water efficient
L A N D S C A P E S

In California, the largest use of all urban water is watering landscapes. When a landscape or irrigation system is poorly designed or poorly maintained, or the landscape consists of plants not suited to the dry and often hot California climate, water demand increases as a result of excessive evaporation, leaks, and runoff. Water consumption can be greatly reduced with careful planning, good plant selection, efficient irrigation systems, and good water management and maintenance practices.

Since California experiences frequent and sometimes prolonged droughts together with an ever-increasing demand, there is a great need for us to use water efficiently. But this doesn't mean we have to give up our gardens. We can use water more efficiently and still have colorful, esthetically pleasing landscapes, including some turf areas for recreation.

This brochure is intended to help you create a landscape that is not only water efficient, but attractive, colorful, and low maintenance. The designs illustrated here are typical back yards, but the principles of water-efficient gardening apply to front yards as well.

Planning ahead

Planning is the key to a successful water-wise landscape. It is tempting to go to a garden center and buy plants because they catch your eye, but not knowing where to place them and how much water they need is the beginning of an unnecessarily high water-using landscape. By planning ahead, costly mistakes can be avoided.

Contact your local water provider to see if it offers any services such as water audits or landscape planning. Some agencies offer landscaping classes and provide water conservation devices. Some also have demonstration gardens where you can witness water-efficient gardens in person, see how attractive they can be, and find ideas for your own site.

To get started, measure the landscape and draw the area and any existing landscape features to scale. This will give you an idea of the number of plants you will need, the size of the lawn, and how much irrigation pipe, sprinkler heads, drip tubing, and mulch you will need to buy.

Consider the size, sun exposure, and slope of the area to be landscaped. Avoid lawns on slopes that are difficult to mow and water. When landscaping slopes, choose plants that can stabilize soil with strong root systems, and use irrigation with slow application rates to avoid runoff. Before making decisions, think about who will use the landscape and how they will use it. These factors determine the type of plants required and how it will be maintained. Don't forget the need for shade and privacy screening.

When drawing the actual planting plan, avoid the temptation to place too many plants in an area. A crowded garden will use more water, cost more, be prone to diseases, and require more maintenance.

Consult books such as *Sunset Western Landscaping Book* about garden design. Many books have useful advice and ideas. Some are written with the dry west in mind and focus on landscaping with the proper types of plants for warm, dry climates.

If this phase of the project is too difficult, hire a licensed landscape architect or landscape designer. A landscape architect might be able to design the irrigation system for you, or you can consult with an irrigation design specialist. Be sure to keep a copy of the landscape plans for future reference. There are links to professional landscape associations at the back of this brochure to help you find the right professional for you.

How much grass do you really need?

Lawns use more water than any other part of a landscape and cover large amounts of acreage statewide. Lawns often are installed because an alternative was never considered. There are alternatives to lawns, so in the planning stage decide if lawn is really a requirement in your yard. Think of who will use it and how often, who will mow it, fertilize it, remove the thatch, etc.

Perhaps a lawn is not needed at all. If a grass area is really just space filler, consider alternatives such as pervious hardscapes, rock gardens, or an unthirsty groundcover. There are many beautiful groundcovers to choose from. This is especially important on areas with slopes that tend to shed water faster than it can soak in. Water draining into street gutters and storm drains usually discharges directly into streams, and this runoff from landscapes contains fertilizers, pesticides, and other pollutants.

If you choose to plant a turfgrass after considering these factors, minimize the size of the lawn and choose a grass type that doesn't require lots of water and fertilizer.

Warm season grasses such as Hybrid Bermuda Grass, St. Augustine Grass, and Buffalo Grass use much less water than cool-season grass like Kentucky Bluegrass. Certain Dwarf Tall Fescues use somewhat less water than Bluegrass. Recently, other low-water-using grass mixtures have become available for landscaping.

Warm-season grasses typically have a short winter dormant period, but winter dormancy occurs when many people are not actively using their gardens, and even dormant, warm-season grass provides a usable surface for people and pets. If the look of dormant grass is objectionable, it can be overseeded with another type of grass for the winter.

Good choices make good landscapes

Once a decision regarding the turf area has been made, choose trees and large shrubs next. Make these choices carefully; they are the "backbone" of any landscape, and poor choices will result in high water use, poor performance, and (frequently) costly maintenance or removal.

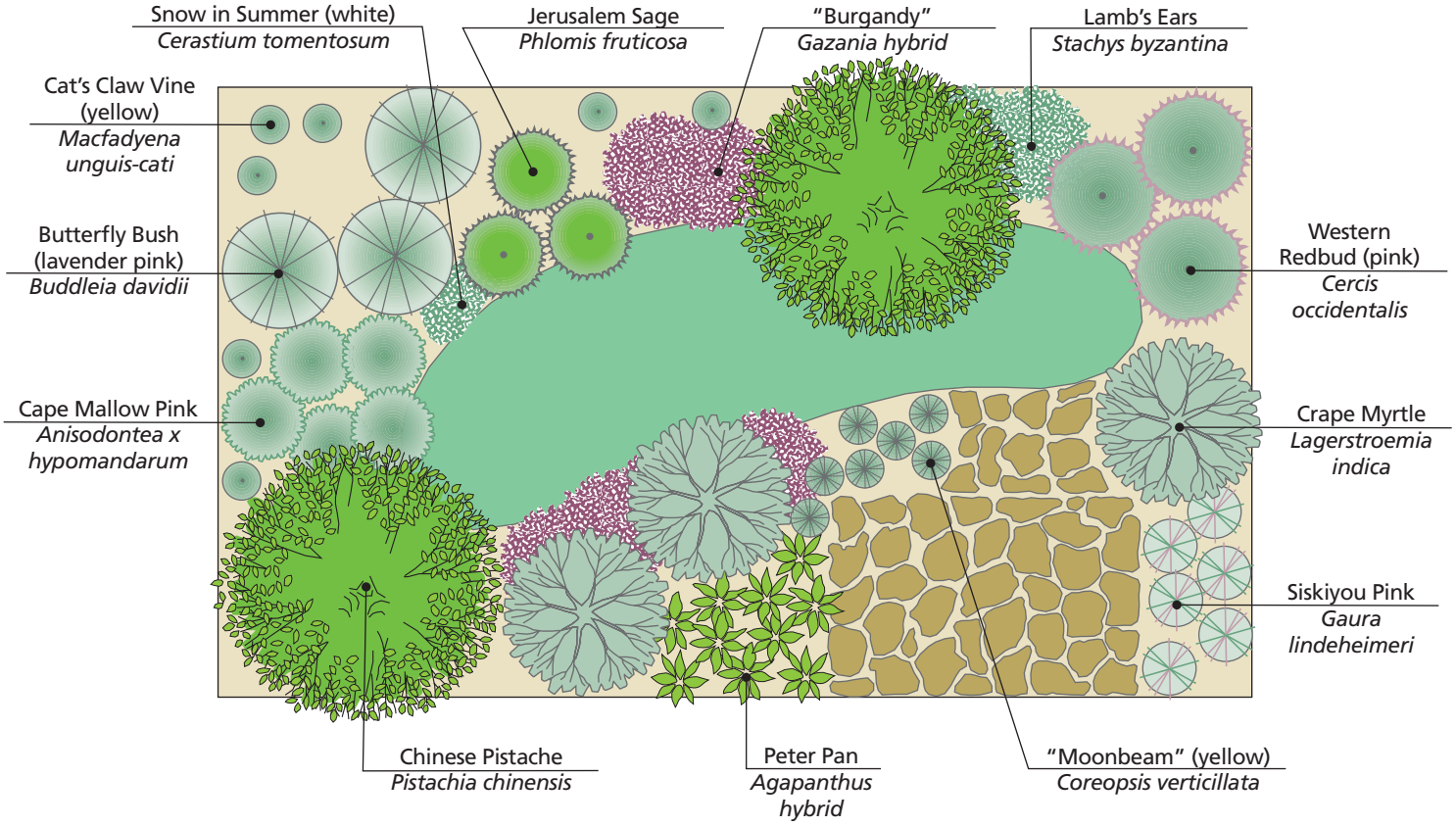
When selecting trees and large shrubs, choose varieties that will still fit into your yard when they mature. Learn what your climate zone is, and buy plants that are suited to it. Choose deciduous trees for shade and evergreen trees for screening.

Try to group plants by water requirements, such as very low (e.g. drought tolerant California natives, such as Blue Oaks, Western Redbud), low (e.g. Rosemary, Lavender), medium

water efficient landscape

What's right about this landscape?

Warm-season grass, permeable surface patio, water efficient plants with nearly year-round color, mulch in shrub areas, deciduous trees for summer shade and winter sun, a California native, shrubs attractive to hummingbirds and butterflies. This garden, with a landscaped area of 1,800 sq. ft., requires about 5,800 gallons of water to irrigate for the month of July in the Central Valley. A smaller lawn would make this landscape even more water efficient. A landscape of the same size with thirsty plants and a bluegrass lawn would require an additional 2,000 to 3,000 gallons of water for the month of July.



(e.g. Photinia, Euonymus), and high (e.g. Australian Tree Fern, Umbrella Sedge). Keep the high-water-using plants to a minimum as focal points.

For help with selecting trees, shrubs, and groundcovers consult a good gardening encyclopedia such as *Sunset Western Garden Book*, your local Cooperative Extension, or a reputable nursery. Your local Urban Forester or tree foundation can give valuable advice about which trees grow well in your area.

Another excellent reference is *Water Use Classification of Landscape Species* (WUCOLS IV) on the Center for Urban Horticulture website: **ucanr.edu/sites/WUCOLS**
This publication provides the estimated water needs of landscape plants in the six major climate regions of California. The WUCOLS database allows you to search by water use and plant types within a city or region. Guides of this type are valuable in the design stage by aiding in the selection of plants for groupings with similar water needs. These groupings of plants of similar water requirements are also known as hydrozones.

Irrigation

After the plants are chosen, design and install an efficient irrigation system—one that will deliver a sufficient amount of water where it's needed. If you need information or help to design an irrigation system, ask at an irrigation supply store or hire a licensed landscape contractor who specializes in irrigation systems to design and install it.

Several of the major irrigation equipment manufacturers sell inexpensive irrigation design manuals online and at supply stores. A good irrigation design manual will address important aspects of sprinkler design, such as sprinkler layout, water pressure, choosing the right sprinkler for the job, head-to-head coverage, and matching precipitation rates. Some manufacturers offer free irrigation design services. Manufacturers also offer online support and videos; some have phone support options.

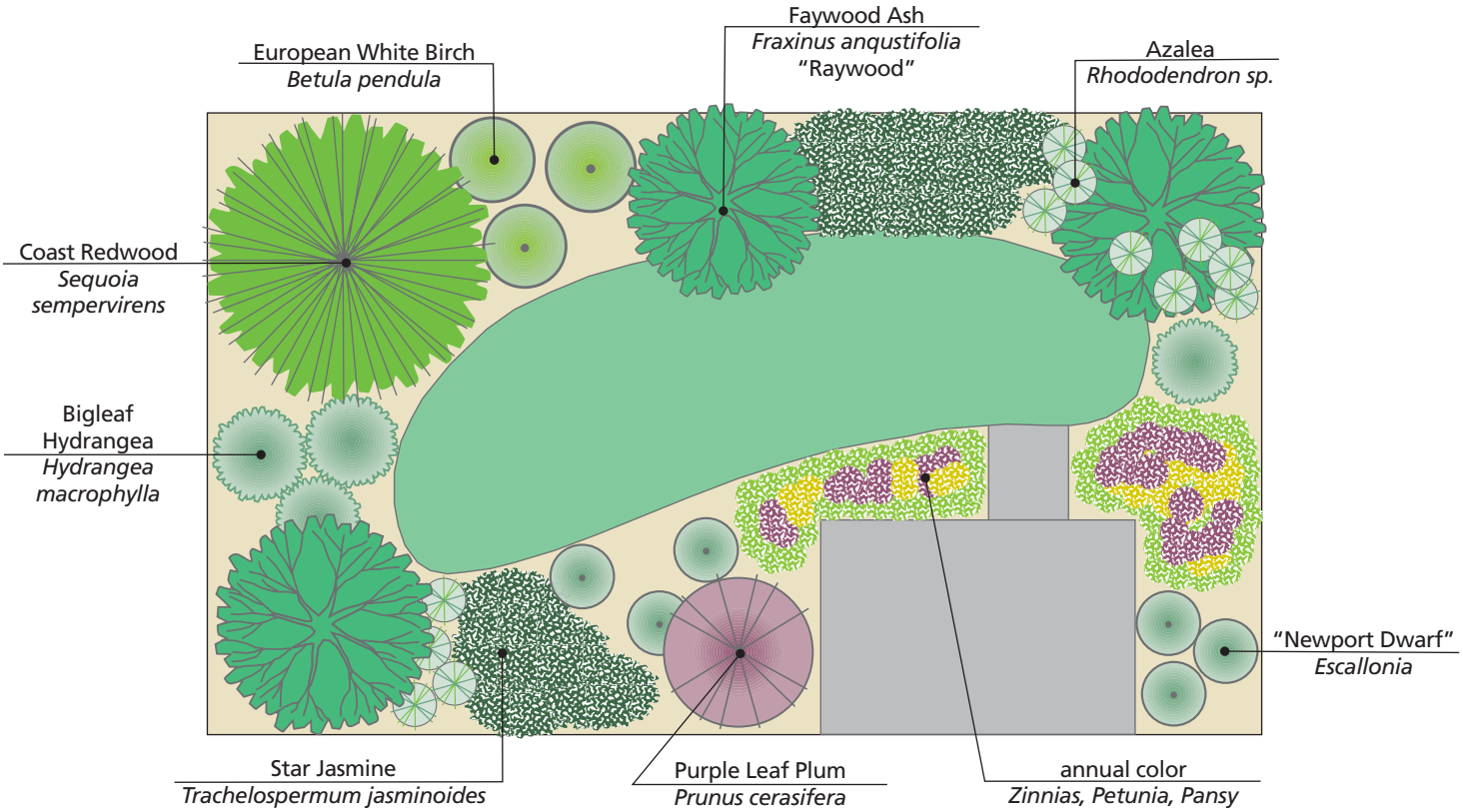
typical landscape

What's wrong with this landscape (from a water conservation point of view)?

Large lawn with cool-season grass, impervious patio, and a lot of high-water-using plants (Hydrangea, Azaleas, Birches, Annual color and Coast Redwood). This garden, with a 1,600 sq. ft. landscaped area, requires about 8,400 gallons of water to irrigate for the month of July in the Central Valley. This landscape requires over 2,500 gallons of water more per month (in July) than the previous example.

What could be a better version?

Although this landscape uses several water-efficient plants, the water use is still high. Smaller lawn, warm-season grass, less high-water-using plants, mulch, and avoiding large trees in smaller yards make landscapes much more resource efficient. For example, Redwoods need a lot of moisture and grow too large.



Always be sure to keep a drawing of the sprinkler layout and a list of parts used (including brand names and model numbers) for future reference. This will make any future repairs or additions much easier.

Use sprinklers that will apply water evenly. Use stream rotors on lawns and bubblers in shrub and tree areas. Microspray and drip also work well in container gardens and window boxes. The better-quality pop-up spray sprinklers work well in smaller areas, but avoid using sprinklers that create a fine mist, because much of that water is lost to evaporation and overspray.

Check the operating pressure with a pressure gauge at an outdoor faucet so that you can select the right sprinkler for the job. Sprinklers are labeled to show how far they spray at different pressures. Operation at too high pressure will create a lot of water-wasting mist, and too little pressure will cause uneven coverage. If your service pressure is too high, a pressure reducer may be needed.

When you water, apply it infrequently, deeply (throughout the root zone), and evenly. This will encourage deep rooting, which will make plants better able to withstand hot dry spells.

Lawns require water about once or twice a week in warm weather. Trees and shrubs require watering less frequently but for longer run times. Because of this, shrubs and trees should always be on separate zones from turf.

In the spring, fall, and winter, all plants need much less water than is required in summer. Consequently, watering time should be less frequent in the off peak seasons. Rainfall may be adequate in most places.

One way to make watering much easier is by using an irrigation controller, also called a sprinkler timer or clock. Timers can save gardeners a lot of time by watering automatically, but they can waste a lot of water if not reprogrammed to water less as the seasons change.

If an irrigation controller is to be used, be sure to purchase one with multiple functions. Buy one with extra stations in case you need to add irrigation zones later. Most importantly, adjust the timer monthly, weekly if needed, so that the irrigation time set for the summer is not set during the rest of the year. Include a rain shut-off sensor, and install it where recommended by the manuafacturer.

During hot or cool spells, most controllers can be easily adjusted without disturbing the original program. By using the "seasonal adjust" or "budget adjust" feature, frequent changes to the amount of time watering can easily be accomplished simply by pushing a button.

The amount of water applied can be increased or decreased in 10-percent increments. July is usually the peak demand for water, so it can be considered to be the 100-percent mark.

For example, during April the irrigation could be turned on and the controller set for 60-percent of the amount it will be watered in July. This can be accomplished by pushing the seasonal adjust button until the display shows 60-percent. The controller can be adjusted upwards gradually as the weather warms.

Likewise in fall, the season adjust can be adjusted downward beginning in August for most areas of California. This can continue through October or November. By November, the irrigation system can be turned off in most places in the state.

Rainfall may be enough for most areas during winter, but if supplemental irrigation is required, use the manual "on" switch to run the irrigation when the landscape shows signs of water stress. The controller can also be reprogrammed to run less frequently than it would during the rest of the year. Use a soil probe or large screwdriver to check the soil moisture. It may look dry on the surface but be moist underneath. If the soil is still moist, plants probably won't need to be irrigated. Always observe how a change in the irrigation schedule affects the landscape.

Some features to look for in irrigation controllers are:

- multiple independent programs (for different types of plant zones)
- several start times, cycle and soak (for heavy or compacted soil or sloped areas)

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water-wise plants

There are many water-wise plants to choose from that thrive in California's mostly moderate climate. These include both attractive natives and plants introduced from other Mediterranean-like climates. These unthirsty plants enable any gardener to create a water-conserving landscape. In addition to the plants shown in these water-efficient landscape designs, here is a list of some of the many water wise-plants that are available.

SHRUBS

Blue Hibiscus, Alyogyne huegelii
Coyote Brush, Baccharis pilularis
Barberry, Berberis x stenophylla
Bush Anemone, Carpenteria californica
Bush Morning Glory, Convolvulus cneorum
Smoke Tree, Cotinus coggygria
Euryops, Euryops pectinatus
Pineapple Guava, Feijoa sellowiana
Texas Ranger, Leucophyllum sp.
Pomegranate, Punica granatum

TREES

Madrone, Arbutus menziesii
Bottle Tree, Brachychiton populneus
Pindo Palm, Butia capitata
Australian Beefwood, Casuarina stricta
Honey Locust, Gleditsia triacanthos
Sweet Bay, Laurus nobilis
Interior Live Oak, Quercus wislizenii
Texas Mountain Laurel, Sophora secundiflora
Chaste Tree, Vitex agnus-castus

GROUNDCOVERS

Bearberry, Arctostaphylos uva-ursi
Carmel Creeper, Ceanthous griseus horizontalis
Red Spike Ice Plant, Cephalophylum sp.
Chamomile, Chamaemelum nobile
Creeping Coprosma, Coprosma x kirkii
Trailing Lantana, Lantana montedivensis
Creeping Mahonia, Mahonia repens
Pork and Beans, Sedum rubrotinctum
Australian Bluebell Creeper, Sollya heterophylla
Wooly Thyme, Thymus pseudolanuginosus

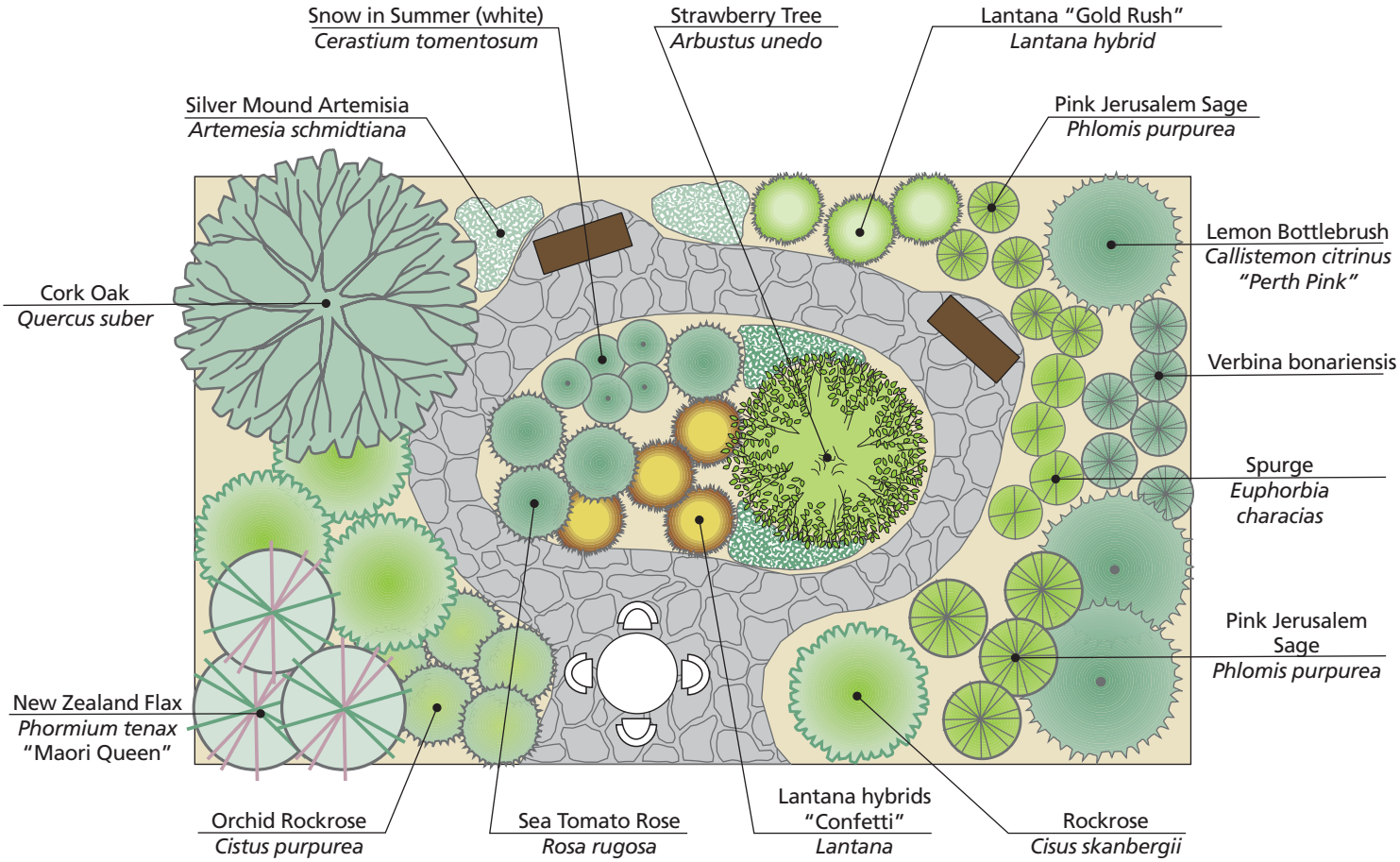
PERENNIALS

Yarrow, Achillea millefolium
Columbine, Aquilegia hybrids
Wormwood, Artemisia "Powis Castle"
Italian Arum, Arum italicum
Cast Iron Plant, Aspidistra elatior
Fortnight Lily, Dietes iridioides
Siberian Wallflower, Erysimum x allionii
Blanketflower, Gaillardia grandiflora
Sunrose, Helianthemum nummularium

strolling garden

Turfless is effortless—well, almost.

If you don't need grass, just a quiet place to enjoy nature and be outside, try installing a strolling garden. Many water efficient-plants are not fussy and don't require a lot of maintenance. Occasional pruning to rejuvenate and improve shape is all that many of these plants need. Unthirsty plants, organic mulch, and a permeable gravel path make this garden a real water saver. This garden, with a landscaped area of about 900 sq. ft., requires about 1,550 gallons for July in the Central Valley and only about 1,000 gallons on the Coast during July.



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- nonvolatile memory and battery backup (to keep the schedule current after a power failure)
- water budgeting in percentage increments (to water according to what the plants really need)
- rain shut-off device (to save water when the landscape is watered by rain)

These irrigation guidelines are general and may not always reflect the needs of your particular site.

The fun part

Once the irrigation system is installed, the lawn, trees, and shrubs can be planted. If your site has sandy or heavy clay soil, amend the soil with compost to increase the fertility and water-holding capacity or to improve drainage. Plant shrubs according to the plan so their leaves will just touch once they become established. This will ensure that the ground will be shaded by foliage with adequate air circulation. This "room to breathe" will make appreciating the foliage and flowers much easier.

Set all shrubs and tree root balls somewhat high in the planting hole so that the top of the root ball will not settle below grade.

If young trees need staking, use two or three stakes tied loosely and just high enough on the trunk to keep the trunk from bending over. Remove them once the trees can stand on their own. While stakes can support a newly planted tree, if left too long, they will actually cause the tree to grow weakly. Shorten the staking poles so they will not rub the bark of the new tree.

New lawns can be seeded, hydroseeded, or planted with sod or plugs. There are advantages to all of these methods; therefore, budget, time of year, and availability of products will determine the right grass planting method for your landscape. A good landscaping book will outline the steps to preparing, planting, and maintaining a lawn.

After the plants are planted, cover the ground around trees and shrubs with a three- to four-inch layer of organic mulch, keeping it away from the plant stems or trunk. Mulch will keep the soil cool and moist in warm weather and insulate it during winter. Mulch also has the added benefit of controlling weeds and enriching the soil by adding organic matter.

Routine maintenance keeps a landscape looking great

Regular maintenance of a landscape will keep it looking great and resource efficient. By working on small tasks on a continuous basis, the large tasks will be limited.

- Check the irrigation system frequently for leaks, broken sprinklers, and clogged emitters; repair with the correct parts.
- Adjust the sprinklers as needed. If water runs off the landscaped area before the irrigation cycle is complete, adjust the timer to run several times with a shorter duration each time. For example, instead of running it for 15 minutes continuously, adjust the timer to run three times that day for 5 minutes each time, with an interval in between to let the water soak in. This is especially important on slopes and high traffic areas and when deep soaking trees.
- Check the soil moisture depth with a soil probe or large screwdriver. If you use a screwdriver, push it in to the soil until you feel resistance. That is the approximate depth of where the soil is dry. If the moisture extends well below the root zone, cut back on the water by shortening the time of an irrigation cycle or adding more time between cycles.
- Observe how a decrease in water affects the landscape, and make adjustments as needed.
- Refresh the mulch layer in the spring.
- Prune only when necessary to shape the plant or remove dead or diseased parts.
- If fertilizer is necessary, use a balanced fertilizer, avoiding high Nitrogen mixtures that will cause excessive growth and could impact groundwater quality.
- When you mow, "grasscycle" the clippings. The clippings left behind on the grass will break down without causing a buildup of thatch.
- Aerate lawns occasionally to improve water infiltration.
- In times of drought, allow lawns to turn gold, and deep soak shrubs and trees only after they show signs of water stress. Water only in off-peak hours. If a drought becomes severe, community leaders may ask people to stop watering their lawns, but any trees planted in lawn areas will still need an occasional soaking to survive. Deep-soak these trees as you would any other tree in the landscape by drip, bubbler, or garden hose.

If a garden is comprised mostly of water-efficient plants, the landscape can be sustained on minimal irrigation through a drought and will be able to recover when water conditions improve.

The big picture

If good horticultural practices are followed, the dependence on chemicals in the garden can be reduced significantly. Mulching and grasscycling can greatly reduce the need for chemical fertilizers. Likewise, when less water is used, fertilizers and pesticides are not washed away. Less water controls excessive growth and reduces the amount of succulent new growth that is attractive to insect pests.

Since overwatering causes many problems with plants, it makes sense to be water wise. It will save money and time, as well as give the gardener the satisfaction of doing his or her part in solving California's real water challenge.

Resources to locate landscape professionals

California Landscape Contractors Association: **CLCA.org**

American Society of Landscape Architects: **ASLA.org**

Association of Professional Landscape Designers: **APLDCA.org**

American Society of Irrigation Consultants: **ASIC.org**

Irrigation Association: **Irrigation.org**

Contractors State License Board: **cslb.ca.gov**

State of California
The Resources Agency
Department of Water Resources
WATER USE AND EFFICIENCY BRANCH
P.O. Box 942836
Sacramento, CA 94236-0001

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Email: landscape@water.ca.gov
A copy of this brochure is available in PDF format at
water.ca.gov/wateruseefficiency/docs/water_efficient_landscapes.pdf

July 2017

Printed by DWR Printing Production Services