

# A Homeowner's Guide to a WaterSmart Landscape





This guide is intended to be used for general informational purposes; the guide does not take the place of professional advice. Please consult with appropriate landscape professionals for site-specific advice prior to making changes to your landscape or irrigation systems.



A non-profit organization that provides education and advocacy for ecologically-responsible landscapes.

This guide was developed and designed by Schmidt Design Group, Inc. "A Homeowner's Guide to a WaterSmart Landscape" was originally produced by the San Diego County Water Authority with support from a grant from the Metropolitan Water District of Southern California. The WaterSmart Landscape logo is copyrighted by the San Diego County Water Authority.



*Photo previous page: Cercis occidentalis/Western Redbud (Very low water use)*

## GETTING STARTED



# A Step-by-Step Process

To a beautiful and water-efficient landscape

## WE'RE ALL IN THIS TOGETHER

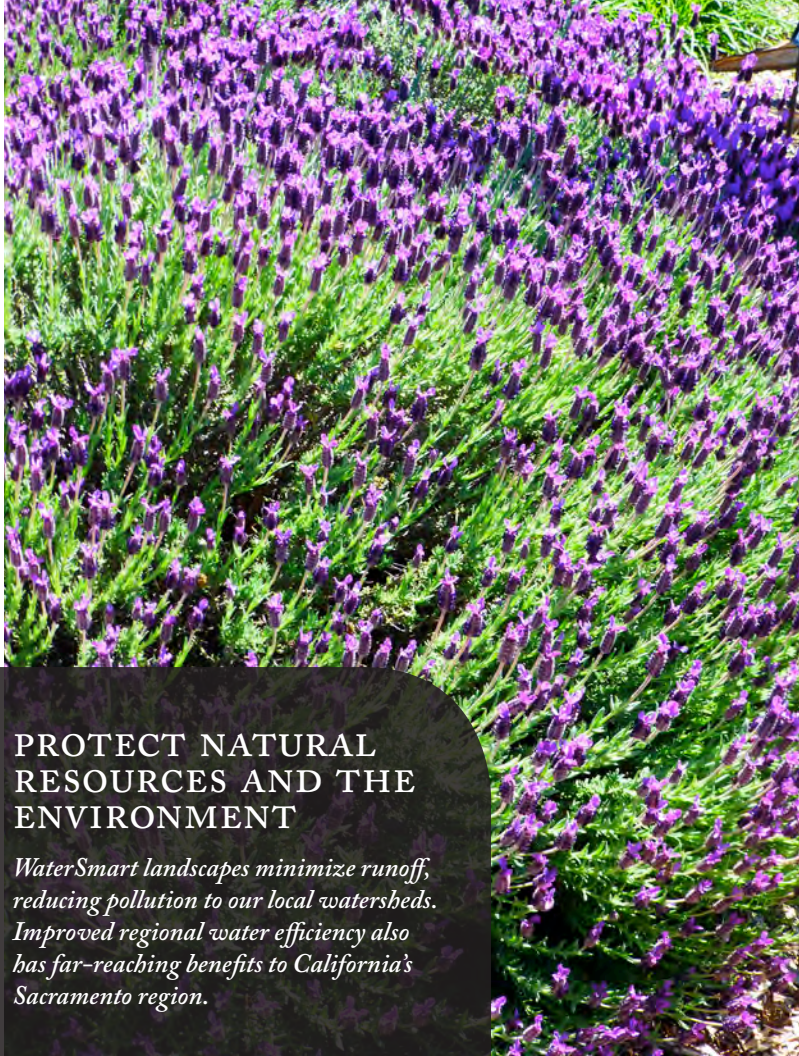
Using water efficiently is a way of life and an important responsibility that comes along with the benefits of living in a beautiful, Mediterranean climate like the Sacramento region. A WaterSmart landscape is all about rethinking the way we use our limited water resources, and making smart choices to reduce outdoor water use by designing beautiful and appropriate landscapes for our region. Working together, we can all help ensure a reliable water supply and keep the Sacramento region vibrant, prosperous and naturally beautiful ... now, and for generations to come.

As of January 1, 2010, all jurisdictions within the State of California adopted the Water Efficient Landscape Ordinance to comply with Assembly Bill 1881. This step-by-step guide is intended to assist homeowners in meeting the spirit of these ordinances. For compliance with specific requirements relative to where you live, including any relevant landscape permits, please contact your local land use agency.



## BEAUTIFY YOUR PROPERTY

*A well-designed WaterSmart landscape enhances the appearance of your property, transforming it into a vibrant neighborhood showcase.*



## PROTECT NATURAL RESOURCES AND THE ENVIRONMENT

*WaterSmart landscapes minimize runoff, reducing pollution to our local watersheds. Improved regional water efficiency also has far-reaching benefits to California's Sacramento region.*



## SAVE WATER

*WaterSmart landscaping uses less water than traditional landscaping, which could potentially save you money on your water bill.*



## REDUCE MAINTENANCE

*Well-designed irrigation systems and plants appropriate to the Sacramento region's climate often require less-frequent care and maintenance.*

# What is a WaterSmart Landscape?

A WaterSmart landscape includes:

## WATER EFFICIENT DESIGN

Proper landscape design is a key element. Begin with an overall goal of how much water you want to save on your project.



*This guide can help you identify a WaterSmart goal for your landscape.*

## EFFICIENT IRRIGATION

Incorporate WaterSmart irrigation components – including smart controllers, pressure regulators, high-efficiency and multi-stream nozzles and low-volume drip – into your irrigation system to maximize water use efficiency.



*Drip emitters are the most efficient method of irrigation.*

## CLIMATE APPROPRIATE PLANTS

Select plants that naturally thrive in the Sacramento region's Mediterranean-type climate and are also appropriate for your specific soil and microclimate.



*We have a generous palette of water-wise plants.*

## APPROPRIATE MAINTENANCE AND IRRIGATION MANAGEMENT

Know the needs and requirements of your water efficient landscape, and strive to manage water use within an established water budget. Monitor systems and make any repairs promptly.



*Seasonal maintenance checks and controller updates can help conserve water.*

*Previous page*

*Top left: Lagerstroemia 'Dynamite' / Crape Myrtle*

*Top right: Lavandula stoechas / Spanish Lavender*

*Bottom left: Coreopsis lanceolata / Tickseed*

*Bottom right: Echeveria 'Imbricata' / Hen and Chicks*

# Your **Path** to Achieving a WaterSmart Landscape

Achieving a WaterSmart landscape requires careful planning and implementation. The many benefits you will derive include improving the beauty of your property, reducing maintenance and waste to the landfills, minimizing water pollution due to runoff, and conserving water.



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ASSESS YOUR  
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CARE FOR YOUR  
WATERSMART  
LANDSCAPE

The following pages will guide you through the steps to creating a WaterSmart landscape.

Note: If you're not ready to start the full landscape upgrade right now, you can start by upgrading just one area or zone of your yard at a time. Or, if you're just looking for tips to maximize water savings in your existing landscape, skip to "Step 6 – Care for your WaterSmart Landscape" for recommendations on how to **save water in your landscape now!**

## ASSESS YOUR SITE

Soil is a critical component of a healthy landscape. A soil test will show you how to properly condition your soil before you plant, so you can create a healthy environment for plant material, save water and reduce maintenance in the long run.

- ❑ **Determine your soil type.** You can perform a squeeze test to quickly determine whether you have loam, clay or sandy soil (see squeeze test insert, right) or you can have your soil tested [www.ecolandscape.org/resources](http://www.ecolandscape.org/resources). The results will identify any necessary soil amendments and assist in determining the best plants for the site.
- ❑ **Understand your soil analysis.** A soil analysis should indicate: the type of soil; the levels of nitrogen (N), phosphorus (P), and potassium (K); and the pH level. You can also request information such as salt and organic matter content to help you to better understand your soil. As a rule-of-thumb, your ideal soil for healthy plant growth should be loamy with moderate to high levels of nitrogen, phosphorous and potassium, and a pH of 6.5-7.0.
- ❑ **Design for your soil type.** If your soil analysis does not indicate healthy soil, it should recommend what can be added to the soil for optimum plant health. Although you will prepare the soil before planting, some of the original soil characteristics may remain, so it is a good idea to select plants that can withstand the characteristics of your soil. For example, if you have high clay soil, poor drainage, high salt, low nutrient, etc., you should select plants that can tolerate those conditions.



*Use organic amendments to prepare your soil.*



*Soil is a critical component of a healthy landscape. Landscapes in the Sacramento region often have a high clay content.*

### Squeeze Test

The squeeze test can help you determine the texture of your soil. Start by taking a handful of moistened (but not wet) soil, and squeeze it firmly. Open your hand and determine which of the following it most resembles:



#### High sand content soil

Ball of soil falls apart when you open your hand.

*Sand is quick draining but has a limited ability to retain nutrients and moisture. Sandy soils often benefit from the addition of organic matter.*



#### Loamy soil

Ball of soil holds its shape, but crumbles when you poke it lightly.

*Loam is generally considered to be ideal soil because it retains moisture and nutrients, but doesn't stay soggy.*



#### High clay content soil

Holds its shape and does not crumble when you poke it lightly.

*Clay is typically nutrient rich, but has poor drainage. Drainage can sometimes be improved by the addition of organic amendments.*



STEP **2**

IDENTIFY YOUR LANDSCAPE GOAL

As a homeowner, you have the power to significantly improve your home’s water efficiency. Decide what you want to do and how you want to do it. Cool season turf grass is one of the highest water using plants used in our region. Replacing it with a WaterSmart landscape is a great way to reduce your water use. Whether you want to do a complete remodel or upgrade only a portion of your landscape, the following section will help you identify what type of landscape will meet your needs and maximize your water savings potential.

The amount of water savings your WaterSmart landscape can offer is determined both by the water use characteristics of the plants you choose, as well as the efficiency of the irrigation system. Select your preferred plant and irrigation type from the resources in this guide. Refer to Water Use Classification of Landscape Species (WUCOLS IV) at [www.ucanr.edu/sites/WUCOLS/](http://www.ucanr.edu/sites/WUCOLS/) to select very low, low and/or moderate water-use plants appropriate for the Sacramento region.



*Neat & Petite  
Low and moderate water use*



*Right as Rain  
Very low and moderate water use*



*Wholesome Habitat  
Low and moderate water use*



*Recreation Destination  
Low and moderate water use*

IRRIGATION

**Low efficiency irrigation\***

Conventional spray irrigation: Installing a low efficiency irrigation system is not recommended.  
Impact rotors: Installing a low-efficiency irrigation system is not recommended.

**Moderate efficiency irrigation**

Multi-stream rotator nozzles: Suitable for spaces 10-35 feet.  
High-efficiency nozzles: Best suited for areas 10-35 feet.  
Gear rotors: Best suited for areas 25 feet and larger.









**High efficiency irrigation**

Low-volume drip systems: Best suited for tree and shrub areas of any size.


\* If you have an existing automatic irrigation system, a WaterSmart landscape can still be achieved with the right combination of plants.


*Note: See the definitions section in Appendix C to compare the features of each irrigation type shown underlined above.*


# WATERSMART CHART


Planting	Irrigation			Note: The information in this chart is provided as a simple rule-of-thumb for sites in the Sacramento region. As shown, the only combination of planting and irrigation that does not achieve the water conservation goals of a WaterSmart landscape is "low" to "moderate" water use shrubs with a conventional spray irrigation system. Conventional spray irrigation is not recommended, but it is included to demonstrate that with proper plant selection and the use of efficient irrigation equipment and weather-based irrigation controllers, you can still achieve a WaterSmart landscape.
	Low efficiency irrigation Conventional spray irrigation Impact rotors	Moderate efficiency irrigation Multi-stream rotator nozzles High-efficiency spray nozzles Gear rotors	High efficiency irrigation Low-volume drip systems	
"Low," "moderate," and "high" water use plants 45% Low water use 45% Moderate water use 10% High water use	not WaterSmart			
"Low" water use plants 90% Low water use 10% High water use				
"Very low" water use plants 50% Very low water use 50% Low water use				


### WaterSmart Drop Rating


  
 Less water savings.










  
 Maximum water savings potential. Congratulations!



## Potential Water Savings

Converting cool season turf to a WaterSmart landscape can have a big impact on water use in the Sacramento region:

*High water use cool season turf*



35-44 gal/square foot/year

vs.

*Low water use plants*



9-11gal/square foot/year

## LANDSCAPE GOAL

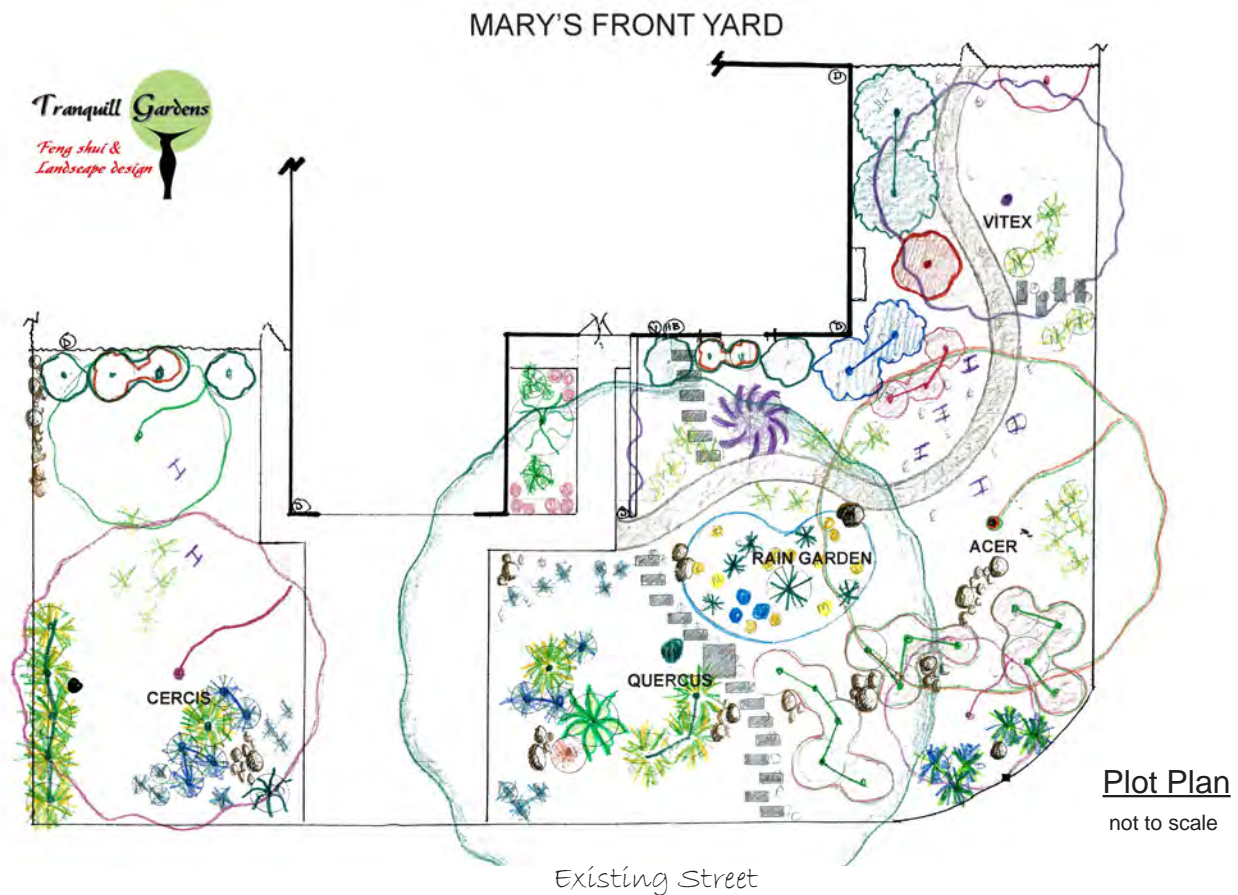
My WaterSmart landscape goal is:

( Select  to  WaterSmart landscape)

Now that you have identified your ideal planting style and the type of irrigation required to achieve your desired water savings, it's time to review the steps you'll need to take to make your landscape upgrade a reality.

## CASE STUDY - FROM TURF TO WATERSMART

The following case study is an example of a Sacramento residence that converted approximately 4,800 square feet of turf to a WaterSmart landscape. Follow the case study through the guide as it illustrates the steps to a WaterSmart landscape.



### Notes:

Soil condition - Light brown color, seemed to be loam soil. Will need a soil sample analysis to determine.

Total landscape area - 4,800 square feet

Landscape goal - 💧💧 WaterSmart landscape with "Low" water use plants and drip irrigation.

Potential water savings - 5865 gallons/year.

*Take a photo of your yard before the renovation and another from the same location after project completion to compare the difference.*



Sacramento residence - before WaterSmart upgrade



## STEP 3 CREATE A BASIC PLOT PLAN

Starting with a sketch of your existing landscape will help you visualize your future WaterSmart landscape. Use graph paper with squares that are 1/8" or 1/4" in size to draw your plot plan so that one square equals one foot. Locate key existing elements such as property limits, walkways, trees, sun patterns, and anything else particular to your landscape. See the case study (page 11) of a Sacramento home where the landscape was successfully converted from turf to a WaterSmart landscape. Below are some tips to help you create your basic plot plan:

- Note any existing hardscape elements that you want to save, such as sidewalks and walls.
- Note any existing landscape plants that you want to save, such as mature trees and shrubs.
- Note any microclimates; areas that are sunny, shady, or windy.
- Include private property and public right of way areas, if known.
- Locate windows that have views out to your yard.
- Take note of natural drainage features. Preserving these and limiting the use of impervious surfaces within the landscape will minimize water waste due to runoff.

### Do It Yourself or Hire a Professional?

If you choose to design, implement and/or maintain your landscape yourself, this guide can help you through each step. If you're interested in hiring a professional, you can use this guide as a reference to help understand the steps that will be involved, and give you the tools you need to work through the project with your professional. Here's how a professional can help:

**Landscape Architect.** A professional, licensed by the State of California, who can design and develop detailed construction plans and specifications. A landscape architect is not licensed to provide installation/construction services. For more information, see the American Society of Landscape Architects website [www.asla-sierra.org](http://www.asla-sierra.org) and the State Licensing Board website [www.cslb.ca.gov](http://www.cslb.ca.gov).

**Landscape Designer.** A person who provides landscape design and horticulture services, such as design concepts, planting plans, and selection of materials. For more information, see the Association of Professional Landscape Designers website [www.apldca.org](http://www.apldca.org).

**Landscape Contractor.** A professional, licensed by the State of California, to install/construct and maintain landscapes. If a landscape contractor installs a project, they can also design it. For more information, see the California Landscape Contractors Association website [www.clcasacramentovalleychapter.org](http://www.clcasacramentovalleychapter.org) and the State Licensing Board website [www.cslb.ca.gov/Consumers/HireAContractor](http://www.cslb.ca.gov/Consumers/HireAContractor).

**Irrigation Designer.** A person who provides irrigation design services. Irrigation designers may achieve certification with the Irrigation Association; see the website for more information [www.irrigation.org](http://www.irrigation.org).

### Tips on Hiring a Professional

Get referrals from friends and neighbors who have landscaped you admire or visit [www.ecolandscaping.org](http://www.ecolandscaping.org).

STEP 4

## DESIGN YOUR WATERSMART LANDSCAPE

### LAYOUT

Consider creating a landscape master plan. Even if you don't plan to implement your entire landscape plan at one time, having a master plan of your overall landscape design will allow you to keep working toward your WaterSmart landscape goal through all phases.

- ❑ **Identify different use areas.** Identify areas for kids, dogs, entertaining, vegetable gardens, etc. This will help you define areas for planting beds, active turf and hardscape.
- ❑ **Consider alternatives to traditional turf grass.** Because cool season turf grass is one of the highest water use plants, it is best to incorporate alternatives to turf such as gravel or decomposed granite paving, organic mulch, or low water use groundcover, whenever possible. If an area of turf is important, especially for active play, utilize a more drought-tolerant variety of grass in the warm season turf category.
- ❑ **Budget.** Keep your budget in mind when locating various elements. See the case study project costs on page 23.

### PLANTING DESIGN TIPS

Before you begin to select specific plants for your landscape, envision the overall planting design. Determine the landscape style by thinking in terms of plant size and characteristics (for example, large background shrub, small colorful accent shrub), before moving into actual plant selection.

- ❑ **Landscape theme.** Consider the landscape style you find appealing that fits your home, neighborhood, and lifestyle. A heavy tropical look may be desirable, but is not appropriate for our arid region. There are dozens of themes and styles from which to choose. The most common landscape style appropriate for our region is a Mediterranean type. This includes a variety of plants native to our region and areas of the world with similar climatic conditions. You may want themed areas that could include edible plants and herbs, wildflowers, a wildlife garden, native plantings, succulents, and even a rose garden. A Mediterranean style landscape provides beauty through a variety of colors and textures.
- ❑ **Analyzing your site.** Spend time in your landscape and make notes about the goals you would like to accomplish. Are there any blank walls or fences that would look better with a nice-looking shrub in front of them? You might want to frame the view out of a window but you probably don't want a large shrub in front of the window blocking the view. Include paths in your design for easy access from one area to another.



## CASE STUDY – PLANTS

Botanical Name	Common Name
<b>Trees</b>	
<i>Quercus lobata</i>	Valley Oak
<i>Cercis canadensis</i>	Eastern Redbud
<i>Chionanthus retusus</i>	Chinese Fringe Tree
<i>Acer rubrum</i> ‘October Glory’ (Existing Tree)	October Glory Red Maple
<i>Vitex agnus-castus</i>	Chaste Tree
<b>Shrubs</b>	
<i>Calycanthus occidentalis</i>	Western Spice Bush
<i>Ceanothus</i> ‘Concha’	Wild Lilac
<i>Mahonia repens</i>	Creeping Mahonia
<i>Rhamnus californica</i> ‘Mound San Bruno’	Coffeeberry
<i>Cornus stolonifera</i> ‘Peters Choice’	Red Twig Dogwood
<i>Arctostaphylos densifolia</i> ‘Howard McMinn’	Vine Hill Manzanita
<i>Cercis occidentalis</i>	Western Redbud
<i>Daphne odora</i> ‘Aureomarginata’	Winter Daphne
<i>Dasylyrion wheeleri</i>	Desert Spoon
<i>Carpenteria californica</i> ‘Elizabeth’	Bush Anemone
<i>Heteromeles arbutifolia</i> ‘Davis Gold’	Yellow Berry Toyon
<i>Mahonia aquifolium</i> ‘Compacta’	Compact Oregon Grape Holly
<i>Salvia brandegeei</i>	Brandegee’s Sage
<i>Salvia apiana</i>	California White Sage
<i>Salvia mellifera</i> ‘Terra Seca’	Black Sage
<i>Rosa californica</i>	California Wild Rose
<i>Rosa gymnocarpa</i>	Wood Rose
<i>Salvia clevelandii</i> ‘Winnifred Gilman’	Blue Sage



*Chionanthus retusus*  
Chinese Fringe Tree



*Vitex agnus-castus*  
Chaste Tree

## CASE STUDY - PLANTS

### Botanical Name

#### Grasses, Sedges and Rushes

*Festuca idahoensis* 'Siskyou Blue'  
*Helictotrichon sempervirens*  
*Deschampsia caespitosa* 'Susan's Choice'  
*Muhlenbergia capillaris*  
*Muhlenbergia rigens*  
*Leymus condensatus* 'Canyon Prince'  
*Panicum virgatum* 'Haense Herms'

#### Perennials

*Aquilegia* species  
*Artemesia douglasiana*  
*Artemesia* 'Limelight'  
*Iris Pacific Coast* 'Canyon Snow'  
*Scabiosa columbaria*  
*Satureja douglasii*  
*Asclepias fascicularis*  
*Penstemon spectabilis*  
*Penstemon heterophyllus* 'Margarita BOP'  
*Epilobium canum* (*Zauschneria californica*)  
*Woodwardia fimbriata*  
*Heuchera* 'Rosada'  
*Heuchera* 'Canyon Delight'

### Common Name

Siskyou Blue Fescue  
 Blue Oat Grass  
 Tufted Hair Grass  
 Hairy Awn Muhly Grass  
 Deer Grass  
 Canyon Prince Lyme Grass  
 Red Switch Grass

Columbine  
 Mugwort  
 Limelight Artemesia  
 White Hybrid Iris  
 Butterfly Blue Pincushion Plant  
 Yerba Buena  
 Milk Weed  
 Royal Beard Tongue  
 Margarita Foothill Penstemon  
 California Fuchsia  
 Giant Chain Fern  
 Coral Bells  
 Alum Root



*Iris Pacific Coast* 'Canyon Snow'  
 White Hybrid Iris



*Penstemon heterophyllus* 'Margarita BOP'  
 Margarita Foothill Penstemon

## CASE STUDY – PLANTS

### Botanical Name

#### Vines

*Lonicera hispidula* var. *vacillans*  
*Aristolochia californica*

#### Groundcovers

*Erigeron karvinskianus*

#### Succulents

*Agave vilmoriniana*

#### Aquatics

*Hibiscus californicus* (*H. lasiocarpus*)  
*Helianthus angustifolius*  
*Mimulus guttatus*  
*Sisyrinchium bellum*  
*Carex divulsa* (*C. tumulicola*)  
*Carex glauca* (syn. *C. flacca*)  
*Juncus patens*  
*Chondropetalum tectorum*

### Common Name

Pink Wild Honeysuckle  
California Pipe Vine

Santa Barbara Daisy

Octopus Agave

California Hibiscus  
Swamp Sunflower  
Yellow Monkey Flower  
Blue-Eyed Grass  
Eurasian Grey Sedge  
Blue Sedge  
California Grey Rush  
Cape Rush



*Aristolochia californica*  
California Pipe Vine



*Helianthus angustifolius*  
Swamp Sunflower



## PLANTING DESIGN TIPS CONTINUED

❑ **Plant placement.** Typically a planting design will include a tree or two to provide a shade canopy. Placing a deciduous tree on the south or west side of the home will shade the house during the summer to keep it cool and allow more light and sun exposure in the winter [www.sactree.com](http://www.sactree.com). Shrub and groundcover planting is typically designed with a variety of heights. Usually medium size (3 to 4 feet tall) shrubs are placed closer to the house to create a “foundation” or back drop. Lower shrubs are then placed in front of the foundation planting and low groundcovers in the area closest to the sidewalk or street. Accent shrubs that provide a special texture, color or flowers should be placed so they attract interest and focus views on a few locations in the landscape. Try to highlight your entrance walk with special accent plants. This places a higher emphasis on your entry, which is where you want to direct visitors. Be bold and have fun, don’t be afraid to express your individual tastes.

❑ **Water features and higher water-use plants in the garden.** Water has been a precious resource throughout history in arid regions of the world. This perspective has been integrated into modern water-efficient landscapes by utilizing extra water only in focal areas that are considered to be most important. Since the sound of water is pleasant and calming, water features can be a desirable element to include in your design, and can provide a water source for bees, birds, and other wildlife. The surface area of a pond or fountain will lose water at about the same rate as cool season turf grass or another high water-use plant. By minimizing the square footage of open water and using a recirculating pump, a water feature can be incorporated into the WaterSmart landscape. If you have some higher water-use plants that you particularly want to include, they can be used. As a general rule, your landscape should include no more than ten percent high water-use plants or water features. Be sure that higher water-use plants are watered on a separate irrigation valve, independent from other less thirsty plants in the landscape.



The Sacramento region has exceptional resources for WaterSmart landscapes and outdoor water conservation:

- Water-Wise Gardening in the Gold Country Region
- EcoLandscape California
- BeWaterSmart.info
- UC Cooperative Extension



### Right as Rain Theme

#### “Low” water use

What could be more eco-friendly and use water more efficiently than the on-site capture and use of water from irrigation and storm events? This landscape plan includes a variety of permeable materials and elements to achieve just that. The rain garden features plants that can thrive in wet or dry conditions. A number of walkways provide easy access to all parts of this landscape so the year-round color plant palette can be enjoyed from many vantage points.

### Neat and Petite Theme

#### “Low” and “Moderate” water use

With an emphasis on recycled, permeable materials and on-site water management, this landscape includes a variety of features, materials, and plants that fit neatly into this beautiful, small-scale property. Low water-use plants and dwarf plant varieties are perfect where space is limited. Placing the right plant in the right place coupled with proper care results in a low maintenance landscape that requires little or no pruning. Use of mulch provides a tidy appearance while conserving water and reducing weed growth.

## Eco-Friendly Landscape Design Plans for The New California Landscape



### **FREE** Four Complete Landscape & Irrigation Plans

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- Irrigation Equipment
- Guided Verbal Tours of Plans
- **Interactive Designs:** See plants, features, & learn about water-saving irrigation equipment and practices

**Visit Download Learn**

For additional site plan details or to access the complete plant list for the New California Landscape visit:

[www.ecolandscape.org](http://www.ecolandscape.org)

Developed with generous support from the Water Forum



### Wholesome Habitat Theme

#### “Low” and “Moderate” water use

Worthy of “National Wildlife Federation” designation, this landscape plan provides water, shelter, and food for birds, butterflies, and beneficial insects. With an edible garden, children’s corner, labyrinth and citrus grove, it is like a small-scale learning laboratory for the entire family. In harmony with the environment, this garden connects children with nature and produces food for the family. The pond-less water feature is attractive for all to enjoy. Use of pest- and disease-resistant plant varieties can eliminate the need for pesticides and the raised beds provide easy access to edibles at harvest time.

### Recreation Destination Theme

#### “Low” and “Moderate” water use

This plan offers sophisticated style and a flow-through design for easy access to all parts of this park-like setting. There is something for everyone to enjoy, whether it be entertaining, gaming or relaxing. The Mediterranean-type plant palette is appropriate for the Sacramento region. These plants originate from areas of the world with similar climatic conditions; including much of California and northwestern Baja, western and southern Australia, the South African cape, Mediterranean Sea area and coastal Chile. The retractable shade cover provides cooling comfort in summer but allows for warmth from the sun in winter.

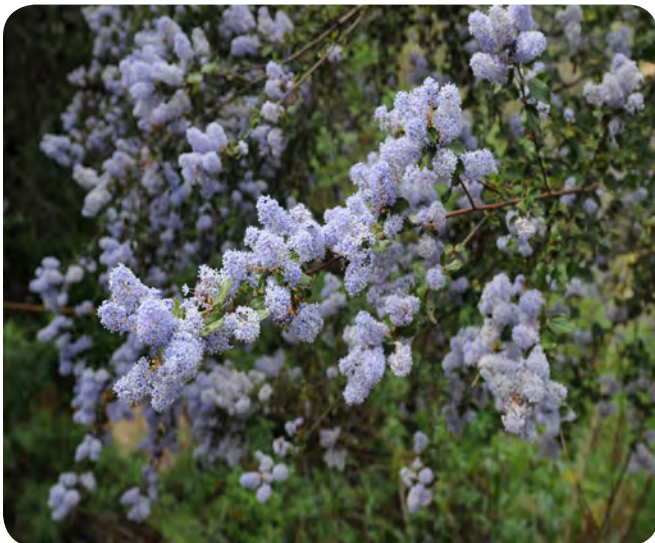
### Irrigation

The irrigation system for each plan is optimized for peak water efficiency. Valve zones are apportioned into “hydrozones”, where plants having similar water needs are grouped together and watered with an appropriate schedule. Where there is a functional size lawn, sprinklers use high-efficiency rotary-type nozzles. Plants are watered with in-line drip tubing with built-in emitters. A smart, weather-based controller, is utilized for daily adjustment of the irrigation schedule in response to changes in the weather. Multiple flush points are specified for easy maintenance of drip systems. During unusually dry winters and in drought conditions, supplemental watering may be necessary, especially for California natives and plants in rain gardens because these plants rely on winter rains to survive in their natural habitat.

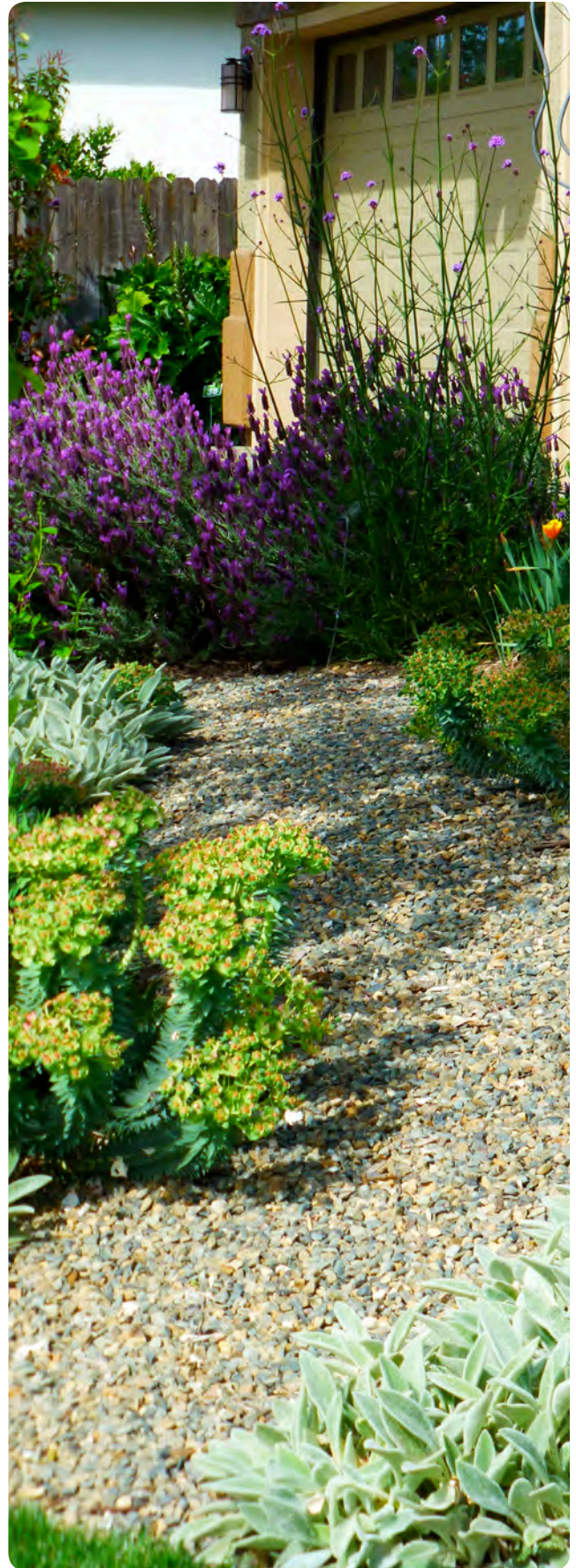
## PLANT SELECTION

From your WaterSmart landscape goal identified in Step 1, select plants that fit within that plant water use category to ensure you meet your WaterSmart water conservation goals.

- ❑ **WaterSmart plant selection.** See Appendix F for a list of plants that have been classified as “very low” to “moderate” water use and other resources included in this guide to choose regionally-appropriate plants.
- ❑ **Minimize turf.** Limit the amount of turf in your design as much as possible. If you decide to incorporate turf, consider varieties that use less water than traditional cool season turf. Other less thirsty grasses to consider are mow-free blends or UC Verde Buffalo Grass. Visit [www.cesacramento.ucanr.edu](http://www.cesacramento.ucanr.edu) to learn more about alternative turf varieties.
- ❑ **Group plants according to water use requirements.** If you choose to include plants that are not classified as “very low” or “low” water use, be sure to group these “moderate” or “high” water use plants together. Grouping plants with similar water use requirements together, known as planting in hydrozones, makes it easier to irrigate efficiently by applying additional water only where it is needed.
- ❑ **Provide appropriate spacing.** Select plants that will have room to grow to their full size to avoid overcrowding and the need for excessive pruning.



*Ceanothus species/California Lilac (low water use)*



## IRRIGATION DESIGN

Start by reviewing the irrigation type you identified in Step 1; this will help you decide which irrigation equipment to use. Whether you are working with a professional designer or are doing the project yourself, the following checklist will help you keep track of the key decisions involved in irrigation design.

- ❑ **Water pressure.** Check your available water pressure to ensure that you choose the right irrigation equipment for your site. To determine your water pressure, follow one of these two steps:  
(1) Contact your local water provider and request a pressure reading (see Appendix B for a list of water providers).  
(2) Check your pressure with a gauge (available at your local irrigation supply store) at a hose bib. If your house has a hose bib located on the water line before the line enters the house, test the pressure at that location, as it will give you the available pressure before water passes through the pressure regulator for the house. It is important to identify your available water pressure so you can select equipment that is optimized for that operating pressure. If your pressure is high (above 70 psi), pressure regulation is needed to avoid misting when overhead irrigation is used (e.g., pop-up sprinklers). If your pressure is low (under 30 psi), drip irrigation would be the ideal choice, as it has a lower operating pressure.
- ❑ **Existing conditions.** Evaluate your existing irrigation system and determine if it can be maintained in its current condition or if you need to upgrade the system. Some irrigation systems can be upgraded by simply changing nozzles, converting to drip emitters, or adding a smart controller, while others may need to be completely redesigned. The following is a summary of the range of irrigation options to consider.
- ❑ **High efficiency irrigation.** The most efficient method to deliver water to plants is low-flow irrigation which delivers water from the valve through a filter and then through a network of lateral pipes, and sometimes flexible tubing, to the individual emission devices such as drip emitters or in-line drip emitters. Pressure-compensating devices are always the most efficient option. Low-flow irrigation is a good choice for tree and shrub areas and should be used in any landscaped areas next to hardscape and in areas less than ten feet wide to prevent runoff from overspray. When using drip emitters, reduce maintenance and ensure long term durability by selecting good quality tubing and designating at least two emitters per plant. (See Appendix E for photos of a drip system.)
- ❑ **Moderate efficiency irrigation.** Other efficient irrigation types include multi-stream and high-efficiency nozzles (typically used in spaces 10 to 35 feet in size) and gear rotors (typically for spaces 25 feet and larger). These are good choices for turf or large shrub areas. If you use multi-stream and high-efficiency nozzles, it is worth the investment to purchase good quality nozzles. Check with your local commercial irrigation supply store to ensure you get the most efficient nozzles for your project.
- ❑ **Low efficiency irrigation.** The least efficient types of automatic irrigation include conventional spray irrigation and impact rotors. Installing a new system with low efficiency irrigation is not recommended. Most existing conventional spray systems can be retrofitted with new efficient nozzles as noted above, or converted to drip irrigation.

*Note: To compare the features of each irrigation type shown underlined above, see the definitions section in Appendix C.*



*Drip irrigation can be installed at soil surface.*



Weather-based controllers often have a sensor that should be mounted outside, free of obstructions, and connected to the controller.

- Smart controller.** Upgrade to a smart controller (often called a weather-based controller), which is an automatic controller (also called a timer or clock) that is weather-based and automatically adjusts the watering schedule in response to environmental changes. Smart controllers have the ability to interrupt the watering schedule and prevent sprinklers from running when it rains. They can also increase the frequency and/or duration of watering in hotter weather. Locate the controller in a place that is easily accessible, such as the garage.
- Irrigation layout.** The goal of WaterSmart irrigation is to apply water as efficiently as possible. This means using low-flow drip irrigation whenever possible. In areas with overhead spray, provide even coverage to ensure maximum efficiency. Once you have determined what type of irrigation equipment you would like to use, divide your yard into hydrozones and note what type of irrigation you plan to use in each zone. Contact irrigation manufacturers to inquire if they offer an irrigation design guide, which can be helpful to determine the specifics of your irrigation layout. Some manufacturers offer free irrigation design services.

### Layout Tips

Do not mix different sprinkler types within the same valve zone. Do not mix low-volume drip emitters and spray heads on the same zone. Key elements to locate on your layout plan are the locations of mainline pipes (pressurized) and lateral line pipes (non-pressurized, except when valves are open), the point of connection to your household water supply, and backflow preventer, if required.

## VERIFY YOUR NEW LANDSCAPE WATER USE

Now that you have designed your WaterSmart landscape, it is important to confirm that your design meets the landscape water use goal you set in Step 1, and if necessary, adjust your design to maximize your water savings.

- Verify your overall plant water use.** Review your planting design and determine, based on area, what percentage of plants are very low, low, moderate, or high water use. If the planting plan you selected does not fit exactly into one of the categories below, adjust the plant selection so that it does, or select the category that represents the higher water use category.
- Verify your overall irrigation efficiency.** Review your irrigation design and note below what type of irrigation you selected.

Planting	Irrigation		
	Low efficiency irrigation	Moderate efficiency irrigation	High efficiency irrigation
“Low” “moderate” and “high” water use plants	not WaterSmart		
“Low” water use plants			
“Very low” water use plants			

**WaterSmart Drop Rating**

## CASE STUDY – PROJECT COSTS

### MARY'S RAIN GARDEN & LAWN REPLACEMENT

Square feet of lawn removed: 4,587 sq. ft.

Total landscaped area: 4,800 sq. ft.

Cost per sq. ft. before rebates: \$4.57/sq. ft.

Cost per sq. ft. after rebates: \$4.00/sq. ft.

Item	Qty./Unit	Price	Total
Design and consultation	1		\$800
Demolition, soil and site preparation			\$3,026
Soil amendments, compost & grading	48 cubic yards	\$34/yard + labor	\$2,880
Waste disposal	2	\$350	\$700
Cardboard wrap for sheet mulching	4/\$88 each	\$352 + installation	\$752
<b>Hardscape materials and features</b>			
Boulders	11 tons	\$70/ton + installation	\$1,540
Flagstone	2,600 lbs.		\$1,950
Entry fence and lattice on roof for shade			\$1,219
<b>Rain garden</b>			
Site preparation, solid drain pipe from down-spouts, irrigation components, mulch and compost			\$735
<b>Irrigation, plants and mulch</b>			
Controller	1	\$233 + installation	\$550
Valves, standard and in-line emitters, pressure regulator, PVC pipe and fittings	3 zones/valves	Parts + installation	\$2,100
Plant material		\$928 + installation	\$2,428
SMUD tree provided free of charge from the Sacramento Tree Foundation (Valley Oak)	1		\$0
Replacement plants (post-project completion)			\$120
Mulch – walnut shell mulch	40 yards	\$40/yard + installation	\$2,200
Mulch delivery			\$980
<b>Total project costs</b>			<b>\$21,980</b>
<b>Rebates</b>			
Lawn replacement			<\$2,000>
Rain sensor			<\$40>
Weather-based irrigation controller			<\$200>
Rain garden			<\$500>
<b>Total rebate amount</b>			<b>\$2,740</b>
<b>Total project costs</b>			<b>\$21,980</b>
<b>Less reimbursement from rebate</b>			<b>&lt;\$2,740&gt;</b>
<b>FINAL PROJECT COST</b>			<b>\$19,240</b>

NOTE: Project costs include cost of materials plus labor to install each item.

## CASE STUDY - MARY'S PROJECT STATEMENT

*Concern for the environment, need for water conservation and a growing awareness of sustainable landscaping practices led me to a decision to convert my front yard from a high-water-use lawn to a beautiful and sustainable landscape free of pesticides. Tired of mowing my large corner lot weekly, my main goals were to conserve water and include an abundance of California native plants to attract bees, butterflies, birds and other wildlife.*

*In January 2012 I contacted Karen Wilhelm, Water Conservation Specialist with California American Water, to inquire about available rebates for lawn replacement. She conducted a water survey, audited my water usage and completed a residential audit report. Karen determined that I qualified for reimbursement of up to 2,000 square feet of turf upon removal and referred me to the Qualified Green Gardener Business Referral List. Through this program, I selected my yard designer, Soleil Tranquilli of Tranquill Gardens, and my landscape contractor, Eric Zemlicka, of Zscapes.*



*Mary's yard after WaterSmart transformation*



*It was challenging for Soleil because I had no framework of reference as to the scope and cost of such a project. She fulfilled my wishes to include a variety of California native plants, suggested plants and trees suited to our climate and produced a design that I love. Eric skillfully installed the new landscape. The result is an interesting and beautiful yard that attracts wildlife, is easy to maintain and has something blooming year-round.*

*Soleil selected small-sized plant containers, which are more easily established. I was cautioned that the new landscape would look sparse at first, since ample space was left between plants. Patience is important when creating a landscape with native plants, but as promised, the gaps filled in nicely in a relatively short period of time as the plants grew to maturity.*

*Once into the second winter, my landscape required some pruning and I needed to learn how to care for my plants. Cheryl Buckwalter arranged a meeting with Julia Pollex, a horticultural doctoral student (U.C.Davis) with expertise in maintenance of California native plants. It was a valuable opportunity to learn about proper care for my yard as we discussed, and Julia demonstrated, specific pruning techniques for each plant. My desire to landscape in harmony with our environment also led me to attend the River-Friendly Landscaping Green Gardener at Home Training Program at the Roseville Utility Exploration Center.*

*Now that the plants are settled in, seasonal care is an enjoyable task, unlike the weekly mowing that was required for the lawn. My new sustainable landscape is now ever-changing, pesticide free and visited by many types of wildlife. - Mary*



*Epilobium canum*



*Mahonia repens*

## STEP 5 IMPLEMENT YOUR PLAN

Now it is time to begin the physical construction tasks necessary to upgrade your landscape. Prior to construction, contact your water provider to inquire about any rebates that may be available. Also contact underground service alert (811) to request location of underground utilities. Visit: [www.usanorth.org](http://www.usanorth.org).

### DEMOLITION

Remove existing turf or other materials from areas that you plan to renovate. Reclaiming an area of unwanted turf requires diligence. No matter what method of turf removal is used, periodic weeding will be needed.

- ❑ **Sheet mulching.** A layered mulch system that decomposes grass or weeds and enriches the soil for new plantings. Read more at: [www.ecolandscaping.org/riverfriendly](http://www.ecolandscaping.org/riverfriendly).
- ❑ **Natural turf removal.** A natural way to remove turf and preserve the soil's ecology is to strip the turf and water the area for a few weeks to encourage grass to re-sprout; then remove all new growth.
- ❑ **Turf removal with herbicide.** If other methods have failed and it is necessary to use an herbicide, consult with a professional for best use practices or visit: [www.ipm.ucdavis.edu](http://www.ipm.ucdavis.edu).
- ❑ **Solarization.** Soil solarization is a process which involves covering an area with clear plastic and allowing the sun to heat the soil to temperatures that will kill weed seeds. For more information visit: [www.ipm.ucdavis.edu](http://www.ipm.ucdavis.edu).

### Budget Tips

Note: Before starting any project check with your water provider to determine if rebates are available. In the case study cost estimate, the homeowners will maintain the landscape themselves, so the cost of maintenance is not included. For any professional services you plan to enlist, whether it be for design, installation, or maintenance, you should get more than one estimate. Compare costs and services and select the one that offers the best value and fits your budget.

If you can't complete the entire WaterSmart upgrade at one time, consider dividing the project into phases and working on just one section at a time. When determining how to separate the phases, consider dividing your landscape according to the irrigation valve layout.



CASE STUDY - INSTALLATION



## GRADING

- ❑ **Grading.** Set the soil level so that it will direct water away from the house. To slow runoff from your garden, try creating small depressions where water is allowed to pool and slowly percolate into the soil. The more you slow the water down or hold it on site, the more you improve water quality in your area, as well as downstream.
- ❑ **Reduce runoff.** Runoff carries with it soil particles and pollutants. Reduce runoff by protecting storm drain inlets with sand bags or fiber rolls.

## SOIL PREPARATION

Now that you have removed unwanted vegetation, it is time to condition your soil.

- ❑ **Soil amendments.** Amendments should be selected based on your soil analysis recommendations and applied as a top dressing. Many organic soil amendments are now available and typically include compost and/or slow-release fertilizer. The goal is to achieve healthy soil which will facilitate plant growth, improve drainage, and increase the natural water holding capacity of the soil.

## IRRIGATION INSTALLATION

Now that you have selected your irrigation equipment, drawn a plan showing the layout, and amended the soil, you can start to implement the design.

- ❑ Read the instructions from the manufacturer and familiarize yourself with the parts.
- ❑ Starting from the main connection to the water line, dig trenches for the pipes according to your irrigation plan. Ideally, the main connection to the water line will be downstream of the water meter and upstream of the connection to the house. If you tie into a rear yard hose bib, be aware that the water pressure will be lower because the water for your house is serviced by a separate pressure regulator.
- ❑ Lay an extra pipe sleeve or two under any future hardscape elements and install a chase wire just in case you need to add pipes or wires in the future. Be sure to cover the ends of the pipe with duct tape before back-filling the trench and mark the location on your landscape plan.

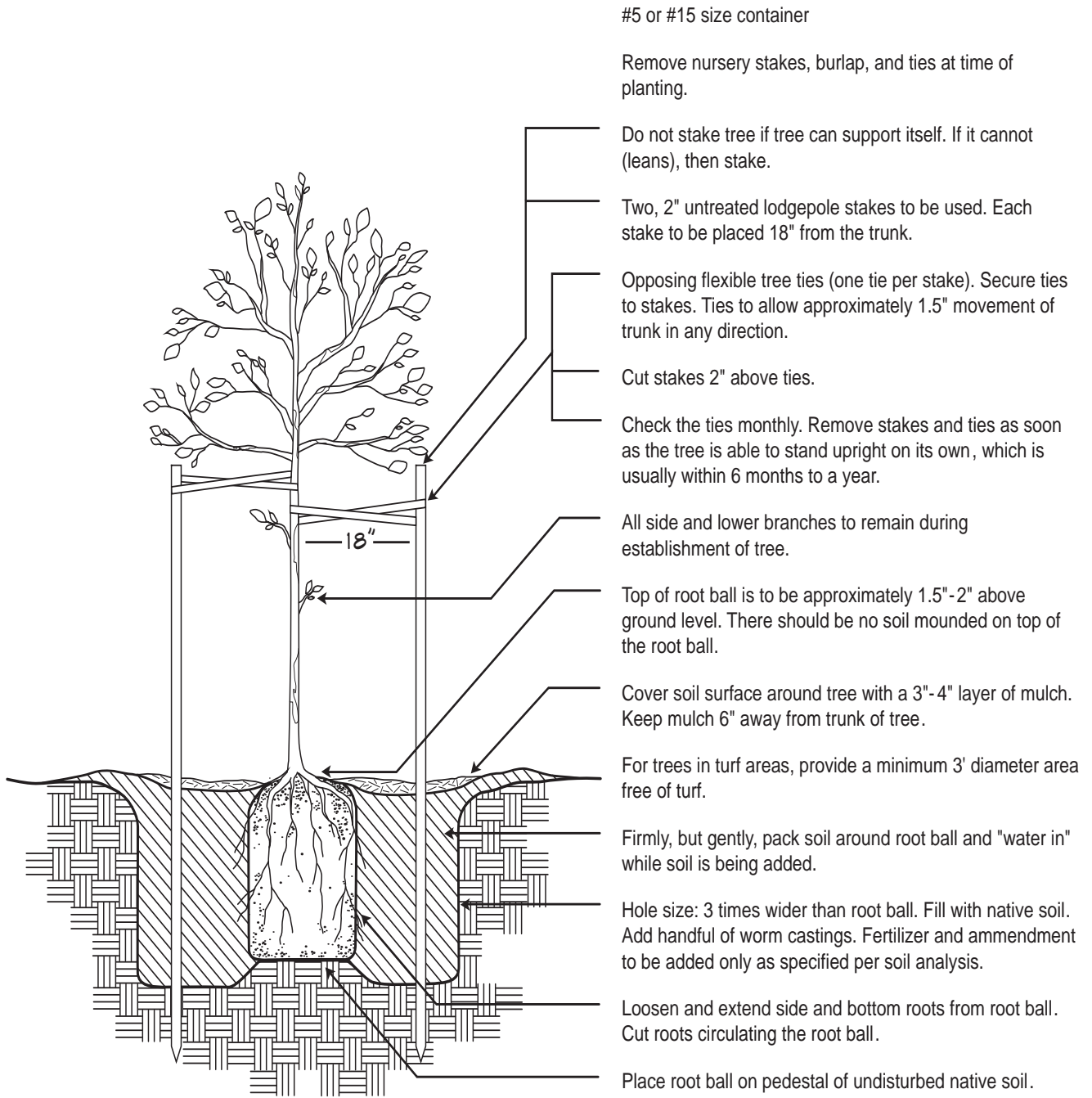
- ❑ If you are using drip irrigation, note that often drip emitters are not installed until after planting is complete. When installing the emitters, be sure to place them at least 6 inches away from the stem or crown of the plant to prevent rot. For diagrams visit [www.ecolandscape.org](http://www.ecolandscape.org).
- ❑ Consult your local irrigation supply store or irrigation product manufacturer for more detailed installation guides.

## PLANTING INSTALLATION

With the irrigation in place, you can get started on the plant installation. Review the following tips to guide you through the plant placement and installation process:

- ❑ Use a garden hose to outline turf or groundcover areas to help you visualize the design before you start installation.
- ❑ Set the plants, while still in their containers, in their approximate location per your planting design plan, stand back and review. Make any adjustments to the design at this time to avoid having to dig up and relocate plants. Many drought tolerant landscapes may look sparse for the first couple of years, but will fill in over time. Be sure to allow proper spacing to allow each plant to grow to its full size.
- ❑ Dig plant holes three times the width of the plant root ball. Water the hole before placing the plant. When planted, the top of the root ball should be 1/2" to 2" above soil level. Visit [www.ecolandscape.org](http://www.ecolandscape.org) and [www.sactree.com](http://www.sactree.com) for detailed information.
- ❑ Once in the hole, the plant should be packed firmly into place with original soil. If additional soil is needed, blend new soil with original soil.
- ❑ If a tree cannot support itself, place two stakes 18" from each side of the trunk and place ties to loosely form a figure eight, then secure ties to the stakes.
- ❑ Cover the planting area with a 2" to 3" deep layer of bark mulch. Keep mulch a few inches away from the base of each plant to prevent rot.
- ❑ Monitor your garden to ensure it receives adequate water. Even natives and drought-tolerant plants need water to become established. To minimize watering needs during establishment, install your landscape in the fall before the rainy season arrives.

# TREE PLANTING



#5 or #15 size container

Remove nursery stakes, burlap, and ties at time of planting.

Do not stake tree if tree can support itself. If it cannot (leans), then stake.

Two, 2" untreated lodgepole stakes to be used. Each stake to be placed 18" from the trunk.

Opposing flexible tree ties (one tie per stake). Secure ties to stakes. Ties to allow approximately 1.5" movement of trunk in any direction.

Cut stakes 2" above ties.

Check the ties monthly. Remove stakes and ties as soon as the tree is able to stand upright on its own, which is usually within 6 months to a year.

All side and lower branches to remain during establishment of tree.

Top of root ball is to be approximately 1.5"-2" above ground level. There should be no soil mounded on top of the root ball.

Cover soil surface around tree with a 3"-4" layer of mulch. Keep mulch 6" away from trunk of tree.

For trees in turf areas, provide a minimum 3' diameter area free of turf.

Firmly, but gently, pack soil around root ball and "water in" while soil is being added.

Hole size: 3 times wider than root ball. Fill with native soil. Add handful of worm castings. Fertilizer and ammendment to be added only as specified per soil analysis.

Loosen and extend side and bottom roots from root ball. Cut roots circulating the root ball.

Place root ball on pedestal of undisturbed native soil.

- EcoLandscape California

# STEP 6

## CARE FOR YOUR WATERSMART LANDSCAPE

Whether you install a new WaterSmart landscape or are looking for tips on how to conserve water in your existing landscape, this section can help you make an immediate impact on your landscape water savings.

- ❑ **Plan ahead.** Keep a copy of the irrigation plan, legend, and runtime schedule to make it easy to buy replacement parts or correct pipe sizing for repairs or adjustments needed in the future.
- ❑ **Monitor and minimize watering.** When set up correctly, your smart controller will automatically adjust watering times to respond to changes in the weather. To maximize water savings, program your controller to apply only the amount of water needed for each zone. A good rule-of-thumb is to water only when the top two to three inches of soil are dry. If you see runoff before the end of the irrigation cycle, adjust the schedule to run multiple times with shorter cycles. This will allow water to infiltrate the soil in between sessions.
- ❑ **Water at appropriate time of day.** Schedule your irrigation system to run in the early morning. It is best to avoid watering at night as some plants develop fungus and mildew problems from night time watering. Avoid watering during the heat of the day to eliminate excessive evaporation.

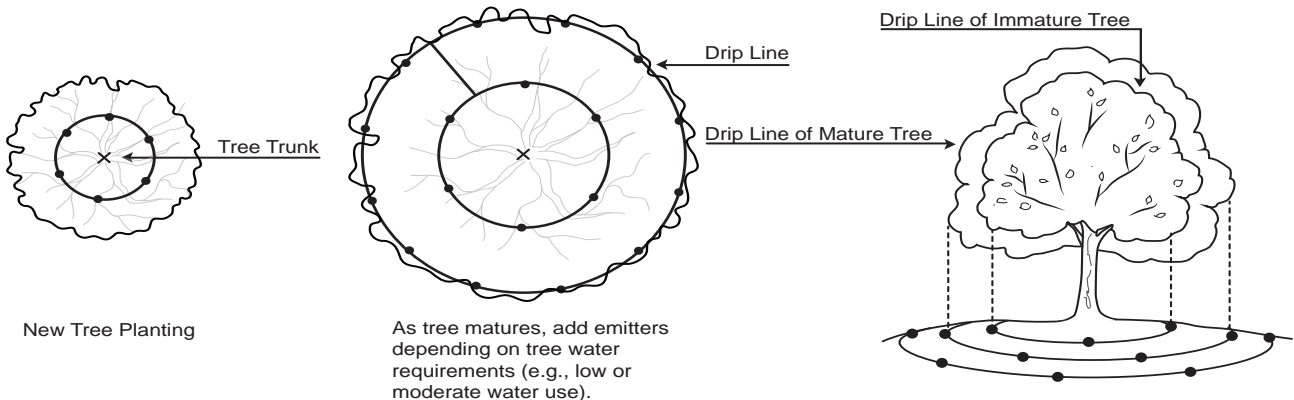


Multi-stream nozzles throw streams of water with larger water droplets which help to prevent misting and runoff. Each nozzle should be checked periodically to be sure it is operating correctly.

- ❑ **Check irrigation equipment.** Because irrigation is typically run in the early morning, you may not witness the system running. Be sure to manually turn the system on seasonally to check for potential problems. Check drip systems to ensure emitters are working and clean out filters as needed. Over time, as plants mature, drip emitters may need to be relocated to the outer edge of the plants' canopy. Adjust sprinklers to prevent overspray and runoff onto roads, sidewalks, driveways and patios and repair any problems.
- ❑ **Fertilize smart.** Use an organic slow-release fertilizer or compost. For more information check out [www.ipm.ucdavis.edu/tools/turf/siteprep/amenfert.html](http://www.ipm.ucdavis.edu/tools/turf/siteprep/amenfert.html).

### TREE EMITTERS - EXAMPLE PLACEMENT

●● In-line / Dripperline Emitters



**NOTE:** - The spacing and number of emitters are examples.  
- EcoLandscape California

- Specific spacing and number of emitters will depend on plant size at installation, plant water requirements, soil type, and emitter flow rate.



❑ **Weed smart.** Manage weeds naturally whenever possible. The common use of herbicides can be costly and is very damaging to the environment. Proper landscape design, as well as building and maintaining a healthy soil, can be the best defense against weeds. To stop the spread of weeds, hand pull any weeds that come up in your garden every few weeks. Be sure to pull them before they go to seed.

❑ **Manage pests.** Use integrated pest management strategies instead of harmful chemical pesticides and insecticides. See University of California Integrated Pest Management program [www.ipm.ucdavis.edu/GENERAL/whatisipmurban.html](http://www.ipm.ucdavis.edu/GENERAL/whatisipmurban.html).

❑ **Mulch.** Maintain a 2-to-3-inch layer of mulch. Replace the mulch layer in the spring, if needed.

❑ **Make a clean sweep.** Use a broom or blower instead of a hose to clean driveways and sidewalks.

❑ **Make a plant maintenance checklist.** Keep a copy of the plant list and make a checklist for key maintenance requirements for each plant.

❑ **Monitor.** Monitor monthly costs and water use on an ongoing basis.



*Maintain a 2-to-3-inch layer of mulch*



*Carpenter Bee on California Fuchsia*

❑ **Find incentives.** Be sure to take advantage of rebates and educational opportunities offered by the Regional Water Authority and local water providers. [www.BeWatersSmart.info](http://www.BeWatersSmart.info)

❑ **Celebrate!** Enjoy peace of mind that comes from knowing you did your part to protect our natural resources and the environment for the health of our families, communities and the waterways of California.

CASE STUDY - WATERSMART GARDEN TRANSFORMATION



Mary's Residence  
BEFORE



Mary's Residence  
AFTER



Rain Garden



Mary's Blue Thumb



Entry Walk





# Review of the steps to a WaterSmart Landscape

Your WaterSmart landscape is a key part of our region’s water efficiency goals. By converting your yard to a WaterSmart landscape, you not only have the potential to beautify your property, save money, and reduce maintenance, but you also help protect, and even improve, the health of our natural environment. Below is a summary of the key steps involved in completing a WaterSmart landscape renovation:

STEP  
1

- ❑ **Assess your site.** Consider your site’s desired function and existing conditions such as sun exposure, topography, and soil. Healthy soil is critical to support vigorous plants, save water and reduce maintenance.

STEP  
2

- ❑ **Identify your landscape goal.** Decide what you want to do and how you want to do it.

STEP  
3

- ❑ **Create a basic plot plan.** Making a plan of your existing landscape will help you visualize your future landscape.

STEP  
4

- ❑ **Design your WaterSmart landscape.** Whether you plan to install the entire project at one time or in phases, lay out the master plan for your landscape so you can ensure that your goals will be met. Include a WaterSmart planting and irrigation design. Estimate your planned water use before you start construction and adjust if it doesn’t meet your original landscape goal.

STEP  
5

- ❑ **Implement your plan.** When implementing your plan, get it right the first time. Consider hiring a professional if needed. [www.ecolandscape.org](http://www.ecolandscape.org).

STEP  
6

- ❑ **Care for your WaterSmart landscape.** Learn the best practices for maintaining your landscape. For additional information see resources in appendix A.



*Remember to document your project by taking “before”, “during” and “after” photos*

# Appendix

## CONTENTS

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## APPENDIX A

### RESOURCES RELATED TO OUTDOOR WATER CONSERVATION

The Regional Water Authority has put together a list of additional water conservation resources, organized by topic, that you may find helpful.

#### Water conservation tips and information

- Be Water Smart  
[www.BeWaterSmart.info](http://www.BeWaterSmart.info)
- EcoLandscape California  
[www.ecolandscape.org](http://www.ecolandscape.org)
- Fair Oaks Horticulture Center  
[ucanr.edu/sites/sacmg/  
Fair\\_Oaks\\_Horticulture\\_Center](http://ucanr.edu/sites/sacmg/Fair_Oaks_Horticulture_Center)
- Guide to a Water-Saver Home  
[www.h2ouse.org](http://www.h2ouse.org)
- Regional Water Authority  
[www.rwah2o.org](http://www.rwah2o.org)
- River-Friendly Landscaping  
[www.ecolandscape.org/riverfriendly](http://www.ecolandscape.org/riverfriendly)
- Save Our Water  
[www.saveourwater.com](http://www.saveourwater.com)
- U.C. Cooperative Extension Master Gardeners  
[www.camastergardeners.ucanr.edu](http://www.camastergardeners.ucanr.edu)
- Water Sense  
[www.epa.gov/watersense](http://www.epa.gov/watersense)
- Water Use it Wisely  
[www.wateruseitwisely.com](http://www.wateruseitwisely.com)

#### Irrigation

- California Irrigation Management Information System (CIMIS)  
[www.cimis.water.ca.gov](http://www.cimis.water.ca.gov)
- How to Install Efficient Irrigation  
[www.h2ouse.org/tour/step-3.cfm](http://www.h2ouse.org/tour/step-3.cfm)
- Irrigation Tutorials  
[www.irrigationtutorials.com](http://www.irrigationtutorials.com)
- Smart Controller Resource List  
[www.irrigation.org/swat/control\\_climate](http://www.irrigation.org/swat/control_climate)
- WaterWiser Drip Calculator  
[www.awwa.org/resources-tools/public-affairs/  
public-information/dripcalculator.aspx](http://www.awwa.org/resources-tools/public-affairs/public-information/dripcalculator.aspx)

#### Plant selection resources

- Arboretum All-Stars  
[www.arboretum.ucdavis.edu/arboretum\\_all\\_stars.aspx](http://www.arboretum.ucdavis.edu/arboretum_all_stars.aspx)
- California Invasive Plant Council  
[www.cal-ipc.org](http://www.cal-ipc.org)
- CalFire - Fire-wise landscaping tips  
[www.readyforwildfire.org/landscaping](http://www.readyforwildfire.org/landscaping)
- Call 811 before you dig  
[www.usanorth811.org](http://www.usanorth811.org)
- Eco-Friendly Landscape Design Plans for the New California Landscape  
[www.ecolandscape.org/new-ca](http://www.ecolandscape.org/new-ca)
- Gardening with California Native Plants  
[www.sacvalleycnps.org](http://www.sacvalleycnps.org)
- Local Nurseries  
[www.ecolandscape.org/resources\\_nurseriesGrowers.html](http://www.ecolandscape.org/resources_nurseriesGrowers.html)
- Plant Right  
[www.plantright.org](http://www.plantright.org)
- Sacramento Tree Foundation  
[www.sactree.com](http://www.sactree.com)
- Water-Wise Gardening in the Gold Country  
[www.rwa.watersavingplants.com](http://www.rwa.watersavingplants.com)
- WUCOLS Landscape Water-Use Planning Tool  
California plant database search tool  
[www.waterwonk.us](http://www.waterwonk.us)



## APPENDIX B

### WATER PROVIDER LIST

Financial incentives offered by the Regional Water Authority and your local water provider may help offset some of the costs of upgrading to WaterSmart landscaping, and we strongly encourage homeowners to take full advantage of these programs. For a complete and up-to-date listing for your area, please go to [www.BeWaterSmart.info](http://www.BeWaterSmart.info).

Water Provider	Phone Number	Website
California American Water	(888) 237-1333	<a href="http://www.calamwater.com">www.calamwater.com</a>
Carmichael Water District	(916) 483-2452	<a href="http://www.carmichaelwd.org">www.carmichaelwd.org</a>
Citrus Heights Water District	(916) 725-6873	<a href="http://www.chwd.org">www.chwd.org</a>
City of Folsom	(916) 355-7252	<a href="http://www.folsom.ca.us">www.folsom.ca.us</a>
City of Lincoln	(916) 434-2450	<a href="http://www.ci.lincoln.ca.us">www.ci.lincoln.ca.us</a>
City of Roseville	(916) 774-5761	<a href="http://www.roseville.ca.us/savewater">www.roseville.ca.us/savewater</a>
City of Sacramento	(916) 808-5454	<a href="http://www.sparesacwater.org">www.sparesacwater.org</a>
City of West Sacramento	(916) 617-4589	<a href="http://www.cityofwestsacramento.org">www.cityofwestsacramento.org</a>
Del Paso Manor Water District	(916) 487-0419	
El Dorado Irrigation District	(530) 622-4513	<a href="http://www.eid.org">www.eid.org</a>
Elk Grove Water District	(916) 685-3556	<a href="http://www.egwd.org">www.egwd.org</a>
Fair Oaks Water District	(916) 967-5723	<a href="http://www.fowd.com">www.fowd.com</a>
Golden State Water District	(800) 999-4033	<a href="http://www.gswater.com">www.gswater.com</a>
Orange Vale Water Company	(916) 988-1693	<a href="http://www.orangevalewater.com">www.orangevalewater.com</a>
Placer County Water Agency	(530) 823-4850	<a href="http://www.pcwa.net">www.pcwa.net</a>
Rancho Murieta Community Services District	(916) 354-3700	<a href="http://www.rmcsd.com">www.rmcsd.com</a>
Rio Linda/Elverta Community Water District	(916) 991-1000	<a href="http://www.rlecwd.com">www.rlecwd.com</a>
Sacramento County Water Agency	(916) 875-7246	<a href="http://www.waterresources.saccounty.net.scwa">www.waterresources.saccounty.net.scwa</a>
Sacramento Suburban Water District	(916) 972-7171	<a href="http://www.sswd.org">www.sswd.org</a>
San Juan Water District	(916) 791-2663	<a href="http://www.sjwd.org">www.sjwd.org</a>



## APPENDIX C

### DEFINITIONS

**Backflow preventer:** Used to protect the potable water supply from contamination due to reverse flow to the home. This may be incorporated into the control valve for each zone (anti-siphon device).

**Bubblers:** Bubblers (sometimes referred to as shrubblers) should not be used in efficient irrigation systems. Although they may be labeled “low-volume drip or flow” they often deliver water faster than the soil can absorb it, which often results in runoff.

**Control valve:** A valve that controls water supply to each zone or station of an irrigation system.

**Conventional spray irrigation:** One of the least efficient types of irrigation; it is a fixed overhead spray with a fan-shaped spray pattern and a range of 4 to 20 feet.

**Cycle/soak method:** To determine how long sprinklers can run before runoff begins, divide total irrigation time needed into two to four sessions with an hour in between. This allows water to soak into the soil before the next session begins.

**Distribution uniformity (DU):** A measure of how evenly water is applied to a landscaped area during irrigation. A higher DU indicates more uniform coverage within a valve zone.

**Drip emitter:** Drip emitters are one of the most efficient ways to water to your landscape. Drip systems convey water through low-flow emission devices to each plant. The most efficient systems use emitters that deliver less than 2.5 gallons per hour (gph) and incorporate pressure compensating devices. A filter should be installed with all drip systems.

**Evapotranspiration (ET):** This term is used to describe water lost to evaporation from soil and plant surfaces and transpiration from plant tissues.

**Filter:** Filters are used with drip systems to remove organic and inorganic debris from the water that could potentially clog the emission devices.

**Fitting:** Components used to connect irrigation parts together. Types of fittings include barbed, compression, locking, glued, threaded or end caps. Configurations include couplings, elbows and tees.

**Flush valve:** A valve used to clear dirt out of the system or drain water from irrigation lines in preparation for freezing temperatures.

**Gear rotor:** Gear rotors are classified as moderately efficient, high-flow overhead irrigation. A rotating stream distributes water evenly. The typical spray range is 25 feet or larger, and they are best suited for large turf areas.

**High-efficiency nozzle:** Very efficient nozzles that deliver 85% of the applied water to a targeted area. Large droplets reduce misting, evaporation and wind-drift. The precipitation rate should be no more than 1 inch per hour. This slower application rate allows the soil to absorb the water before it runs off. Examples include high-efficiency spray nozzles and multi-stream rotary nozzles.

**Hydrozone:** Grouping of plants having similar water needs on one irrigation valve zone. “Very low,” “low,” “moderate,” and “high” hydrozones should each be irrigated separately according to plant water requirements using only one type of sprinkler or emitter throughout the zone.

**Impact rotor:** Impact rotors are one of the least efficient methods of overhead irrigation. Known for the distinct sound they make as they throw rotating streams of water across the landscape. They have a spray range of 20 to 40 feet. Impact rotors are quickly being replaced by gear rotors, sprinklers fitted with multi-stream rotary nozzles and other types of irrigation which are quieter and more efficient.

**In-line emitter tubing:** In-line drip is one of the most efficient ways to water your landscape. Water is conveyed through tubing embedded with low-flow emitters spaced at regular intervals along the line, and delivered at 1.0 gallon per hour (gph) or less. In-line emitter tubing can be installed at grade (on the soil surface) or just beneath the surface. The most efficient systems incorporate pressure compensating emitters. It is important to use a filter with any drip system.

**Micro-spray emitter:** Micro-spray emitters should not be used in efficient irrigation systems. Although they may be labeled “low-volume drip or flow” they often deliver water at a faster rate than the soil can absorb it, which may result in runoff. The rate of application is often between 1-3 inches per hour, which is equal to or higher than that of inefficient fixed spray nozzles.

**Multi-stream nozzle:** These rotating nozzles are the most efficient type of overhead spray for areas 8 to 30 feet in size. Rotator nozzles throw multiple rotating streams of water similar to gear rotors, but the advantage is that the nozzles can be used with conventional spray bodies. In comparison to conventional spray nozzles, rotator nozzles throw larger water droplets at a slower rate which helps to prevent misting and runoff. Use nozzles that distribute water at less than .92 inches per hour.

**Polyethylene tubing:** Flexible tubing used to deliver water to drip emitters for point source irrigation, delivering water precisely where it is needed.

**Precipitation rate (PR):** A measurement of how fast water is applied to the landscape; it is usually expressed in inches per hour.

**Pressure compensating device:** Used to regulate water pressure either at the valve, head, or emitter and maintain constant flow regardless of incoming pressure.

**Riser:** Vertical pieces of pipe used to connect the sprinklers to underground pipes. You may purchase adjustable polyethylene risers at the desired height, or cut-off types that are easily cut to size.

**Smart controller:** An automatic controller (also called a timer or clock) that is weather-based or soil-moisture based and automatically adjusts watering times in response to seasonal weather changes or soil moisture. Smart controllers have the ability to prevent your sprinklers from watering when it rains and increase the frequency and/or duration of watering in warmer weather.

**Soil moisture sensor (SMS):** The soil moisture sensor is a sensor connected to an irrigation system controller that measures soil moisture content in the active root zone before each scheduled irrigation event and bypasses the cycle if soil moisture is above a user-defined set point. Soil moisture sensors, like rain sensors, are considered rain shut off devices, but while rain sensors measure evapotranspiration rates, soil moisture sensors measure real time soil moisture.

**Sprinkler heads:** There are two basic categories: spray and rotary (rotors). Spray heads emit a fixed spray and are generally used for smaller landscaped areas, throwing water in a 15 foot radius. They apply water at a faster rate than rotors and should be set for short sessions (run times) to prevent run off. Often more than one session is required (see definition for cycle/soak method). For maximum efficiency, sprinkler heads should be equipped with nozzles that deliver water at 1.20 inches per hour or less.

**Swing joint:** Very flexible and not easily damaged, use of a swing joint makes it easier to adjust the height and angle of a sprinkler head.

## APPENDIX D

### AVERAGE PRECIPITATION RATES

<i>The following flow rates and emitter spacings are averages and may vary according to manufacturer. This is not an exhaustive list of available products. Consult manufacturers' website for additional information and specifications.</i>					
<b>SPRINKLERS</b>					
Fixed spray = 1.5 inches per hour					
Stream rotors = 0.67 to 1.33 inches per hour (Consult manufacturers' catalog for accurate specifications)					
Gear-driven rotors = 0.6 inches per hour					
Rotary nozzles = 0.39 inches per hour					
High-efficiency nozzles = 1.0 inches per hour					
Microspray = 1.0 to 3.0 inches per hour					
<b>LINE-SOURCE DRIP</b>					
<i>In-line emitter tubing with grid pattern layout</i>					
0.5 gallons per hour, 12" emitter spacing, 12" row spacing = 0.8 inches per hour					
1.0 gallons per hour, 12" emitter spacing, 12" row spacing = 1.6 inches per hour					
0.5 gallons per hour, 18" emitter spacing, 18" row spacing = 0.36 inches per hour					
1.0 gallons per hour, 18" emitter spacing, 18" row spacing = 0.72 inches per hour					
<i>Note: Gallons per hour may vary based on product and manufacturer</i>					
<b>POINT-SOURCE DRIP</b>					
<i>Emitters placed at plant locations only</i>					
0.5 gallons per hour, start with 0.36 inches per hour					
1.0 gallons per hour, start with 0.72 inches per hour					
<i>The precipitation rate of emitters placed in a non-uniform pattern is difficult to calculate, therefore the above recommendation is intended as a starting point. Close monitoring of plants within the irrigation zone is highly recommended. Run-time minutes may be adjusted as needed.</i>					
<p>To calculate the precipitation rate for any zone, use the following formula:</p> <p style="text-align: center;"><b>PR=(96.3 x GPM)/Area</b></p> <p style="text-align: center;">PR = Average precipitation rate expressed in inches per hour            96.3 = Constant to resolve the units of measure (GPM x Area)            GPM = Total gallons per minute of water applied to an area            Area = Total square foot area where the water is being distributed</p>					
<b>AVERAGE DISTRIBUTION UNIFORMITY</b>					
Irrigation Type	Excellent	Very Good	Good	Fair	Poor
	(%)	(%)	(%)	(%)	(%)
Fixed Spray	75	65	55	50	40
Rotary Nozzles	85	75	70	65	55
Rotor	80	70	65	60	50
In-line Drip	95	90	85	80	75
Point-source Drip	90	85	80	75	70
<i>Note: Distribution uniformity (DU) is best determined by conducting an irrigation audit on the zone. If an audit cannot be performed, it is best to start with the higher distribution uniformity averages, as the lower numbers result in greater run-times and water usage. If this method of estimating is used, the plants in the zone should be closely monitored and proper adjustments made to run-time minutes as needed.</i>					

Courtesy of Lori Palmquist. For more information visit: [www.waterwonk.us](http://www.waterwonk.us)

## APPENDIX E – DRIP SYSTEM COMPONENTS



This drip irrigation system valve assembly includes an anti-siphon valve with a filter and pressure regulator. In this example, flexible tubing is used to deliver water to the plants.



In-line drip emitter tubing laid out in a grid pattern will provide even irrigation coverage to these plants once they are installed.



## APPENDIX F

### WATERSMART PLANT LIST

The following WaterSmart plant list is based on the WUCOLS (Water Use Characteristics of Landscape Species) rating system. The “very low” and “low” water-use plants included below reflect the water use of plants for most areas in the Sacramento region. For more information, go to the full WUCOLS IV plant list which is available online at:

[www.ucanr.edu/sites/WUCOLS](http://www.ucanr.edu/sites/WUCOLS)

Note: The following plant list is by no means a complete list of plants appropriate for our region. New species become available all the time, so not all “low” and “very low” water use plants that are appropriate for our region are included in this list. Plant availability may vary depending upon the season.

BOTANICAL NAME	COMMON NAME	WUCOLS	CA NATIVE	PLANT TYPE
Abelia x grandiflora cvs. including ‘Kaleidoscope’	Glossy Abelia	M		Shrub, Groundcover
Abies spp. (CA native + non-native)	Fir	M	Some	Tree
Acacia baileyana	Bailey Acacia	L		Tree
Acacia melanoxylon	Blackwood Acacia	L		Tree
Acacia redolens	Prostrate Acacia	VL		Shrub, Groundcover
Acca sellowiana (Feijoa)	Pineapple Guava	L		Tree, Shrub
Acer buergerianum	Trident Maple	M		Tree
Acer palmatum sp.+ cvs. including ‘Atropurpureum’, ‘Bloodgood’	Japanese Maple	M		Tree
Acer rubrum cvs. including ‘Autumn Blaze’, ‘October Glory’, ‘Red Sunset’	Red Maple, Scarlet Maple	M		Tree
Acer truncatum cvs. including ‘Crimson Sunset’, ‘Norwegian Sunset’, ‘Pacific Sunset’, ‘Warrenred’	Manchurian Maple	M		Tree
Achillea ‘Island Pink’	Yarrow	L	Yes	Perennial, Groundcover
Achillea cvs. including ‘Moonshine’, ‘Paprika’, ‘Terra Cotta’	Yarrow hybrids	L		Perennial, Groundcover
Achillea filipendulina	Fern Leaf Yarrow	L		Perennial
Aesculus californica	California Buckeye	VL	Yes	Tree
Aesculus x carnea	Red Horse-Chestnut	M		Tree
Afrocarpus gracilior (Podocarpus)	Fern Pine	M		Tree
Afrocarpus latifolius ‘Purple King’ (Podocarpus)	Yellow-wood	M		Tree
Afrocarpus macrophyllus (Podocarpus)	Yew Pine	M		Tree
Agapanthus sp. + cvs.	Lily of the Nile	M		Perennial
Agastache rupestris + cvs.	Licorice Mint	L		Perennial
Agave americana cvs.	Century Plant	VL		Perennial, Shrub, Succulent
Ajuga reptans ‘Catlin’s Giant’ (requires shade)	Catlin’s Giant Ajuga	M		Perennial, Groundcover
Allocasuarina verticillia (Casuarina stricta)	Coast Beefwood, She Oak	L		Tree
Aloe spp. including ‘Blue Elf’, ‘Johnson’s Hybrid’	Aloe	L	Some	Shrub, Succulent
Amaryllis belladonna	Naked Lady	VL		Bulb
Amelanchier alnifolia	Western Service Berry	M		Tree, Shrub
Anemone x hybrida	Japanese Anemone	M		Perennial
Aptenia cordifolia (may spread vigorously)	Red Apple	L		Perennial, Groundcover
Aquilegia (CA native and non native)	Columbine	L	Some	Perennial

BOTANICAL NAME	COMMON NAME	WUCOLS	CA NATIVE	PLANT TYPE
<i>Arbutus</i> 'Marina'	Marina Arbutus	L		Tree
<i>Arbutus menziesii</i>	Madrone	L	Yes	Tree
<i>Arbutus unedo</i> including 'Compacta'	Strawberry Tree	L	Yes	Tree, Shrub
<i>Arctostaphylos</i> 'Dr. Hurd'	Manzanita	VL	Yes	Shrub
<i>Arctostaphylos</i> including 'Howard McMinn', 'John Dourley', 'Sentinel', 'Sunset'	Manzanita	L	Yes	Shrub
<i>Arctostaphylos</i> 'Carmel Sur', 'Emerald Carpet', 'Pacific Mist'	Manzanita	M	Yes	Shrub, Groundcover
<i>Arctostaphylos uva-ursi</i> 'Point Reyes', 'Woods Compact'	Bearberry, Kinnikinnick	M	Yes	Groundcover
<i>Aristolochia californica</i> (requires shade)	California Dutchman's Pipe	L	Yes	Vine
<i>Armeria maritima</i>	Common Thrift, Sea Pink	M	Yes	Perennial
<i>Artemesia</i> including 'David's Choice', 'Powis Castle', 'Sea Foam', 'Silver Mound'	Artemesia	M		Shrub
<i>Asclepias speciosa</i> (may spread vigorously)	Showy Milkweed	L	Yes	Perennial
<i>Aster novae-angliae</i> 'Purple Dome'	Michaelmas Daisy	M		Perennial
<i>Baccharis pilularis</i> 'Pigeon Point', 'Twin Peaks'	Dwarf Coyote Brush	L	Yes	Shrub, Groundcover
<i>Berberis aquifolium</i> 'Compacta'	Compact Oregon Grape	L	Yes	Shrub, Groundcover
<i>Berberis aquifolium</i> 'Golden Abundance' (Mahonia)	Mahonia	M	Yes	Shrub, Groundcover
<i>Berberis aquifolium repens</i> (requires shade)	Creeping Mahonia	L	Yes	Shrub, Groundcover
<i>Berberis pinnata</i> 'Ken Hartman'	California Holly Grape	L	Yes	Shrub
<i>Berberis thunbergii</i> cvs. including 'Atropurpurea', 'Crimson Pygmy', 'Rose Glow'	Japanese Barberry	M		Shrub
<i>Bergenia cordifolia</i> cvs. including 'Winter Glow'	Heartleaf Bergenia	M		Perennial
<i>Bidens ferulifolia</i>	Apache Beggarticks	L		Perennial
<i>Bletilla striata</i>	Chinese Ground Orchid	M		Perennial
<i>Bouteloua gracilis</i> including 'Blonde Ambition'	Blue Grama Grass	L	Yes	Grass
<i>Buddleja davidii</i> cvs.	Butterfly Bush	M		Shrub
<i>Bulbine frutescens</i>	Cape Balsam	L		Perennial
<i>Buxus microphylla japonica</i> including 'Green Beauty', 'Winter Gem'	Japanese Boxwood	M		Shrub
<i>Calamagrostis foliosa</i>	Leafy Reed Grass	M	Yes	Grass
<i>Calamagrostis x acutiflora</i> including 'Avalanche', 'Karl Foerster', 'Overdam'	Feather Reed Grass	L		Grass
<i>Callistemon</i> sp. + cvs. including 'Little John', 'Violaceus'	Bottlebrush	L		Shrub
<i>Calocedrus decurrens</i>	Incense Cedar	M	Yes	Tree
<i>Calycanthus occidentalis</i> (requires shade)	Western Spice Bush	L	Yes	Shrub
<i>Camellia japonica</i>	Camellia	M		Shrub
<i>Camellia sasanqua</i>	Sasanqua Camellia	M		Shrub
<i>Campsis</i> including 'Madame Galen'	Trumpet Vine	L		Shrub, Vine
<i>Carex divulsa</i>	Berkeley Sedge	M	Yes	Perennial
<i>Carex morrowii</i> cvs. including 'Ice Dance'	Japanese Sedge	M		Perennial
<i>Carex oshimensis</i> cvs. including 'Evergold' (requires shade)	Sedge	L		Perennial

BOTANICAL NAME	COMMON NAME	WUCOLS	CA NATIVE	PLANT TYPE
<i>Carpenteria californica</i> including 'Elizabeth'	Bush Anemone	L	Yes	Shrub
<i>Caryopteris x clandonensis</i> including 'Blue Mist', 'Dark Knight'	Blue Mist, Bluebeard	M		Shrub, Perennial
<i>Cassia artemisioides</i> (Senna)	Feathery Cassia	L		Shrub
<i>Ceanothus</i> 'Centennial', Joyce Coulter'	California Lilac	M	Yes	Shrub, Groundcover
<i>Ceanothus</i> 'Blue Jeans', 'Concha', 'Dark Star', 'Frosty Blue', 'Julia Phelps', 'Louis Edmunds', 'Ray Hartman', 'Skylark', 'Valley Violet', 'Yankee Point'	California Lilac	L	Yes	Shrub
<i>Ceanothus</i> including 'El Dorado', 'Marie Simon'	California Lilac	M	Yes	Shrub
<i>Cedrus atlantica</i>	Atlas Cedar	M		Tree
<i>Cedrus deodara</i> including 'Silver Mist', 'Snow Sprite' (dwarfs), 'Feelin' Blue', 'Feeling Sunny' (mounding forms)	Deodar Cedar	L		Tree
<i>Celtis x magnifica</i>	Hackberry Hybrid	not in WUCOLS		Tree
<i>Centaurea cineraria</i>	Dusty Miller	L		Perennial
<i>Cerastium tomentosum</i>	Snow-in-Summer	M		Groundcover
<i>Ceratostigma plumbaginoides</i>	Dwarf Plumbago	M		Groundcover
<i>Cercis canadensis</i> including 'Forest Pansy', 'Hearts of Gold'	Eastern Redbud	M		Tree
<i>Cercis mexicana</i>	Mexican Redbud	L		Tree, Shrub
<i>Cercis occidentalis</i>	Western Redbud	VL	Yes	Tree, Shrub
<i>Cercis reniformis</i> including 'Oklahoma'	Oklahoma Redbud	L		Tree
<i>Cercocarpus betuloides</i>	Mountain Mahogany	VL	Yes	Shrub
<i>Chaenomeles</i> cvs. Including 'Texas Scarlet'	Flowering Quince	L		Shrub
<i>Chamaerops humilis</i>	Mediterranean Fan Palm	L		Tree, Shrub
<i>Chilopsis linearis</i>	Desert Willow	VL	Yes	Tree
<i>Chionanthus retusus</i>	Chinese Fringe Tree	M		Tree
<i>Chitalpa</i> 'Pink Dawn' (x <i>Chitalpa</i> 'Pink Dawn')	Chitalpa	L		Tree
<i>Choisya ternata</i> including 'Aztec Pearl'	Mexican Orange	M		Shrub
<i>Chondropetelum tectorum</i>	Cape Rush	L		Perennial
<i>Cistus</i> sp. + cvs.	Rockrose	L		Shrub, Groundcover
Citrus	Orange, Lemon, Kumquat	M		Tree
<i>Clytostoma callistegioides</i>	Violet Trumpet Vine	M		Vine
<i>Coleonema pulchellum</i> including 'Compacta', 'Sunset Gold'	Breath of Heaven	M		Shrub
<i>Convolvulus cneorum</i>	Bush Morning Glory	L		Shrub
<i>Convolvulus mauritanicus</i>	Ground Morning Glory	L		Groundcover
<i>Coprosma x kirkii</i>	Creeping Mirror Plant	L		Shrub, Groundcover
<i>Cordyline australis</i> including 'Red Star' ( <i>Dracaena</i> )	New Zealand Cabbage Tree	M		Tree, Shrub
<i>Coreopsis lanceolata</i>	Tickseed	L		Perennial
<i>Coreopsis</i> sp. + cvs.	Tickseed	M		Shrub, Perennial
<i>Coreopsis verticillata</i> including 'Moonbeam', 'Zagreb'	Tickseed	L		Perennial, Groundcover
<i>Cornus</i> including 'Eddie's White Wonder', <i>C. Kousa</i>	Dogwood	M		Tree
<i>Correa</i> sp. + cvs. including 'Dusky Bells', 'Ivory Bells', 'Mission Bells', 'Pink Eyre', 'Wyn's Wonder'	Australian Fuchsia	L		Shrub

BOTANICAL NAME	COMMON NAME	WUCOLS	CA NATIVE	PLANT TYPE
<i>Cotinus coggygia</i> including 'Ancot', 'Golden Spirit', 'Grace', 'Royal Purple'	Smoke Tree	L		Shrub
<i>Cotoneaster dammeri</i> including 'Coral Beauty', 'Lowfast', 'Streib's Findling'	Bearberry Cotoneaster	L		Groundcover
<i>Cotoneaster horizontalis</i>	Rock Cotoneaster	L		Groundcover
<i>Cotoneaster microphyllus</i>	Rockspray Cotoneaster	L		Groundcover
<i>Crataegus</i> including 'Paul's Scarlet'	Hawthorn	M		Tree
<i>Crinodendron patagua</i>	Chilean Lily-of-the-Valley	M		Tree
<i>Cupressus sempervirens</i> including 'Compacta', 'Glauca', 'Swane's Golden', 'Tiny Towers'	Italian Cypress	M		Tree, Shrub
<i>Cycas revoluta</i>	Sago Palm	M		Palm, Shrub
<i>Cyrtomium falcatum</i>	Japanese Holly Fern	M		Perennial
<i>Daphne odora</i> 'Aureomarginata'	Winter Daphne	L		Shrub
<i>Daphne x transatlantica</i> including 'Summer Ice'	Transatlantica Daphne	M		Shrub
<i>Dasiphora fruticosa</i> including 'Gold Finger', 'Klondike' (Potentilla)	Cinquefoil	M	Yes	Shrub
<i>Dasyliirion wheeleri</i>	Desert Spoon, Sotol	VL		Shrub, Succulent
<i>Delosperma</i> spp. cooperi	Cooper's Ice Plant	L		Groundcover
<i>Dendromecon harfordii</i>	Island Bush Poppy	VL	Yes	Shrub
<i>Dianella revoluta</i> cvs. (requires shade)	Flax Lily	L		Perennial
<i>Dicliptera suberecta</i>	Hummingbird Plant	L		Perennial
<i>Dietes</i> (Moraea)	Fortnight Lily	L		Perennial
<i>Diospyros kaki</i>	Chinese Persimmon	M		Tree
<i>Dodonaea viscosa</i> 'Purpurea'	Hopseed Bush	L		Shrub
<i>Dorycnium hirsutum</i>	Hairy Canary Clover	M		Shrub
<i>Dymondia margaretae</i>	Silver Carpet	L		Perennial, Groundcover
<i>Echeveria</i> sp. + cvs.	Hen and Chicks	L		Perennial, Succulent
<i>Echinacea</i> cvs.	Coneflower	M		Perennial
<i>Elaeagnus</i> cvs. including 'Fruitlandii', 'Gilt Edge', 'Variegata'	Silverberry	L		Shrub
<i>Epilobium</i> sp. + cvs. (Zauschneria)	California Fuchsia	L	Yes	Shrub, Groundcover
<i>Erigeron karvinskianus</i>	Santa Barbara Daisy	L		Perennial, Groundcover
<i>Eriobotrya deflexa</i>	Bronze Loquat	M		Tree
<i>Eriogonum fasciculatum</i>	California Buckwheat	L	Yes	Shrub
<i>Eriogonum giganteum</i>	Saint Catherine's Lace	VL	Yes	Shrub
<i>Eriogonum grande rubescens</i>	Red Buckwheat	L	Yes	Perennial
<i>Eriogonum umbellatum polyanthum</i>	Sulfur Buckwheat	M	Yes	Shrub
<i>Erysimum</i> cvs. including 'Bowles Mauve'	Wallflower	L		Perennial
<i>Escallonia</i> sp.+ cvs. including 'Compacta', 'Fradesii', 'Newport Dwarf', rubra	Escallonia	M		Shrub
<i>Eschscholzia californica</i>	California Poppy	VL	Yes	Perennial
<i>Eucalyptus nicholli</i>	Narrow-Leafed Peppermint	L		Tree
<i>Euonymus alatus</i> including 'Compacta'	Winged Euonymus	M		Shrub
<i>Euonymus fortunei</i> cvs. including 'Emerald Gaiety', 'Emerald 'n Gold'	Evergreen Euonymus	M		Shrub, Groundcover
<i>Euonymus japonicus</i> cvs.	Euonymus cultivars	L		Shrub

BOTANICAL NAME	COMMON NAME	WUCOLS	CA NATIVE	PLANT TYPE
<i>Euonymus microphyllus</i> cvs. including 'Greenspire'	Euonymous	not in WUCOLS		Shrub
<i>Euphorbia myrsinites</i>	Creeping Spurge	L		Perennial
<i>Euphorbia rigida</i>	Narrow-Leaved Glaucous Spurge	L		Perennial
<i>Euphorbia</i> sp. + cvs. including 'Ascot Rainbow', 'Blackbird', 'Tasmanian Tiger', 'wulfenii'	Large Mediterranean Spurge	M		Perennial
<i>Euryops pectinatus</i> including 'Munchkin', 'viridis'	Shrub Daisy	L		Shrub, Perennial
<i>Festuca californica</i> (some shade required)	California Fescue	M	Yes	Grass
<i>Festuca glauca</i> including 'Elijah Blue'	Blue Fescue	L	Yes	Grass
<i>Festuca idahoensis</i> + cvs. including 'Siskiyou Blue'	Blue Fescue	L	Yes	Grass
<i>Forsythia x intermedia</i> cvs. including 'Lydia', 'Magical Gold'	Spring Gold	M		Shrub
<i>Frangula californica</i> including 'Eve Case', 'Mound San Bruno' (Rhamnus)	Coffeeberry	L	Yes	Shrub
<i>Fraxinus angustifolia</i> 'Raywood'	Raywood Ash	M		Tree
<i>Fremontodendron</i> including 'California Glory', 'Ken Taylor', 'Pacific Mist'	Flannel Bush	VL	Yes	Shrub
<i>Gaillardia x grandiflora</i> including 'Arizona Sun', 'Goblin'	Blanket Flower	L		Perennial
<i>Garrya elliptica</i> including 'Evie'	Silktassel	L	Yes	Shrub
<i>Gaura lindheimeri</i> cvs. including 'Passionate Blush', 'Passionate Rainbow', 'Siskiyou Pink', 'Whirling Butterflies'	Gaura	M		Perennial
<i>Gazania</i> spp.	Clumping Gazania	M		Groundcover
<i>Geijera parviflora</i>	Australian Willow	M		Tree
<i>Gelsemium sempervirens</i>	Carolina Jessamine	L		Vine
<i>Geranium</i> 'Biokovo', 'Rozanne'	Cranesbill	M		Perennial, Groundcover
<i>Ginkgo biloba</i> 'Autumn Gold', 'Fairmount', 'Princeton Sentry', 'Saratoga' (Male cultivars only)	Maidenhair Tree	M		Tree
<i>Glandularia lilacina</i> 'De La Mina' (Verbena)	Lilac Verbena	L	Yes	Perennial
<i>Gleditsia triacanthos</i> 'Shademaster'	Honey Locust	L		Tree
<i>Grevillea</i> including 'Canberra Gem', 'Coastal Gem', 'Molonglo', 'Mt. Tamboritha', 'Noelii', 'Scarlet Sprite'	Grevillea	L		Shrub
<i>Hardenbergia violacea</i> including 'Happy Wanderer'	Lilac Vine	M		Shrub, Vine
<i>Helianthemum nummularium</i> including 'Wisley Primrose'	Common Sunrose	M		Perennial
<i>Helictotrichon sempervirens</i> + cvs.	Blue Oat Grass	L		Grass
<i>Helleborus argutifolius</i>	Corsican Hellebore	L		Perennial
<i>Helleborus orientalis</i> + cvs.	Lenten Rose	M		Perennial
<i>Hemerocallis</i> hybrids	Daylily	M		Perennial
<i>Hesperaloe parviflora</i>	Red/Yellow Yucca	L		Shrub, Succulent
<i>Hesperocyparis arizonica</i> including 'Blue Ice', 'Glabra' (Cupressus)	Arizona Cypress	VL		Tree
<i>Heteromeles arbutifolia</i>	Toyon	VL	Yes	Shrub
<i>Heuchera</i> hybrids (some shade required)	Coral Bells	M		Perennial
<i>Heuchera</i> 'Lillian's Pink', 'maxima', 'Rosada' (shade)	Island Alumroot	L	Yes	Perennial
<i>Hibiscus syriacus</i>	Rose of Sharon	M		Shrub
<i>Hypericum x moserianum</i> including Ignite series	Gold Flower	M		Shrub

BOTANICAL NAME	COMMON NAME	WUCOLS	CA NATIVE	PLANT TYPE
<i>Ilex</i>	Holly	M		Shrub
<i>Iris</i> 'Canyon Snow' + Pacific Coast Hybrids	Iris Hybrids	M	Yes	Perennial, Bulb
<i>Jacobaea maritima</i> ( <i>Senecio cineraria</i> )	Dusty Miller	L		Shrub
<i>Jasminum mesnyi</i>	Primrose Jasmine	M		Shrub, Vine
<i>Jasminum nudiflorum</i>	Winter Jasmine	L		Shrub, Groundcover
<i>Jasminum polyanthum</i>	Evergreen Jasmine	M		Vine
<i>Juncus patens</i> sp. + cvs. including 'Elk Blue'	California Gray Rush	M	Yes	Perennial
<i>Juniperus horizontalis</i> including 'Bar Harbor', 'Blue Chip'	Juniper	L		Groundcover
<i>Juniperus procumbens</i> including 'Green Mound', 'Nana'	Juniper	L		Groundcover
<i>Juniperus scopularium</i> including 'Tolleson's Blue', 'Wichita Blue'	Juniper	L		Tree
<i>Kniphofia</i> sp. + cvs. including 'Christmas Cheer'	Red Hot Poker, Torch Lily	L		Perennial
<i>Koelreuteria bipinnata</i>	Chinese Flame Tree	M		Tree
<i>Koelreuteria elegans</i>	Formosan Flame Tree	M		Tree
<i>Koelreuteria paniculata</i>	Goldenrain Tree	M		Tree
<i>Lagerstroemia</i> cvs. including 'Dynamite', 'Muskogee', 'Natchez', 'Pecos', 'Tuscarora'	Crape Myrtle	L		Tree
<i>Lagerstroemia petite</i> cvs. including 'Moners', 'Monhid'	Petite Crape Myrtle	L		Shrub
<i>Lantana</i> hybrids	Lantana	L		Shrub, Groundcover
<i>Lantana montevidensis</i>	Trailing Lantana	L		Groundcover
<i>Laurus nobilis</i>	Sweet Bay	L		Tree
<i>Lavandula</i> sp. + cvs.	Lavender	L		Shrub
<i>Lavatera maritima</i>	Bush Mallow	L		Shrub
<i>Leonotis leonurus</i> (frost tender)	Lion's Tail	L		Shrub
<i>Leptospermum</i> including 'Helene Strybing', 'Ruby Glow', 'Snow White'	New Zealand Tea Tree	M		Tree, Shrub
<i>Lessingia</i> 'Silver Carpet'	California Beach Aster	M	Yes	Groundcover
<i>Leucanthemum maximum</i> , x <i>superbum</i>	Shasta Daisy	M		Perennial
<i>Leucophyllum</i> including 'Cimarron', 'Compacta'	Texas Ranger, Cenizo	L		Shrub
<i>Leucophyllum</i> 'Lynn's Legacy'	Texas Ranger, Cenizo	M		Shrub
<i>Liriope</i>	Lily Turf	M		Perennial
<i>Lobelia laxiflora</i>	Mexican Bush Lobelia	L		Shrub
<i>Lonicera standishii</i>	Winter Honeysuckle	not in WUCOLS		Shrub
<i>Loropetalum chinense</i> + cvs.	Fringe Flower	M		Shrub
<i>Mahonia oiwakensis</i>	Chinese Holly Grape	M		Shrub
<i>Mandevilla laxa</i>	Chilean Jasmine	M		Vine
<i>Micromyrtus ciliata</i>	Dwarf Myrtus	not in WUCOLS		Shrub
<i>Mimulus aurantiacus</i>	Sticky Monkey Flower	L	Yes	Shrub
<i>Miscanthus sinensis</i> cvs. including 'Adagio', 'Morning Light' + dwarf varieties	Japanese Silver Grass	M		Grass
<i>Monardella villosa</i>	Coyote Mint	VL	Yes	Perennial
<i>Morella californica</i> ( <i>Myrica</i> )	Pacific Wax Myrtle	M	Yes	Shrub
<i>Muhlenbergia capillaris</i> + cvs.	Pink Muhly	L		Grass

BOTANICAL NAME	COMMON NAME	WUCOLS	CA NATIVE	PLANT TYPE
<i>Muhlenbergia dubia</i>	Pine Muhly	L	Yes	Grass
<i>Muhlenbergia rigens</i>	Deer Grass	L	Yes	Grass
<i>Myoporum parvifolium</i> cvs. including 'Burgundy Carpet', 'Prostratum'	Creeping Boobiala	L		Shrub, Groundcover
<i>Myrsine africana</i>	African Boxwood	L		Shrub
<i>Myrtus communis</i> including 'Compacta'	True Myrtle	L		Shrub
<i>Nandina</i> cvs. including 'Firepower', 'Harbor Dwarf', 'Monfar', 'Monum', 'Moonbay', 'Nana'	Heavenly Bamboo	L		Shrub
<i>Narcissus</i> species	Daffodil	VL		Bulb
<i>Neomarica caerulea</i>	Walking Iris	L		Perennial
<i>Nepeta</i> cvs. including 'Walker's Low'	Catmint, Catnip	L		Perennial
<i>Nerium oleander</i> + cvs.	Oleander	L		Shrub
<i>Olea europaea</i> including 'Little Ollie', 'Majestic Beauty', 'Swan Hill'	Olive	VL		Tree
<i>Origanum</i> sp. + cvs. including 'Betty Rollins'	Dwarf Oregano	M		Perennial, Groundcover
<i>Osmanthus fragrans</i>	Sweet Olive	M		Shrub
<i>Osmanthus heterophyllus</i> including 'Goshiki', 'Gulftide', 'Variegatus'	Holly-Leaf Osmanthus	M		Shrub
<i>Osmanthus x fortunei</i>	Hybrid Tea Olive	M		Shrub
<i>Osteospermum fruticosum</i>	Trailing African Daisy	L		Groundcover
<i>Paeonia</i> hybrids including Itoh hybrids	Peony	M		Perennial
<i>Parthenocissus quinquefolia</i>	Virginia Creeper Vine	M		Vine, Groundcover
<i>Pennisetum alopecuroides</i> including 'Hameln', 'Little Bunny'	Black Pennisetum	L		Grass
<i>Pennisetum orientale</i> 'Karley Rose' (seedless)	Oriental Fountain Grass	L		Grass
<i>Penstemon</i> garden hybrids including 'Garnet'	Border Penstemon	M		Perennial
<i>Penstemon</i> southwest native sp. + cvs. including 'Margarita BOP'	Foothill Penstemon	L	Yes	Perennial
<i>Peritoma arborea</i> (Isomeris)	Bladderpod	VL	Yes	Shrub
<i>Perovskia x atriplicifolia</i> sp. + cvs. including 'Lacey Blue', 'Little Spire'	Russian Sage	L		Shrub, Perennial
<i>Philadelphus</i> 'Belle Etoile'	Purple Spot Mock Orange	M		Shrub
<i>Philadelphus lewisii</i>	Western Mock Orange	M	Yes	Shrub
<i>Philadelphus x virginalis</i>	Double Mock Orange	M		Shrub
<i>Phlomis fruticosa</i>	Jerusalem Sage	L		Shrub
<i>Phlomis purpurea</i>	Purple Phlomis	L		Shrub
<i>Phlox</i> sp. + cvs.	Summer Phlox	M	Some	Perennial
<i>Phlox subulata</i> cvs. including 'Emerald Blue'	Moss Pink	M		Groundcover
<i>Phormium</i> cvs. including 'Jack Spratt', 'Platt's Black', 'Tom Thumb'	New Zealand Flax	M		Perennial
<i>Photinia x fraseri</i>	Photinia	M		Tree, Shrub
<i>Physocarpus opulifolius</i>	Common Ninebark	M		Shrub
<i>Picea</i> sp. + cvs.	Spruce	M		Tree, Shrub
<i>Pieris</i> cvs.	Lily of the Valley Shrub	M		Shrub
<i>Pinus canariensis</i>	Canary Island Pine	L		Tree
<i>Pinus contorta</i> including 'Spaan's Dwarf', 'Taylor's Sunburst'	Shore Pine	M	Some	Tree

BOTANICAL NAME	COMMON NAME	WUCOLS	CA NATIVE	PLANT TYPE
<i>Pinus eldarica</i>	Afghan Pine	L		Tree
<i>Pinus flexilis</i> 'Vanderwolf's Pyramid'	Limber Pine	not in WUCOLS	Yes	Tree
<i>Pinus halepensis</i>	Aleppo Pine	L		Tree
<i>Pinus leucodermis</i> including 'Compact Gem', 'Emerald Arrow'	Bosnian Pine	not in WUCOLS		Tree
<i>Pinus mugo mugo</i>	Mugo Pine	L		Shrub
<i>Pinus pinea</i>	Italian Stone Pine	L		Tree
<i>Pinus thunbergii</i> including 'Thunderhead' (dwarf)	Japanese Black Pine	M		Tree
<i>Pistacia chinensis</i> 'Keith Davey' (Male cvs. only)	Chinese Pistache	L		Tree
<i>Pittosporum crassifolium</i>	Evergreen Pittosporum	M		Tree
<i>Pittosporum eugenioides</i>	Lemonwood Tree	M		Tree
<i>Pittosporum tenuifolium</i> cvs.	Tawhiwhi	M		Tree
<i>Pittosporum tobira</i> including 'Cream de Mint', 'Variegata', 'Wheeler's Dwarf'	Mock Orange, Tobira	M		Tree, Shrub
<i>Platanus racemosa</i>	Sycamore	M	Yes	Tree
<i>Platanus x acerifolia</i> 'Columbia'	London Plane	M		Tree
<i>Plumbago auriculata</i> including 'Monott' (frost tender)	Cape Plumbago	M		Shrub
<i>Polypodium californicum</i>	California Polypody	VL	Yes	Perennial
<i>Polystichum munitum</i>	Western Sword Fern	M	Yes	Perennial
<i>Prosopis glandulosa</i>	Mesquite	L		Tree
<i>Prunus caroliniana</i> including 'Bright 'n Tight', 'Compacta'	Carolina Cherry Laurel	L		Tree
<i>Prunus ilicifolia</i> <i>lyonii</i>	Catalina Cherry	L	Yes	Tree, Shrub
<i>Prunus ilicifolia</i> ssp. <i>Illicifolia</i>	Hollyleaf Cherry	L	Yes	Tree, Shrub
<i>Prunus cerasifera</i> including 'Krauter Vesuvius', 'Purple Pony' (dwarf)	Purple Leaf Plum	M		Tree
<i>Prunus serrulata</i> 'Snow Fountains'	Weeping Cherry	M		Tree
<i>Prunus x yedoensis</i> 'Akebono', 'Daybreak'	Flowering Cherry	M		Tree
<i>Punica granatum</i>	Pomegranate	L		Tree
<i>Punica granatum</i> 'Nana'	Dwarf Pomegranate	L		Shrub
<i>Pyracantha</i> cvs. including 'Lowboy', 'Santa Cruz'	Firethorn	L		Shrub, Groundcover
<i>Pyrus</i> including 'Capital', 'Chanticleer', 'Redspire', 'Korean Sun'	Ornamental Pear	M		Tree
<i>Quercus agrifolia</i>	Coast Live Oak	VL	Yes	Tree
<i>Quercus chrysolepis</i>	Canyon Live Oak	L	Yes	Tree
<i>Quercus coccinea</i>	Scarlet Oak	M		Tree
<i>Quercus douglasii</i>	Blue Oak	VL	Yes	Tree
<i>Quercus ilex</i>	Holly Oak	L		Tree
<i>Quercus kelloggii</i>	California Black Oak	M	Yes	Tree
<i>Quercus lobata</i>	Valley Oak	L	Yes	Tree
<i>Quercus palustris</i>	Pin Oak	M		Tree
<i>Quercus phellos</i>	Willow Oak	not in WUCOLS		Tree
<i>Quercus shumardii</i>	Shumard Red Oak	M		Tree
<i>Quercus suber</i>	Cork Oak	L		Tree
<i>Quercus virginiana</i>	Southern Live Oak	M		Tree



BOTANICAL NAME	COMMON NAME	WUCOLS	CA NATIVE	PLANT TYPE
<i>Quercus wislizeni</i>	Interior Live Oak	VL	Yes	Tree
<i>Rhamnus alaternus</i> including 'John Edwards', 'Variegata'	Italian Buckthorn	L		Shrub
<i>Rhamnus crocea</i>	Hollyleaf Redberry	L	Yes	Shrub
<i>Rhaphiolepis indica</i> including 'Ballerina', 'Clara', 'Indian Princess', 'Jack Evans', 'Pink Lady'	Indian Hawthorn	M		Shrub
<i>Rhaphiolepis</i> 'Majestic Beauty'	Majestic Beauty Indian Hawthorn	L		Tree
<i>Rhaphiolepis umbellata</i> cvs. including 'Minor'	Yedda Hawthorn	L		Shrub
<i>Rhodophiala bifida</i>	Red Argentine Amaryllis	L		Bulb
<i>Rhus ovata</i>	Sugar Bush	L	Yes	Shrub
<i>Ribes aureum</i> (requires shade)	Golden Currant	L	Yes	Shrub
<i>Ribes malvaceum</i> (requires shade)	Chaparral Currant	VL	Yes	Shrub
<i>Ribes sanguineum</i> (requires shade)	Pink Winter Currant	L	Yes	Shrub
<i>Ribes speciosum</i> (requires shade)	Fuchsia Flowering Gooseberry	L	Yes	Shrub
<i>Ribes viburnifolium</i> (requires shade)	Evergreen Currant	L	Yes	Shrub
<i>Romneya coulteri</i>	Matilija Poppy	VL	Yes	Shrub, Perennial
<i>Rosa californica</i>	California Wild Rose	L	Yes	Shrub
<i>Rosa chinensis</i> including 'Chi Long Han Zhu', 'Mutabilis'	China Rose	M		Shrub
<i>Rosa</i> 'Floral Carpet' cvs.	Carpet Rose	M		Shrub, Groundcover
<i>Rosa floribunda</i> 'Iceberg', 'Korbin'	Iceberg Rose	M		Shrub
<i>Rosa rugosa</i>	Japanese Rose	M		Shrub
<i>Rosmarinus officinalis</i> including 'Blue Spires', 'Huntington Carpet', 'Ken Taylor', 'Majorica Pink', 'Mozart', 'Prostratus', 'Tuscan Blue'	Rosemary cultivars	L		Shrub, Groundcover
<i>Rubus calycioides</i> including 'Emerald Carpet'	Creeping Raspberry	M		Groundcover
<i>Rudbeckia</i> sp. + cvs.	Black-Eyed Susan	M		Perennial
<i>Ruellia brittoniana</i>	Mexican Petunia	L		Shrub, Perennial
<i>Russelia equisetiformis</i>	Coral Fountain	L		Shrub
<i>Salvia apiana</i>	California White Sage	L	Yes	Shrub
<i>Salvia</i> 'Bee's Bliss'	Bee's Bliss Sage	L	Yes	Shrub, Groundcover
<i>Salvia chamaedryoides</i>	Mexican Blue Sage	L		Shrub
<i>Salvia clevelandii</i> including 'Allen Chickering', 'Aromas', 'Winnifred Gilman'	Cleveland Sage	L	Yes	Shrub
<i>Salvia greggii</i> including 'Dark Dancer', 'Furman's Red', 'Lipstick Red'	Autumn Sage	L		Shrub, Perennial
<i>Salvia leucantha</i> cvs. including 'Midnight'	Mexican Bush Sage	L		Shrub, Perennial
<i>Salvia mellifera</i> 'Terra Seca'	Low Black Sage	L	Yes	Shrub
<i>Salvia microphylla</i> cvs. including 'Hot Lips'	Graham Sage	L		Shrub
<i>Salvia spathacea</i> and cvs. (requires some shade)	Hummingbird Sage	L	Yes	Perennial, Groundcover
<i>Santolina chamaecyparissus</i>	Lavender Cotton	L		Shrub, Perennial, Groundcover
<i>Santolina rosmarinifolia</i>	Green Santolina	L		Shrub, Perennial, Groundcover
<i>Saponaria x lempergii</i> 'Max Frei'	Hybrid Soapwort	L		Perennial

BOTANICAL NAME	COMMON NAME	WUCOLS	CA NATIVE	PLANT TYPE
<i>Scaevola</i> 'Mauve Cluster' (frost tender)	Fan Flower	L		Groundcover
<i>Schinus molle</i>	California Pepper Tree	L		Tree
<i>Scilla peruviana</i>	Squill, Bluebell	VL		Bulb
<i>Searsia lancea</i> (Rhus)	African Sumac	L		Tree
<i>Sedum</i> including 'Angelina', 'Blue Spruce'	Stonecrop	L		Groundcover, Succulent
<i>Sedum pachyphyllum</i>	Jelly Bean Stonecrop	L		Groundcover, Succulent
<i>Sedum palmeri</i>	Palmer's Sedum	L		Groundcover, Succulent
<i>Sedum</i> x 'Autumn Joy'	Autumn Joy Stonecrop	L		Perennial, Groundcover, Succulent
<i>Sedum</i> x <i>rubrotinctum</i>	Pork & Beans Stonecrop	L		Groundcover, Succulent
<i>Sempervivum</i> spp.	Hen and Chicks	L		Perennial, Succulent
<i>Sisyrinchium bellum</i> + cvs.	Blue-Eyed Grass	L	Yes	Perennial
<i>Solanum laxum</i>	Potato Vine	M		Vine
<i>Sollya heterophylla</i>	Australian Bluebell Creeper	L		Shrub, Groundcover
<i>Sphaeralcea</i> spp. (native & non-native)	Desert Mallow	L	Some	Shrub
<i>Spiraea</i> including 'Anthony Waterer', 'Bumalda', 'Gold Flame'	<i>Spiraea</i>	M	Yes	Shrub
<i>Sprekelia formosissima</i>	Aztec Lily	L		Bulb
<i>Stachys byzantina</i> including 'Silver Carpet'	Lamb's Ears	L		Perennial
<i>Sternbergia lutea</i>	Yellow Autumn Crocus	VL		Bulb
<i>Stipa gigantea</i>	Giant Feather Grass	not in WUCOLS		Grass
<i>Styphnolobium japonica</i> (Sophora)	Japanese Pagoda Tree	L		Tree
<i>Styrax japonicus</i>	Japanese Snowbell	M		Tree
<i>Syringa</i> x <i>laciniata</i>	Cut Leaf Lilac	L		Shrub
<i>Tagetes lemmonii</i>	Copper Canyon Daisy	L		Shrub, Perennial
<i>Tecomaria capensis</i> (Tecoma)	Cape Honeysuckle	M		Shrub, Vine
<i>Teucrium chamaedrys</i> including 'Nanum'	Germander	L		Shrub, Perennial, Groundcover
<i>Teucrium cossonii</i>	Majorican Teucrium	L		Perennial, Groundcover
<i>Teucrium fruticans</i> including 'Azureum', 'Compactum'	Bush Germander	L		Shrub
<i>Thuja occidentalis</i> cvs. including 'Smaragd'	American Arborvitae	M		Shrub
<i>Thuja plicata</i> + cvs. including 'Green Giant'	Western Red Cedar	M	Yes	Tree
<i>Thymus</i> sp. + cvs.	Thyme	M		Perennial, Groundcover
<i>Trachelospermum asiaticum</i>	Asiatic Jasmine	M		Shrub, Groundcover, Vine
<i>Trachelospermum jasminoides</i>	Star Jasmine	M		Shrub, Groundcover, Vine
<i>Trachycarpus fortunei</i>	Windmill Palm	M		Tree, Palm
<i>Trichostema lanatum</i>	Woolly Blue Curls	VL	Yes	Shrub, Perennial
<i>Tulbaghia violacea</i> including 'Variegata'	Society Garlic	L		Perennial
<i>Ulmus</i> cvs. including 'Drake', 'Emerald Sunshine', 'Frontier'	Elm hybrids	not in WUCOLS		Tree
<i>Verbena</i> cvs. including 'Homestead'	Verbena	L		Perennial, Groundcover
<i>Verbena</i> 'Tapien' hybrids	Tapien Verbena	M		Perennial, Groundcover
<i>Veronica</i> spp. + cvs.	Speedwell	M		Perennial
<i>Viburnum suspensum</i>	Sandankwa Viburnum	M		Shrub

BOTANICAL NAME	COMMON NAME	WUCOLS	CA NATIVE	PLANT TYPE
Viburnum tinus including 'Anvi', 'Spring Bouquet'	Laurustinus	M		Shrub
Vinca minor	Dwarf Periwinkle	M		Perennial, Groundcover
Vitex agnus-castus	Chaste Tree	L		Tree
Vitis californica including 'Roger's Red'	California Wild Grape	VL	Yes	Vine
Westringia fruticosa	Australian Rosemary	L		Shrub
Woodwardia fimbriata	Giant Chain Fern	M	Yes	Perennial
Xylosma congestum including 'Compacta'	Shiny Xylosma	L		Shrub
Yucca filamentosa + cvs.	Adam's Needle	M		Shrub, Succulent
Zelkova serrata	Sawleaf Zelkova	M		Tree
Zephranthes candida	Argentine Rain Lily	L		Bulb
Ziziphus jujuba	Jujube	L		Tree

## APPENDIX G

### PHOTO CREDITS

Front Cover: Ellen Zagory, UC Davis Arboretum

Page 4 (top left, top right and bottom left): Cheryl Buckwalter, Landscape Liaisons

Page 4 (bottom right): Anne Stevens

Page 9: The New California Landscape renderings - Art direction by Linda Brandon, illustrations by Lisa Friedlander

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Page 31 (top): Pat Schink, UCCE Master Gardener, photo taken at Fair Oaks Horticulture Center

Page 31 (bottom left): Pat Schink, UCCE Master Gardener

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