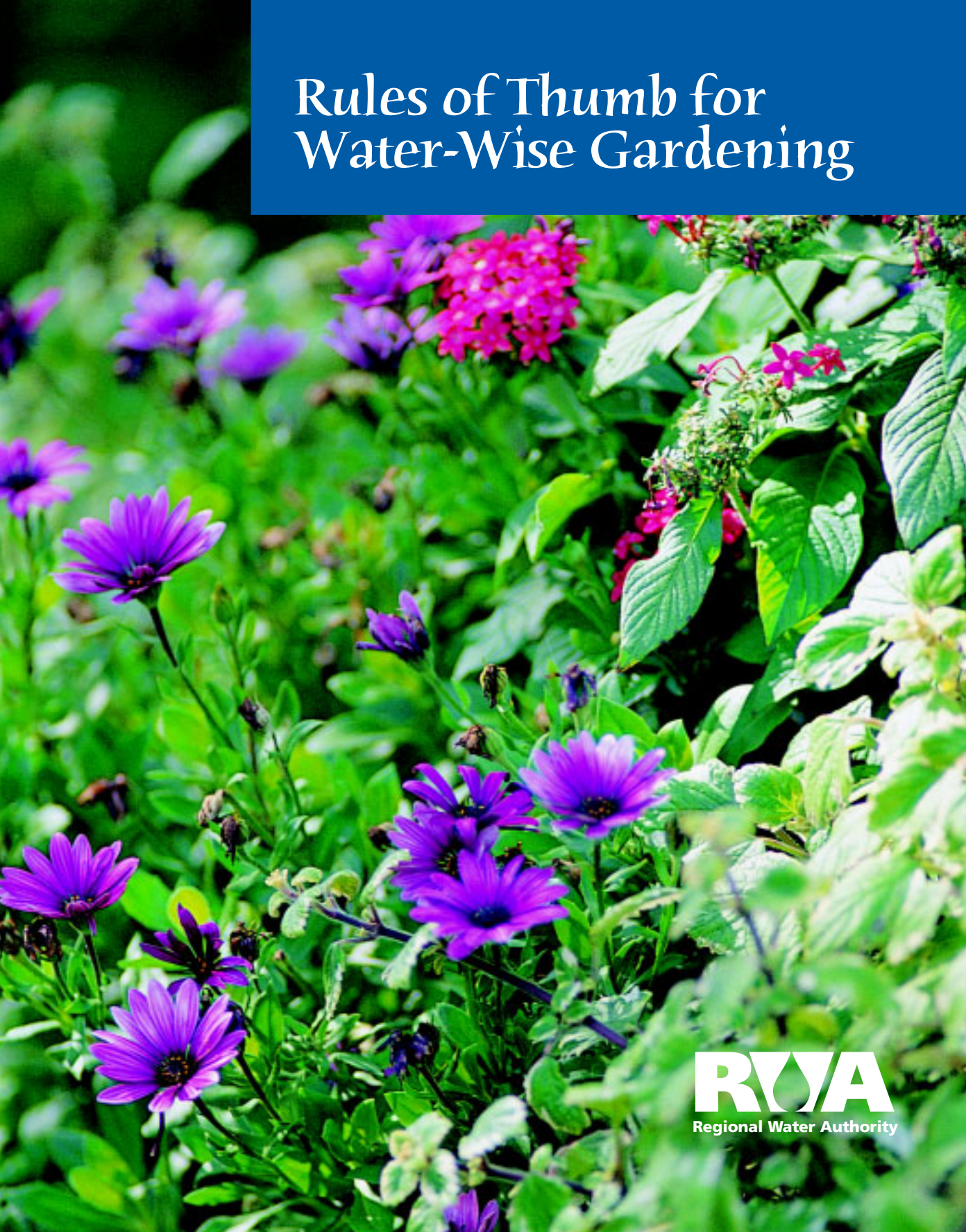
Rules of Thumb for Water-Wise Gardening

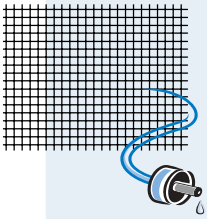


RWA
Regional Water Authority

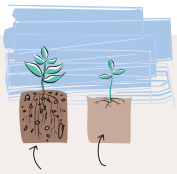
Rules of Thumb for Water-Wise Gardening

1 Design Your Water-Wise Garden

page 2



- Know your site
- Watering zones
- Plan lawn areas
- Plan a watering system
- Controller selection
- Hardscape
- Climate zones



2 Do the Groundwork

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- Know your soil
- Improve your soil
- Soil amendments
- Choosing plants

3 Water Wisely

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- When to water
- How much to water
- Watering on a slope
- Watering lawns

- Monitor water use
- Lawn care
- Fertilizing
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4 Maintain Your Water-Wise Garden

page 16

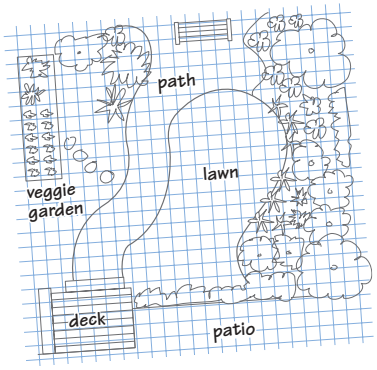
1. Design Your Water-Wise Garden

Planning is the first step for a successful water-wise garden. A well-planned landscape will save you money, time and water.

Get to know your site

Paying attention to your garden's unique characteristics will help you put the right plants in the right place. Look around carefully and note the following (use the notes section on page 20):

- Where are the sunniest areas? How long does the sun shine there each day in different seasons?
- Where are the shadiest areas?
- Do you have any slopes? How steep?
- Are there any spots where drainage is a problem?
- Is wind a particular problem?
- Are there any views you'd like to enhance or screen?



A landscape map can be the backbone of a successful design.

How will you use your garden?

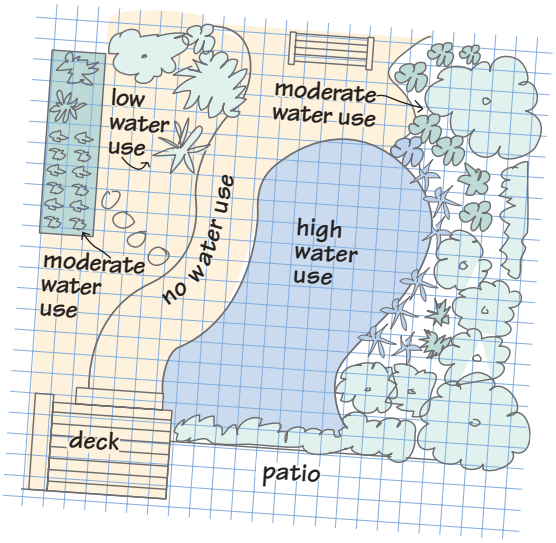
Will it be a place of quiet contemplation or a play space for kids? Will it be used for:

- Entertaining
- Play or sports
- Vegetable gardening
- Erosion or climate control
- Wildlife habitat

In addition, where are the most appropriate places for paths or walkways to the house?

Water-use zones

Many high water-use plants generally do better in shady areas. Before you purchase plants, look at the following chart, noting the different types of zones you have. Next, draw a rough map of your garden based on the zone information.



Mapping out your water-use zones makes landscape planning easier.

HIGH water-use zone	MODERATE water-use zone	LOW water-use zone	NO water-use zone
Lawns, water-loving plants Container plants	Plants needing a little more water than low water-use zone May take advantage of runoff from downspouts and patios, but avoid drowning plants	Many established trees and plants Requires little, if any, additional water during summer months	Hardscapes (patios, decks, walkways) and established native plants that can survive on rainfall only

Planning for lawn areas

Lawns are great for play and entertaining. But they also use lots of water and require continual upkeep. When planning your garden, think about how much lawn you actually need, and place it where it will be enjoyed. Consider lawn alternatives, such as hardy ground covers, decks, patios, containers, ornamental grasses or cut-flower gardens.

Groundcovers: Attractive, fragrant—even edible

Varieties of thyme, yarrow, verbena, chamomile and other herbs make delightful perennial lawn alternatives. What's more, they smell good when stepped on, some can be used in cooking and they generally require far less maintenance than lawns. Other plants, such as *ajuga reptans*, make great shade-tolerant groundcovers. After you "zone" your landscape, ask your nursery professional for the best groundcover suggestions for your particular site.

Turf Tips:

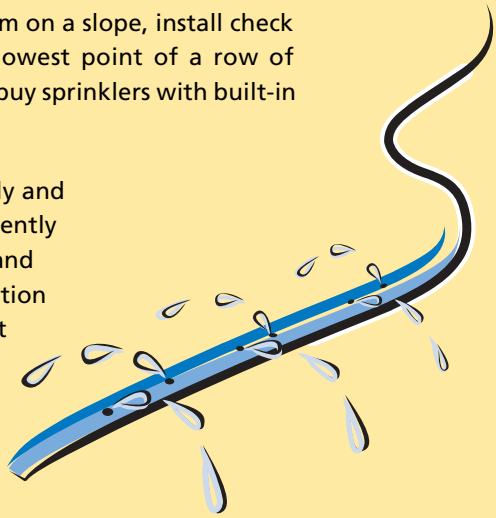
- Place grass near the house and in areas of heavy use.
- Avoid using grass on steep slopes, next to fences and along narrow walkways.
- Plant turf only where it will be used and enjoyed, such as in your backyard.
- Try water-conserving turf varieties. Hybrid tall fescue grasses need less water than bluegrass.
- Some sprinkler systems are less efficient at watering narrow lawn areas, so plan accordingly and check your system's operation and coverage.

Plan an efficient watering system

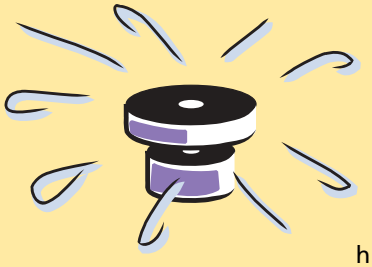
Design your watering system after planning all the zones, plants and hardscapes. An efficient irrigation system applies the right amount of water to the right place at the right time.

- Design your watering system to match your plan's water-use zones.
- Choose equipment appropriate for your design, layout and type of landscape as it grows and matures.
- Use separate irrigation valves for each water use zone so individual scheduling is possible.
- Make sure that drip emitters or sprinklers do not apply water faster than the soil's ability to absorb it.
- When designing a watering system on a slope, install check valves before sprinklers at the lowest point of a row of sprinklers to reduce puddling, or buy sprinklers with built-in check valves.

Drip systems apply water slowly and directly to the root zone, and efficiently water trees, shrubs, ground covers and containers. Filters and pressure reduction valves are usually required. Once a plant or tree is established, the drip emitter may be relocated and resized. Excess water near the base of a plant can cause problems.



Soaker hoses are inexpensive, easy to install off of a hose bib and do well in narrow planting beds.



Sprinklers are best used for lawns and larger, high-water use areas. They should apply water uniformly and at a rate that the soil can absorb; heads should be placed so that the water from one sprinkler reaches the adjacent heads, called head-to-head coverage.

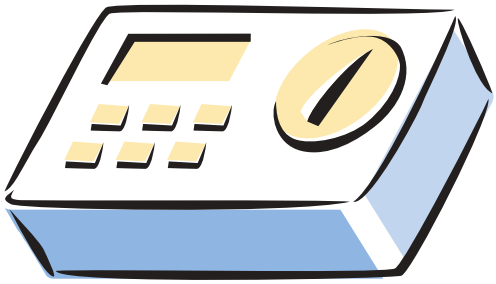
Need Help?

You can install a system yourself, or consult nursery personnel, landscape designers, landscape contractors or a landscape architect. Ask for referrals from friends and neighbors. Check with previous clients to see examples and ask about their experiences with the landscape professional.

Choosing a controller

Look for these features:

- Allows you to set varying times for each station. A controller should be capable of setting run–times in minutes or hours. For example, a drip station may need to run one hour a week or longer, whereas a lawn may only need to be watered twice a week for 10 minutes each time.
- Features multiple watering start times: good for slopes or heavy clay soils.
- Has a battery back-up or "non-volatile" memory. After a power outage, some controllers water every day for 10 minutes as a default.
- Has a water-budgeting feature which quickly lets you adjust your watering times depending on the season.
- Rain shut-off device capability (device is purchased and installed separately).
- Features multiple programs to support various landscape zones/stations.



Used properly, a controller with the right features can be one of the most effective water and money-saving tools you can buy.

Including hardscape in your garden design can save water and money and add versatility to your landscape.

Hardscape: not just concrete anymore

For high-traffic areas, entertainment areas or to reduce maintenance, consider replacing turf grass with hardscape. You can use decorative stepping stones, natural rock pavers or bricks with herbs such as thyme tucked in between. Accent your hardscape with large pots filled with colorful flowers, or a border of unthirsty salvias and other perennials.

Decks with seating areas are another good hardscape alternative. Pots, fence-hanging flower baskets and decorative fence or wall ceramics can turn your deck into an outdoor "room" for entertaining.

Greater Sacramento Area climate zones

Get to know the climatic factors that influence which plants will do well in your garden. Varying amounts of sun, heat, moisture and frost will influence which plants will survive and thrive in your garden.

Zone 7 - High Foothills

Hot, dry summers and mild, pronounced winters. Excellent climate for plants that need some winter chill to thrive, such as peonies and flowering cherries. Typical winter low temperatures: 23° to 9° F.

Zone 8 - Cold-air Basins of Central Valley

Long, hot, dry summers. Cold air from zone 9 settles here, making some winter nights cold enough to injure fruit and citrus trees. Fruit trees that need chill grow well here. Typical winter low temperatures: 29° to 13° F.

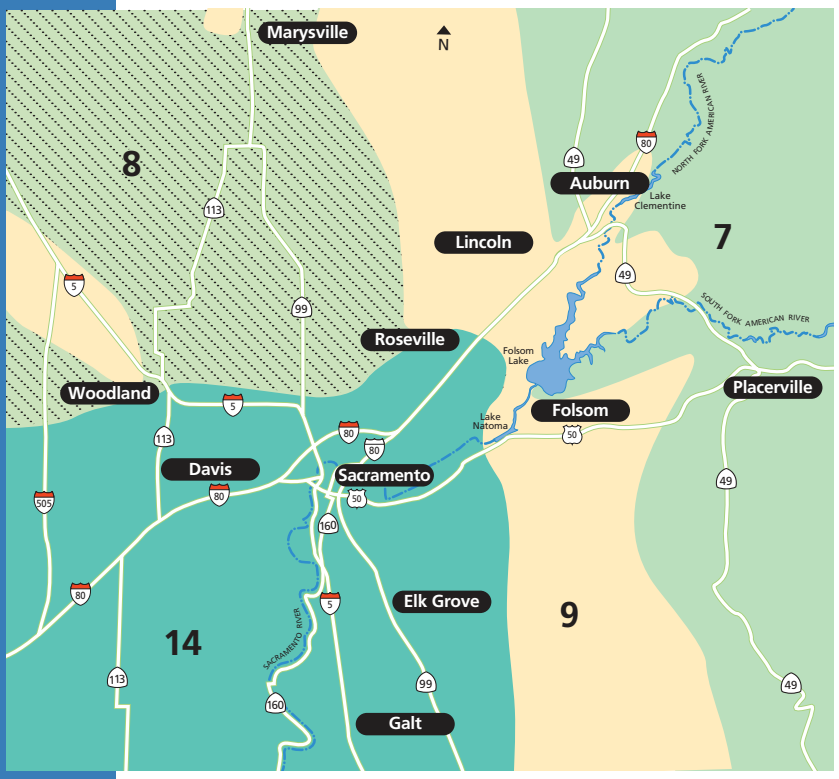
Zone 9 - Thermal Belts of Central Valley

Long, hot, dry summers like zone 8 except that hilltops poke above winter fog and winter cold air flows to zone 8. Deciduous fruits and vegetables thrive. Safer for hibiscus, citrus, melaleuca and pittosporum. Typical winter low temperatures: 28° to 18° F.

Zone 14 - Inland Areas with Ocean Influence

Similar to zone 8 but occasionally gets some marine influence that is cooler in summer and warmer in winter. Fruits that need winter chill do well here, as do shrubs needing summer heat. Typical winter low temperatures: 26° to 16° F.

The descriptions and maps on this page are adapted from the "Sunset Western Garden Book" 7th edition, copyright 2001. Used with permission.



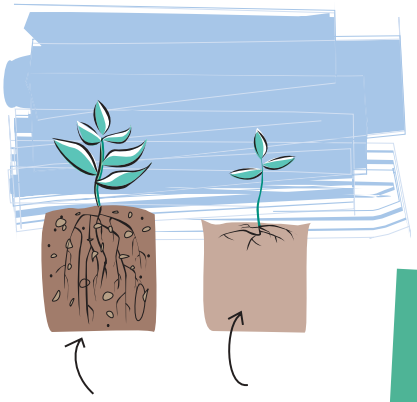
2. Do the Groundwork

Impulse shopping at the nursery can be fun. But devoting some serious thought and planning to your garden before you buy—from the soil to the watering system—will save you money and headaches in the long run.

The right plant in the right place

Before you purchase plants, read up on their water, sun, soil and maintenance needs. Using your zone diagram and rough map from Step 1, choose plants that correspond to appropriate zones in your garden. Group plants together that share similar water, sun and soil needs. And remember—they grow! The one-gallon plant you buy today could grow into a 20-foot tree, so be sure to select plants that will grow to an appropriate size for their location. Following recommended guidelines for spacing can also help prevent overcrowding of plants.

Check projected growth and height of any tree or shrub you plant, and choose its location accordingly. Otherwise, you could end up with a space-hungry pruning challenge, like this blue spruce.



Roots in an amended soil have room to reach out to acquire water and nutrients.

Compacted soil makes it difficult for roots to develop properly, depriving the plant of air, water and nutrients.

Get soil-savvy

Many water-wise and other plants prefer loamy to partially sandy soil that drains well, yet holds some water. Soils are often clay, which retains water for a long time. This type of soil often gets compacted, which can be harmful to root systems.

Soil Type	Identification	Texture
Sand	Difficult to form a ball. Crumbles easily.	Gritty
Loam	Forms a ball. Holds shape.	Smooth with grit
Clay	Forms a ball. Holds shape very well. Can form a ribbon between fingers.	Smooth

Improve the soil

It's a good idea to check your garden's soil and, if necessary, add organic materials to improve it. Some gardeners also test the pH of their soil for acidity/alkalinity, which can be altered by working in organic materials to the entire planted area.

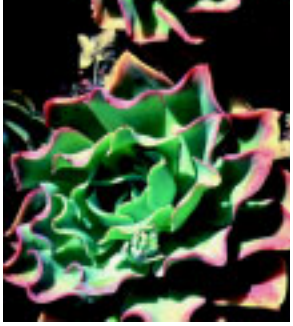
Soil amendments

Many gardeners believe that they need to use either sand, gypsum or lime to improve the quality of their soil; however, this is often untrue. To aerate your soil, try using organic matter (see below) instead of sand. Lime is rarely needed in our area because it is often used to lower acidity of soils typically located in wetter climates. Gypsum is extremely difficult to properly mix with the soil and is rarely needed in residential landscapes.

Compost	Mix in compost from your garden or obtain varieties available at local nurseries to improve the quality of your soil. Mushroom, redwood and fir compost are commonly available in nurseries throughout the area. Free compost or composting classes may be available through your local city or University Extension.
Manure	Both aged chicken and steer manure are frequently used as a mulch or soil conditioner.
Mulch	Any organic material placed over the soil, such as shredded bark or leaves, also adds nutrients to your soil. See pages 18 and 19 for more details on mulches.

Choosing plants

Water-wise gardens focus on plant varieties that thrive with little water. However, no plant is "wrong" in a water-wise garden—it just needs to be in the right zone to use water most efficiently. You can select desert plants, Mediterranean varieties, herbs and perennials from around the world, or native plants. Lush plants, such as ferns and mosses, can play a part, provided they're in the right water-use zone (see Step 3, "Water Wisely"). Include a lawn if you like—but consider limiting it to play/entertainment areas, and use low-water-use grass varieties.



Succulents use little or no water.

Nurseries generally feature an ever-growing number and selection of water-wise plants. Several (see the list inserted into the back pocket of this guide) specialize in particular plants or offer personalized services. It's fun and instructive to look through plant guides that focus on native, perennial and other water-wise plants. Remember to keep in mind your water-use zones and plants' individual water, sun and soil needs as you select plants. Using your map, write in names of plants for particular locations. You can also use the plant wish list on page 10.

Keep in mind your water-use zones and plants' individual water, sun and soil needs when selecting plants.

Columbines are colorful, moderate-water use perennials.

Want ideas?

There are many local water-wise gardens and specialized nurseries. Check the list inserted into the back pocket of this guide for locations and phone numbers.

Many perennials, like this salvia, are low-water use plants.

Most ferns are a high-water use plant.

Plant Wish List

Plant name	Water needs			Sun needs			Notes
	Low	Medium	High	Full sun	Partial sun	Shade	Other needs, size, maintenance; bloom season
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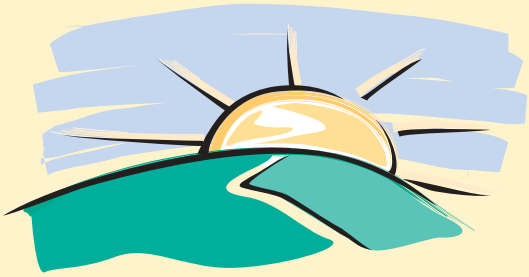
3. Water Wisely

It pays to know when, how much and how often to water your plants. A flexible watering schedule—preferably using a drip irrigation system—can save water and money by adjusting to changing weather conditions. Your watering schedule can also help prevent runoff, encourage deep root growth and better meet plants' changing water needs.



Water at the right time

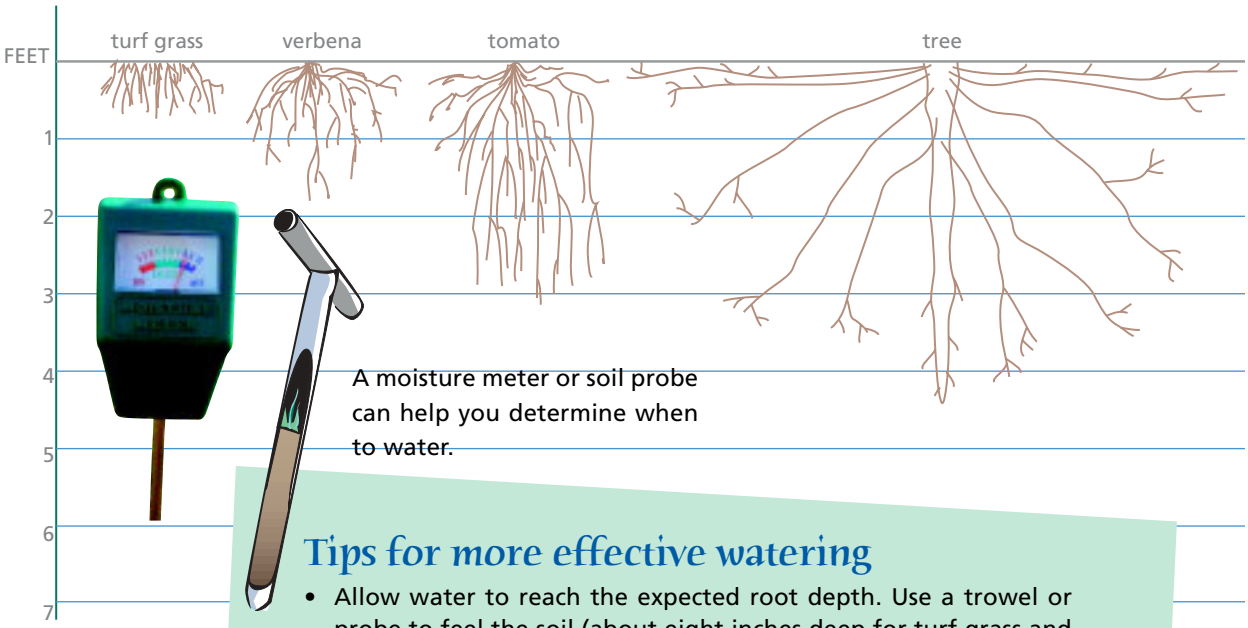
If you have a drip system, you can run it anytime because it minimizes water loss from evaporation and runoff. Sprinkler systems, on the other hand, should be run when it's not windy and when it's cool—midnight to early morning—to reduce evaporation.

Water deeply but infrequently

Deep soakings encourage roots to utilize moisture deep in the ground and enable plants to thrive between waterings. Not sure how much to water? Use your soil type as a watering guide ("Get soil–savvy" on page 8).

Watering at the right time of day can save water, money and energy.

Soil Type	Watering Considerations
Sand	Apply water faster and more often.
Loam	Apply water at a moderate rate but less often than for sandy soil.
Clay	Apply water slowly and infrequently. If you have heavy clay soil, consider adding compost to improve drainage and aeration.



A moisture meter or soil probe can help you determine when to water.

Tips for more effective watering

- Allow water to reach the expected root depth. Use a trowel or probe to feel the soil (about eight inches deep for turf grass and two to three feet for shrubs and trees). Record the total time required for water to reach this depth.

Total time required for water to reach eight inches

Total time required for water to reach two feet

- Apply only the amount of water the soil can absorb at any one time. Stop watering before runoff or puddling occurs. You may need to divide the irrigation time into several shorter periods or cycles.

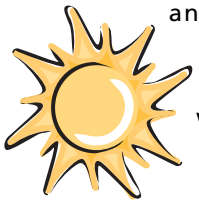
- Before watering again, allow the soil to dry to a depth of 1/3 to 1/2 of the root zone depth; time and record how long that takes. Then, water again for the same amount of time, watering in cycles if necessary. Most absorptive roots of grass are in the top 8–12" of soil. Most shrubs have roots in the top 18", and trees have most of their absorptive roots in the top 2–3'.

Total time required for soil to dry to a depth of several inches

- Get to know your plants' signals for water. If moisture is low, grass tends to lie flat under footprints. Some plants lose their luster and begin to droop before wilting. It's best to water before the onset of such stress. Also keep in mind that over–watering can have the same effect.

Adjusting your watering schedule

When the weather and seasons change, adjust your watering schedule (and irrigation controller, if you have one). On warm or windy days, plants and soils dry out more quickly. During cooler and wetter months, you won't need to water as often. Check the soil periodically for moisture content.



A garden's water needs vary with the seasons.

Tip

In our mild-winter, semi-arid climate, fall is one of the best times to plant your landscape and aerate your lawns.

As plants grow and become more established, they often need less water. Check plants periodically and gradually decrease watering frequency, but continue to water deeply when you do irrigate.

Photo courtesy of Kay Stewart

Watering on a slope

- If possible, terrace the slope to reduce runoff potential.
- Use shorter watering times to avoid runoff; add another watering cycle if necessary.
- Consider planting a groundcover on the slope instead of a lawn.
- Use drip or rotor spray sprinklers on slopes.

Watering your lawn

Did you know that nearly half the summertime water used by local homes goes toward lawn watering? Lawns need to be watered only once every three days to remain healthy and green, yet many are overwatered and unhealthy. Here's a tried-and-true method for determining how long to operate your sprinklers if you water every third day.

Remember to change your irrigation timer seasonally!

Monthly adjustments are encouraged.

Spring
Mar. 15 - May 14

Summer
May 15 - Sept. 14

Fall
Sept. 15 - Nov. 14

Winter
Nov. 15 - Mar. 14

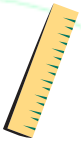
Lawn Problems?

Consult a landscape professional, or check with your local nursery or your local water purveyor.

Measure sprinkler ouput

Place five or more straight-sided cans or coffee mugs randomly around your lawn.

Run your system for 15 minutes.



With a ruler, measure the depth of the water in each can or mug.

Then determine the average water depth of the containers. Multiply the average by 4 to get the hourly precipitation rate. Use the hourly precipitation rate with the table on page 15.

SOME WATER PURVEYORS PROVIDE ASSISTANCE OR SERVICE TO HELP WITH THIS TEST.

Determine how long to water your lawn

	Hourly Precipitation Rate	TOTAL WEEKLY WATERING RUN TIMES Minutes to water each week in the Sacramento Valley based on hourly sprinkler output											
		JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
WARM SEASON TURF Bermuda grass and Zoysia grass	.5"	19 min.	44 min.	69 min.	101 min.	126 min.	158 min.	164 min.	145 min.	113 min.	82 min.	38 min.	19 min.
	1"	9 min.	22 min.	35 min.	50 min.	63 min.	79 min.	82 min.	72 min.	57 min.	41 min.	19 min.	9 min.
	1.5"	6 min.	15 min.	23 min.	34 min.	42 min.	53 min.	55 min.	48 min.	38 min.	27 min.	13 min.	6 min.
	2"	5 min.	11 min.	17 min.	25 min.	32 min.	39 min.	41 min.	36 min.	28 min.	20 min.	9 min.	5 min.
COOL SEASON TURF fescues, Kentucky Bluegrass and perennial ryegrass	.5"	25 min.	59 min.	92 min.	134 min.	168 min.	210 min.	218 min.	193 min.	151 min.	109 min.	50 min.	25 min.
	1"	13 min.	29 min.	46 min.	67 min.	84 min.	105 min.	109 min.	97 min.	76 min.	55 min.	25 min.	13 min.
	1.5"	8 min.	20 min.	31 min.	45 min.	56 min.	70 min.	73 min.	64 min.	50 min.	36 min.	17 min.	8 min.
	2"	6 min.	15 min.	23 min.	34 min.	42 min.	53 min.	55 min.	48 min.	38 min.	27 min.	13 min.	6 min.

NOTE: Use this watering chart as a guide only.
During winter months, water only during extended dry periods.
Source – "Lawn Diseases: Integrated Pest Management in the Home Landscape – Publication 7497, UC IPM"

Remember, the ground is like a sponge. To make sure it can absorb all the water your lawn needs, divide your total watering time into two or three cycles. For example, if your lawn requires 18 minutes of watering, don't water once for 18 minutes; instead, water three times for six minutes each. Water between 12 midnight and 10 a.m., avoiding the peak water use times of 5 to 8 a.m. if possible.

IRRIGATION FREQUENCY:

Although the preferred watering frequency is no more than 3 times per week, you may need to water more frequently if your lawn soil is compacted, if the lawn has a thick layer of thatch or if it is on a slope. Ideally, you should aerate or dethatch, so water can percolate through the soil. If that is not possible, you may need to water every other day during the hot summer months.

4. Maintain Your Water-Wise Garden

A small amount of regular maintenance throughout the year is all your garden needs to look great. Follow the tips below for an effective maintenance plan.

Checking your irrigation system

Clogged, leaking or misaligned drip emitters and sprinkler heads waste a lot of water—and money. Be water-wise and keep an eye on your system with these tips:

- Periodically check your sprinkler heads and drip emitters for clogging, leaks and malfunctioning (e.g., broken or misdirected) heads, then get them fixed. Clean the emitter filters twice a year.
- Look for wilting trees, shrubs and groundcovers and for dry spots in the lawn. They could point to inadequate water coverage, indicate that more water is needed if adequate coverage already exists or be a sign of too much water being applied.

Checking and adjusting your controllers

- Adjust your controller schedule at least two or three times a year: early spring, summer and fall (preferably monthly). Call your local water purveyor for help if you have trouble.
- As a rule of thumb, change your controller batteries when you change your clocks in the spring and fall.

Mowing, dethatching and aerating lawns

To look their best, lawns need constant upkeep, including regular mowing and aeration.

- Aeration allows water to penetrate and percolate down to grass roots. It promotes efficient use of water and also reduces soil compaction. To aerate, invest in a hand held aerifier. You can also rent an aerifier or pay a service to aerate your lawn. You may need to aerate more frequently depending upon the amount of foot traffic on your lawn.
- Dethatching, or removing undecomposed grass stems, leaves and roots, is important because this layer prevents air and water from entering the soil, leading to plant disease and water waste due to runoff. Dethatch a small lawn with a dethatching or garden rake, or, for larger lawns, rent, purchase or pay a service to use a vertical mower, which cuts through the thatch with a series of revolving blades. Avoiding summer months, remove thatch during the growing season so the grass has an opportunity to recover.
- Raise the mowing height of your lawn mower to encourage a more extensive root system. For bluegrass and tall fescue lawns set your lawn mower to cut two to three inches high. For additional information contact a lawn care professional or check with your local nursery.

Fertilizing

Fertilizers, especially organically-based ones, can work wonders for your garden. But too much fertilizer can damage plants and can impact stream and river water quality through storm drain runoff. So fertilize as needed, when new growth is less than normal or if color appears pale—but be sure to follow directions.

- One of the best, easiest and cheapest forms of fertilizer is compost. You can start a backyard compost pile easily with kitchen scraps (no meat or dairy products), garden and lawn clippings, strips of newspaper and a little soil. Check your library, garden center or the Internet for a how-to guide. Some cities also offer composting classes.
- Consider using organic fertilizers, such as aged and dried manure, cottonseed meal and dried blood meal.
- Try using a low-nitrogen fertilizer (nitrogen stimulates growth, creating a demand for more water).

If you do use chemical fertilizers, try a slow-release variety.

Pest control

Insects, snails and other critters—some beneficial, some harmful—are an integral part of any garden. Sometimes the most effective methods of controlling them are also the simplest. As with other maintenance, pest control should be part of your gardening routine.

- Begin by using simple physical control measures, such as hand-picking and setting traps and barriers.
- Try biological control measures by introducing predatory insects, such as aphid-eating green lacewings or ladybugs, or by using bacterial insecticides, such as *Bacillus thuringiensis*. Your garden center may have others to recommend.
- As a last resort, control with chemicals. Choose the least toxic products available (e.g., insecticidal soaps, horticultural oils, silica gel, diatomaceous earth and pyrethrin-based insecticides), but follow directions and use sparingly.
- For more information regarding pest control, contact the UC Cooperative Extension (916) 875-6913, or the California Integrated Waste Management Board, www.ciwmb.ca.gov.

Pruning

Pruning can be a regular part of your gardening routine, rather than a demanding yearly ordeal. Prune portions of your plants that are dead, diseased or damaged.

Moderate pruning will direct growth. Avoid heavy pruning, which requires plants to use energy and water to replace removed portions.

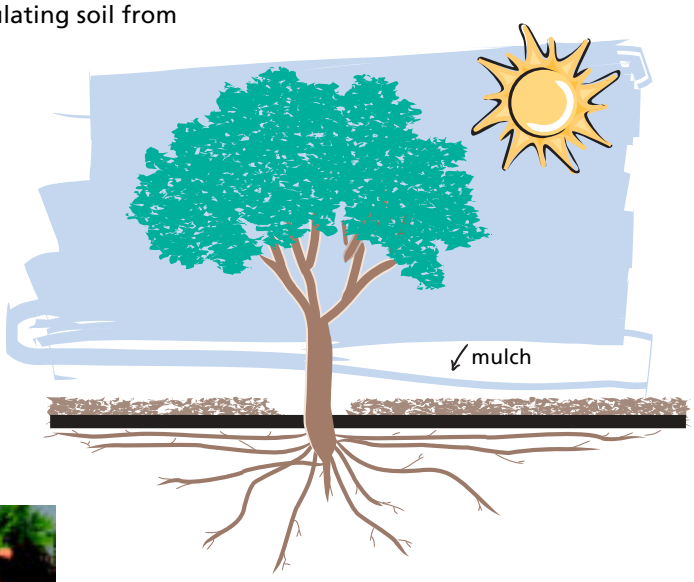
Mulching

Mulch is one of the quickest, easiest and most cost-effective ways to save water in your garden. It provides an attractive surface as well as many other landscape benefits. Mulch can:

- Conserve water by reducing evaporation
- Suppress weed growth
- Reduce erosion by allowing water to penetrate the soil
- Encourage better root growth by insulating soil from temperature extremes
- Improve soil

Applying mulch

Mulch should be layered three to four inches deep over the soil. Keep mulch about six inches away from the base of plants to prevent fungal diseases. Avoid using mulched material from diseased plants.



Weeding Tips

- Pull weeds when shoots first appear, before they set seed.
- It's easiest to pull stubborn weeds when the soil is damp.
- To keep weeds down, use mulch consistently.

Which mulch to use?

Organic Mulches

Mulch type	Facts
Bark	Bark is available ground, shredded or in chips. Ground fir, pine, hemlock or redwood are attractive and long-lasting. Fine-textured sawdust and wood shavings require nitrogen to decompose. Check the package label and, if not present, add a nitrogen supplement before applying.
Straw	Not a recommended mulch.
Aged or composted animal manures	Animal manures are effective for about a year. Fresh manure can burn plant roots.
Agricultural by-products	Agricultural by-products such as mushroom compost, ground corncobs and apple or grape pomace vary by region; check your garden center for resources.
Tree leaves	Tree leaves with thicker textures, like most oaks, make good mulch. Thin-textured leaves (maple leaves, for example) will compact into a water-repellent mat and are not recommended unless they are composted first.
Grass clippings	Grass clippings should be spread in a thin layer and allowed to dry before adding another thin layer. Also, consider mixing with a small amount of slow release fertilizer to prevent nitrogen depletion.

Inorganic Mulches

Mulch type	Facts
Polypropylene plastic	Polypropylene plastic (landscape fabric) allows air and water to pass through, but suppresses weed growth. Use it on steep slopes to limit runoff and erosion. For a more attractive appearance, cover the plastic with organic mulch. Plastic covers help conserve water, but they do not build up the soil.
Rocks	Rocks are available in varying sizes, shapes and colors and make a permeable and permanent mulch. Rocks help conserve water; however, they do not build up the soil.

NOTES

Be WATER SMART
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"Be Water Smart" Hotline
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www.rwah2o.org

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