_Plant_Materials/SLIDE_Simplified_Irrigation_Demand_Estimation/)



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Plants from arid regions often don't need any summer irrigation once established. Some "species of special concern" include maples (especially Japanese maples), coast redwoods, magnolias, and birch trees. While we might not recommend these trees in most situations anymore, there are plenty of them around the area and it would be a shame to lose them. So focus your extra watering on trees and shrubs that you know will be adversely impacted by drought.

### **Know your water use areas**

The high-water users in your landscape are beds of annual flowers, vegetable gardens, fruit trees (with some exceptions), and lawns.

Let's talk about lawns.

We live in a Valley Grassland plant community. The natural landscape of our area is a mix of annual and perennial bunchgrasses, some native flowering annuals and perennials, and occasional oak trees very widely spaced. Someone walking through this area hundreds of years ago, probably hiking around the tule marshes and sticking to the grassier knolls, would have been traversing ankle-high grasses that would be largely brown in summer.

Some folks have apparently adopted this natural pattern simply by stopping the watering of their lawns, as evidenced by dead and dying lawns all over town.

We can adopt the principle of acceptable vs optimal for lawns without going to the brown extremes. It's been known for a long time that many lawn species can look adequate and maintain good density when watered at 80% of the measured ET. If you go much lower than that, many turf species will thin out and get clumpy. Open soil invites weeds. If you cut back on your watering to, say, 50% of ET, your lawn's appearance will suffer, but you can just scatter more seed in the bare areas when the rains return.

As you go through this process, you'll likely notice that some of the grass types in your lawn fare better than others. Fescue grasses are more drought tolerant in general than other types. Some new, slow-growing perennial ryegrass varieties take drought well. And, of course, the bermudagrass you've been working so hard to eradicate? It'll be just fine.

As you choose the seed you use to repair your stressed lawn this fall, look for those that have better drought recovery.

The simplest way to reduce your water use is to reduce your total lawn area. Lawns should be functional. As the old saying goes: if the only time you walk on your lawn is when you mow it, maybe it's time to get rid of it.

### **The food garden**

Unfortunately, the food-producing parts of our landscape tend to be the highest water users per square foot. When a vegetable plant is drought stressed, the first things the plant will shed to protect itself are the flowers, young fruit, and new growth. Drought substantially decreases yield. Better to make a tradeoff of less lawn for more vegetables.

Drip irrigation systems can water your vegetables and fruit trees more efficiently, but you still need to run them long enough to water to a depth of at least a foot for vegetables and deeper for fruit trees. Exactly how long that takes depends on what brand and model of drip you have. A time-tested technique to see how deep you watered is to take a stick or long screwdriver (18"



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is best) and push it slowly into the ground the day after you run your system. It will penetrate easily into moist soil and be harder to push into dry soil.

Fruit trees are often described as needing a lot of water, but that is based on high yields expected by farmers. Home gardeners can accept lower yields and still have healthy trees by soaking deeply every couple of weeks.

Summer pruning, a technique used to reduce the size of the trees for small yards, can reduce their water use by up to 50%. Citrus are more drought tolerant than stone fruits, and can also be pruned for size control. There are some species of fruit trees that are very drought tolerant: figs, mulberries, pomegranates, persimmons, loquats, pineapple guavas, and more.

### **Choosing landscape plants**

As you select plants for your landscape or to replace your high-water flower borders, you can make use of many local resources, most notably the Central Park Gardens and the various themed gardens in the UC Davis Arboretum.

An excellent online resource is the UC Landscape Plant Irrigation Trials, hosted online at <https://ucanr.edu/sites/UCLPIT/> and with updates on their Facebook page. They are continuing to test new varieties and older species for drought tolerance, and one of the test gardens is here at UCD. Watch for their updates and open garden events.