

How to water efficiently

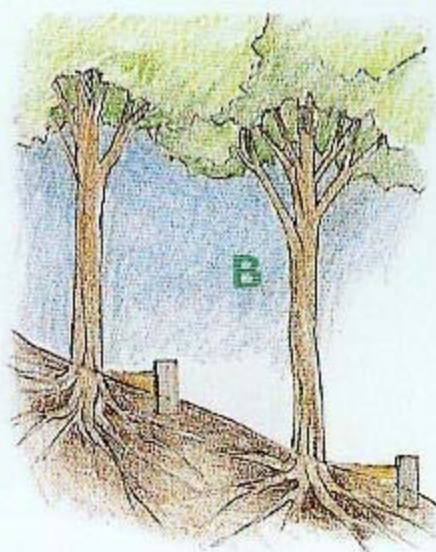
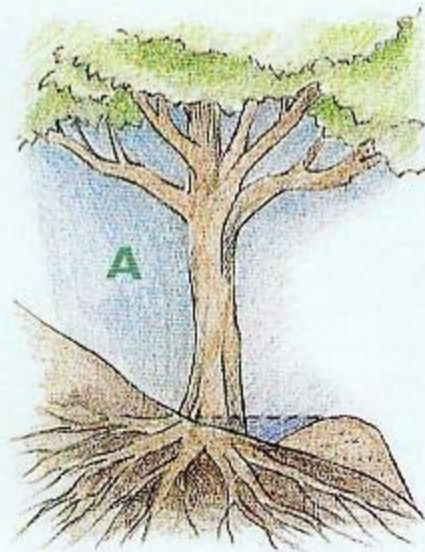
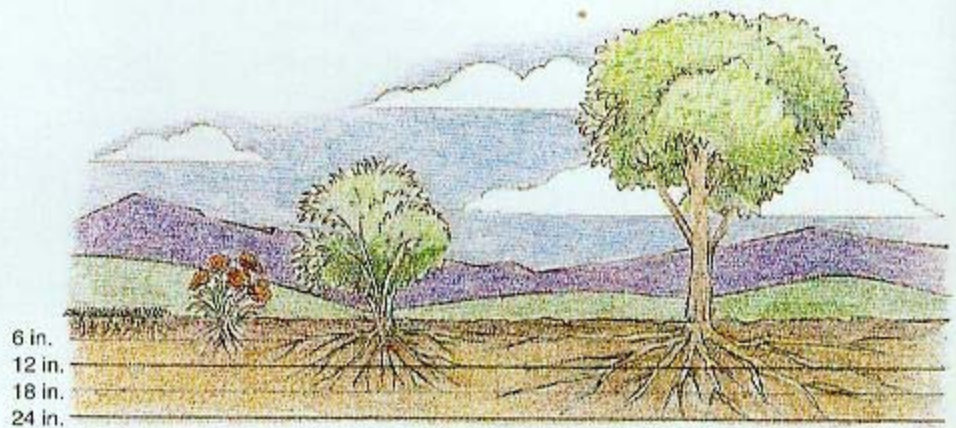
When determining how you should water, consider your plants. The illustration below shows comparative depths of root systems of various plants under ideal conditions. Because deeper roots are better able to withstand periods of drought, your goal should be to apply enough water to wet the entire root zone and to encourage deep rooting. Shallow watering leads to shallow roots and plants that are very susceptible to drought and fluctuating temperatures. You should also avoid applying so much water that it penetrates deeper than roots actually grow. That water is wasted.

How can you tell how deep the water is penetrating? Push a stiff metal rod into the soil after watering. It will move easily through wet soil but will stop or be harder to push when it hits dry soil. A soil sampling tube like the one shown on page 2 is also useful for checking water penetration.

Remember, your soil type will have a big impact on how much water you need to apply to reach a certain depth. To avoid wasteful runoff in heavy clay soils, you may have to pulse-irrigate: Water until puddles appear, stop until the water is absorbed, then repeat the cycle until water penetrates to the desired depth. Automatic controllers make this easy.

Comparative root depths

When following the advice to water to a plant's root depth, you'll accomplish your goal if you use the depth guidelines illustrated at right. Most of the feeder roots of even large trees are within the top 2 feet of soil, and they extend much wider than the plant's leafy top. Nonetheless, tree roots grow much deeper than grass roots, so don't assume that lawn irrigation will supply the needs of trees growing in turf.



Averting runoff on a slope

A. Forming individual basins. Build up the soil on the downhill side of the tree, so that water running down the slope will pool inside the basin and soak into the root zone.

B. Terracing. This technique allows you to level out the soil over the root zone, so that water can seep in instead of running off. Install header boards across the slope at the outside edge of the root zone, then add soil to within a couple of inches of the top of the board.

WATERING IN FURROWS AND BASINS

Basins 3 to 6 inches deep hold water around plants. On level ground, link basins to make watering easier.

Furrows 3 to 8 inches deep help a bubbler irrigate straight rows.

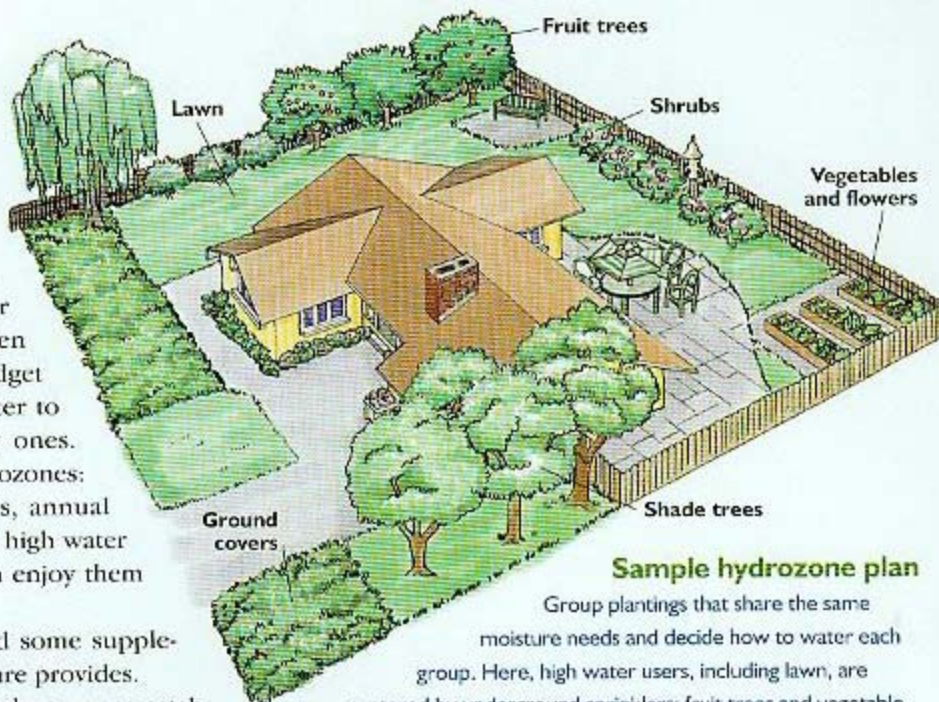


Source:
Sunset magazine
Date unknown

Hydrozoning

Savvy Western gardeners choose landscape plants that do well in their local climates, and they organize their landscapes into hydrozones—groups of plants with similar water, soil, and exposure needs. By doing so, it's possible to apply water very efficiently. Arranging your garden into hydrozones also allows you to budget your water use—allocating more water to thirsty plants and less to unthirsty ones. Plants can be grouped into three hydrozones:

- **High water users** include lawns, annual flowers, and vegetable gardens. Plant high water users near the house, where you can enjoy them and monitor their water needs.
- **Moderate water users** will need some supplemental water in addition to what nature provides.
- **Low water users**, such as native plants, once established, get along with minimal supplemental water to what nature provides. Plant larger spaces, perhaps in less prominent locations, with low water users.



Sample hydrozone plan

Group plantings that share the same moisture needs and decide how to water each group. Here, high water users, including lawn, are watered by underground sprinklers; fruit trees and vegetable and flower beds by emitter lines; moderate water users, such as shrubs, by individual drip emitters; low water—using ground covers by pop-up sprinklers; and shade trees by deep-root irrigators, as needed.

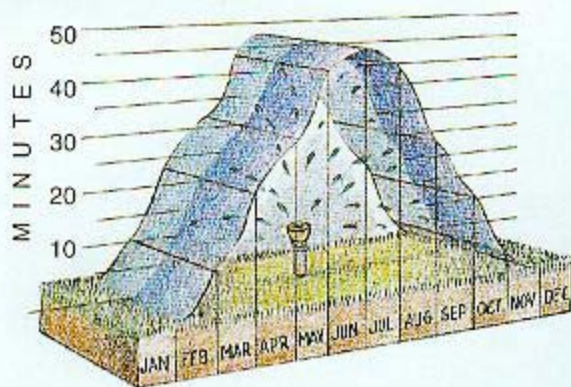
Efficient watering checklist

- **Water deeply, then let the soil partially dry before watering again.** Run your system long enough to wet the entire root zone. Use a soil probe to determine water penetration and soil moisture content. Before watering again, let the top few inches of soil dry out, depending on the size of the plant.
- **Avoid runoff.** Don't apply water faster than the soil can absorb it. Direct the water to plant roots by building basins or furrows of soil around plants. Avoid runoff on slopes with terraces or basins. Pulse-irrigate plants in clay soil or on slopes. Use drip or low-volume irrigation (see pages 11–15).
- **Adjust watering schedules** with the weather and seasons. Water less often in cool weather, more frequently during hot weather. Irrigate early in the morning,

when winds are calm and evaporation is low. When watering lawns, use ET guidelines (see "How season affects watering," page 6).

- **Group plants** with similar water needs (see "Hydrozoning," above).
- **Water only the target area.** Proper planning ensures you won't sprinkle sidewalks, driveways, or the sides of the house.
- **Know your soil.** Examine it frequently, making sure it is not too wet or too dry between waterings. If necessary, add organic matter to new planting areas to improve soil texture or to hold moisture better.
- **Maintain your irrigation systems.** Check them frequently for leaks, clogs, or misdirected sprinklers and emitters.
- **Apply mulch** to cool the soil surface, reduce evaporation, and retard weed growth.

- **Observe your plants.** Get to know the signs of moisture stress, such as droopy, off-colored foliage. Adjust watering schedules, if necessary, but first examine the soil. Symptoms of underwatering are very similar to those of overwatering.
- **Read your water meter.** To find out where you use water most, read your meter before and after watering each zone. Armed with that information, you can decide how best to conserve water around your garden.
- **Make use of advances in irrigation technology.** On the following pages, we'll introduce you to the latest irrigation technology, from drip systems to sprinklers to automatic irrigation controllers. They can greatly simplify watering chores and help conserve water.



This irrigation schedule was developed by a Northern California water district to illustrate the maximum weekly water needs of lawns in its service area. The sprinkler run time (the minutes column) is based on an application rate of 2 inches per hour spread out over a week.

How season affects watering

Plants use more water during hot, dry weather, so you need to irrigate more in summer than in spring or fall. (In winter in many areas, you don't need to water at all.) Also, wind dries out plants faster than still air, so plants require more water during windy weather. Day length also influences water requirements. From January until June 22 (summer solstice) days grow longer, while from late June until December 22 (winter solstice), they grow shorter. That's why in July, during a week of longer, 80° days, your landscape will require more water than during a week of 80° days in December.

As obvious as this sounds, gardeners often forget to adjust automatic controllers according to weather and seasons: Gardeners should water less in cool weather, turn sprinklers off altogether in winter or during rainy spells, and increase watering when it's windy or hot.

Your water department or cooperative extension service can provide you with very specific weather-related guidelines for watering lawns in your area. Based on evapotranspiration (ET) rates—the amount of water that evaporates from the soil and transpires from the leaves of a plant—these guidelines tell you how much water to apply (this is your water budget) based on historical weather data. *A Guide to Irrigation Water Needs of Landscape Plants in California*, published by the University of California, also provides watering guidelines. For a free copy, write to Department of Water Resources, Box 942836, Sacramento, CA 94236-0001.

Where does your water go?

OUTDOORS

- A ½-inch-diameter hose delivers about 300 gallons per hour, a ¾-inch hose up to 500 gph, and a 1-inch hose

as much as 600 gph.

- A standard sprinkler head emits ½ to 4 gallons of water per minute.
- One drip-irrigation emitter delivers ½ to 2 gallons of water per hour.
- In July, a 1000-square-foot lawn

needs 2,500 gallons of water in San Francisco, 5000 gallons in Los Angeles, and 7,500 gallons in Phoenix.

INDOORS

- A standard showerhead delivers 5 to 8 gallons per minute (50 to 80 gallons

for a 10-minute shower), or 1,500 to 2,400 gallons per month.

- A low-flow showerhead delivers 1½ to 3 gallons of water per minute (15 to 30 gallons for a 10-minute shower), or up to 900 gallons per month.