A Homeowner's Guide to a **WaterSmart Landscape**

water smart
SAN DIEGO COUNTY
WATER AUTHORITY

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.

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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 San Diego County. WaterSmart landscaping is all about rethinking the way we use our limited water resources, and making smart choices to reduce outdoor water use. But saving water isn't the only reason to get excited about a WaterSmart garden.

WaterSmart landscapes are attractive and in balance with our environment and climate. They incorporate elements of sustainable landscaping such as healthy, living soils, climate-appropriate plants, high-efficiency irrigation and rainwater harvesting, and generate many environmental and community benefits.

Working together we can all help ensure a reliable water supply and keep San Diego County vibrant, healthy and naturally beautiful now, and for generations to come.

WaterSmart Landscape Makeover Program

The WaterSmart Landscape Makeover Program is an award-winning educational program developed in 2012 by the San Diego County Water Authority, it's 24 member agencies and local community college experts. The program empowers homeowners with the skills and knowledge necessary to convert a turf area into a WaterSmart landscape.

If you're reading this guide and attending one of the makeover program classes, then you're one step closer to a better way to beautiful. You're on your way to being WaterSmart!

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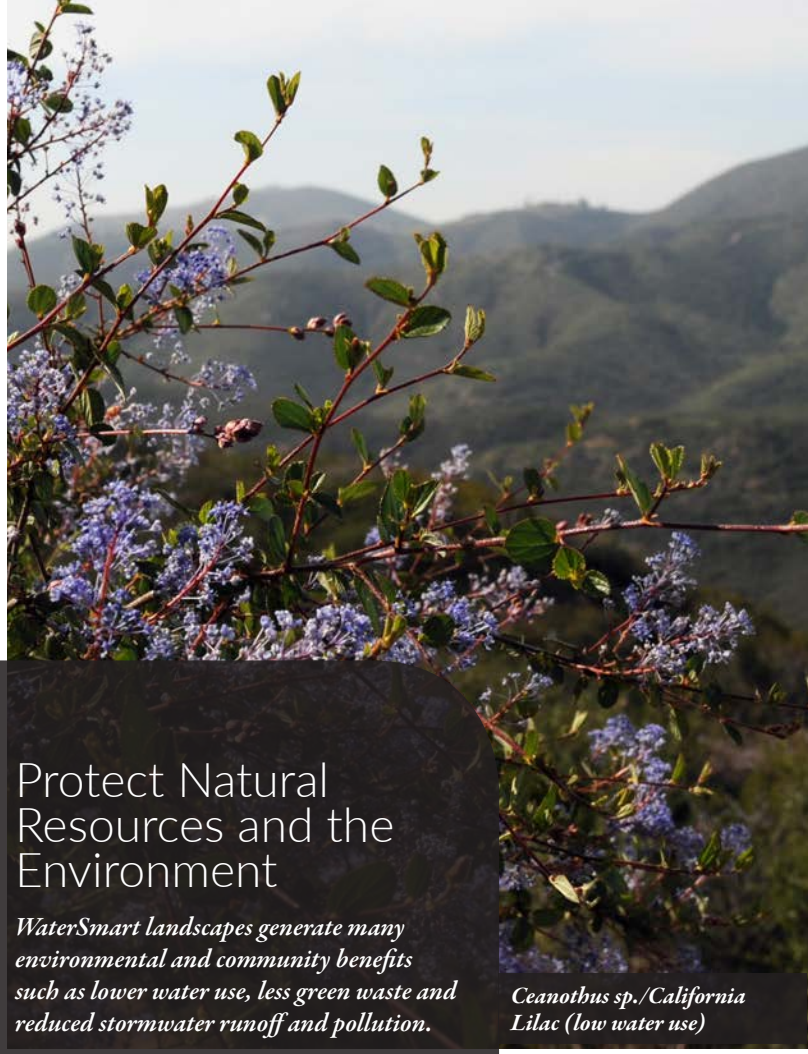
Bougainvillea sp./ Bougainvillea (low water use)

Beautify Your Property

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

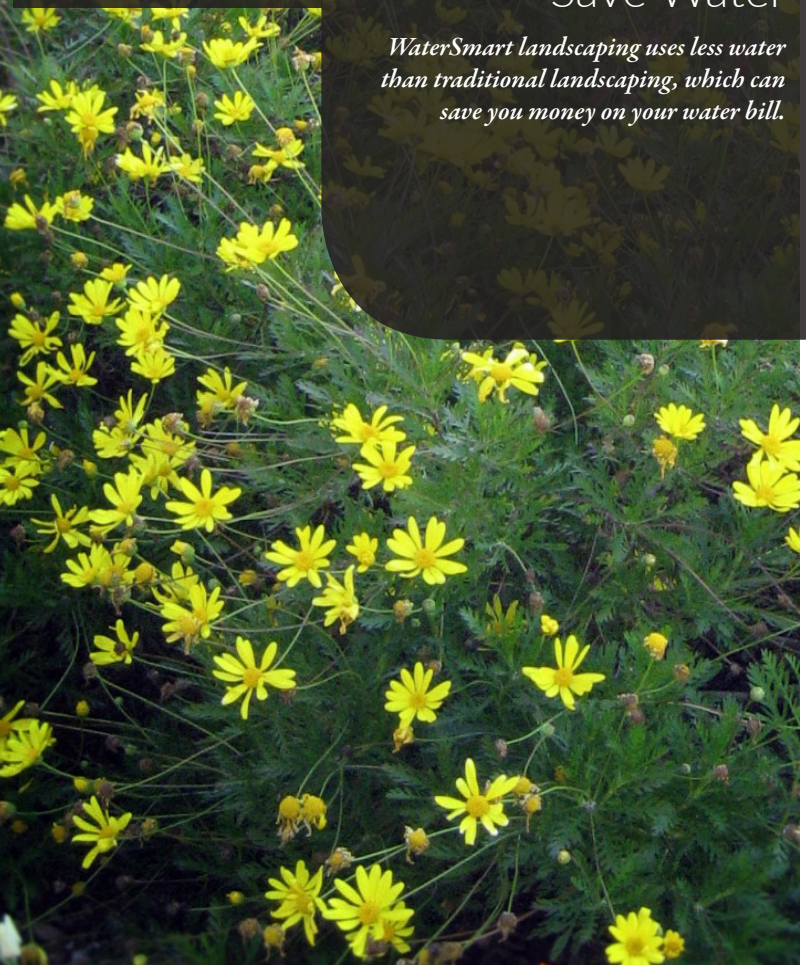


Ceanothus sp./California Lilac (low water use)

Protect Natural Resources and the Environment

WaterSmart landscapes generate many environmental and community benefits such as lower water use, less green waste and reduced stormwater runoff and pollution.

Euryops pectinatus 'viridis' / (low water use)



Save Water

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

Aeonium sp./Canary Island Rose (low water use)

Reduce Maintenance

Well-designed irrigation systems and plants appropriate to San Diego County's climate often require less-frequent care and maintenance.

What can you do with a

WaterSmart Landscape?

Outside!

Saving water isn't the only reason to get excited about a WaterSmart garden. The idea is to have a garden to live in as well as look at – to create outdoor rooms for your favorite activities. Adding outdoor living space makes even the smallest home feel open.

Rediscover Your Front Yard

The front yard is making a comeback across the country in developments focused on sustainable living. Most San Diego County homes have a garage out front, but we can redesign our front yards to be the new American front porch, where we connect with neighbors and create the kind of street we always wanted to live on.

Create a Sense of Place

Restoring regional authenticity and incorporating it in new development is the hot trend today. What's exciting is that authentic also means sustainable. Plants native to Mediterranean climate zones love it here as much as you do.

Meet New Plants and People

Gardening is one of those activities, like painting, cooking or golf, where you never stop learning. Think of your garden as one big experiment and take a trial-and-error approach to every idea. San Diego is full of gardeners who will share their knowledge, show you how, tell you what to buy, and introduce you to design ideas that you can't wait to try.

Your Path to a WaterSmar

Creating a WaterSmart landscape requires careful planning and implementation, but the many benefits you will derive – which include improving the beauty of your property, reducing maintenance, minimizing water pollution due to runoff, and conserving water – are well worth the effort. WaterSmart landscapes are an upgrade, not a compromise!

1 Identify Your Landscape Target

2 Create a Basic Plot Plan

3 Evaluate Your Site

WaterSmart Landscape Makeover Videos On Demand

Our entertaining and informative video series covers many of the topics discussed in this guide. These videos take you step-by-step through the process of creating your very own beautiful, water-efficient landscape. Watch them anytime at watersmartsd.org.

1 Identify Your Landscape Target

As a homeowner, you have the power to significantly improve your water efficiency. The first step is to determine what type of landscape will meet your needs and maximize your water savings potential. Our WaterSmart Matrix will help you select the combination of plants and irrigation that will meet your water efficiency goals. Every star represents water savings potential.

Why is turf the main target for saving water? Just look around. Grass requires more water to keep it green than most other plants -- about four times the amount of rain our region gets annually! But saving water isn't the only reason to get rid of your lawn. If you're like many homeowners, the only traffic your turf gets is the gardener and the neighbor's dog.

Whether you want to create space for entertaining, limit landscape maintenance or maintain some turf for children and pets, you **can** reach your water-saving goals and create an outdoor space to live in. WaterSmart landscapes are an upgrade, not a compromise.

A low to moderate water use garden.

A low water use garden.

A very low water use garden.

Planting

Low to moderate water use plants

A low to moderate water use garden has some moderate water use accent plants and up to 10% high water use plants.

- 45% low water use
- 45% moderate water use
- 10% high water use

Low water use plants

A low water use garden has no more than 10% high water use plants.

- 90% low water use
- 10% high water use

Very low water use plants

A very low water use garden has a mix of very low and low water use plants.

- 50% very low water use
- 50% low water use

Irrigation

Low efficiency irrigation (not WaterSmart)

Conventional spray irrigation: Conventional spray heads apply water faster than most soils can absorb it, and they produce smaller water droplets that are susceptible to wind.
Impact rotors: Impact rotors are one of the least efficient methods of irrigation. They are quickly being replaced by higher efficiency options.

Moderate efficiency irrigation

Rotating nozzles: Best suited for spaces 15 to 70 feet wide.
Low precipitation sprays: Best suited for areas 5 to 30 feet wide.

High efficiency irrigation

Drip emitters and inline emitters: Drip irrigation is the most efficient way to water perennials, shrubs, trees, and new turf. Drip systems apply water slowly so runoff is not an issue. You can leave the water on long enough to reach the deep roots of shrubs and trees. **Pressure-compensating inline drip:** Best for low-maintenance. **Pressure-compensating point source drip:** efficient distribution when properly maintained.

Bubblers: Best suited for trees and large shrub.
Micro-spray: Best suited for tree and shrub areas of smaller size.

WaterSmart Matrix

Planting \ Irrigation	Low efficiency irrigation Conventional Sprinklers Impact Rotors *IE = 0.55**	Moderate efficiency irrigation Rotating Nozzles Low Precipitation Sprays *IE = 0.75**	High efficiency irrigation Drip Emitters Bubblers Micro Spray *IE = 0.81**
Low to moderate water use plants 45% Low water use 45% Moderate water use 10% High water use *average PF = 0.40**	not WaterSmart	½	★
Low water use plants 90% Low water use 10% High water use *average PF = 0.26**	not WaterSmart	★½	★★
Very low water use plants 50% Very Low water use 50% Low water use *average PF = 0.15**	not WaterSmart	★★½	★★★

Select your preferred combination of plants and irrigation to determine your WaterSmart star rating.

IE=irrigation efficiency

PF= plant factor

Note: This matrix is based on the State Model Water Efficient Landscape Ordinance water use calculations for a 1,000 to 3,000 square foot size landscape, and is provided as a simple rule of thumb for sites in San Diego County.

WaterSmart Star Rating

Some water savings potential. ½ ★ ★½ ★★ ★★½ ★★★ Maximum water savings potential. Congratulations!

Potential Water Savings

Converting cool season turf to WaterSmart planting can have a big impact on water use in the warmer microclimates of San Diego County:

High-water-use cool season turf

46-50 gallons per square foot per year

vs.

Low-water-use plants

9-12 gallons per square foot per year

Landscape Target

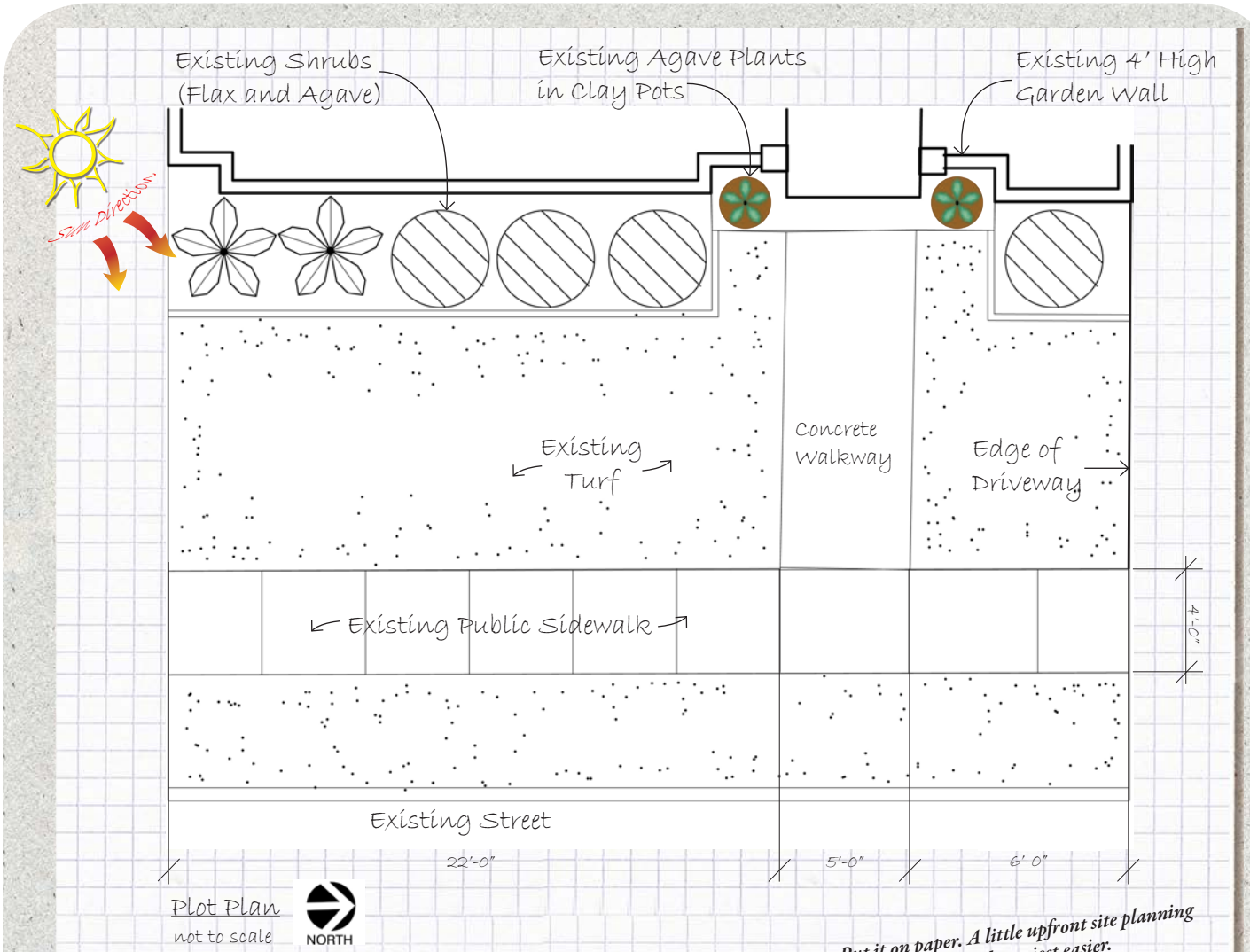
My WaterSmart landscape target is:

(Select ½ 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 San Diego residence that converted approximately 625 square feet of turf to a WaterSmart landscape. Follow this case study through the guide as it illustrates the steps to a WaterSmart landscape.



Plot Plan
not to scale
NORTH

Notes:

Soil Condition - Light Brown Color, Seemed to be loam soil. Will need a soil texture analysis to determine.

Drainage - 2" per hour

Total Landscape Area - 625 square feet

Target Landscape Type - ☆☆ WaterSmart landscape with Low water use plants and micro-spray irrigation.

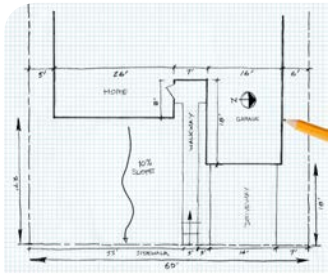
Potential Water Savings - 5865 Gallons/year (per Water Use Calculation worksheet Appendix A)

Put it on paper. A little upfront site planning will make the whole project easier.

Measure all distances to create a plot plan

2 Create a Basic Plot Plan

Your landscape makeover starts with observing and recording your property as it exists today. Think of it as a bird's eye view, or satellite map, that shows the boundaries and physical features of your property. This will become the basis of all your planning.



All you need to draw your own plot plan is a tape measure for accurate measurements, a ruler to measure and draw straight lines, a clipboard, a pencil and paper, preferably ¼" grid graph paper.

Here are the steps to create a basic plot plan:

1. Start at the corner of your property.
2. Measure across to the edge of your drive or sidewalk to your property line. Say, for example, the distance from the corner of your lot to the driveway is 28 feet 8 inches. Using the scale ¼ = 1 foot, you would use 28 and a half squares for the space on your graph paper.
3. Next, measure the depth of your property to the sidewalk or curb. Use this approach to locate property lines, walkways, trees, driveways, easements, and your home.
4. Measure and mark any existing hardscape or landscape you want to save such as walkways, mature trees and shrubs.
5. Use a ruler to draw your shapes and keep your scale accurate.
6. Take note of natural drainage features. Preserving these and limiting the use of impermeable surfaces in your landscape will minimize runoff and maximize site water infiltration.
7. Add compass directions so you can understand the sun's shade effects as it moves across your yard. South-facing exposures are sunny and hot while north-facing exposures can be cool and shady.
8. Locate views that should be preserved and areas you want hidden from view, like your neighbor's garbage cans.
9. Locate features on your house such as windows, doors and other openings. Indicate their height off the ground.
10. Locate utilities like the water meter, electrical boxes and overhead power lines.
11. Note your existing irrigation heads. You'll need to know where these area later when designing your new irrigation plan.

Now you have a road map of your landscape. This is the document from which your future plans will evolve.

Take A Walk in the Sunshine

Walk around your property during the day and note areas that are sunny or shady in the morning and areas that are sunny or shady in the afternoon. When you start choosing your plants make sure to select those that are appropriate to the sunlight patterns of your garden.

3 Evaluate Your Site

San Diego is a unique place with a diverse range of habitats. Your landscape is in one of sixteen watersheds in the county. The watershed approach to landscaping considers every garden as a mini-watershed, holding onto or cleaning the water that falls on it and nurturing a diverse habitat of plants and insects. Each mini-watershed can be controlled by the people who steward it. The result is that our collective actions restore our greater watersheds.

Every landscape has unique opportunities and constraints. A thorough evaluation will help you identify them and inform your planting and design choices. Spend time in your yard and make notes about it. Identify site elements that will help you make decisions as you start the design process. Note your home's architectural style and materials, good and bad views, slopes, and plants and trees that you want to protect. Locate utilities and major irrigation items such as your water meter, controller and valves.

Get to Know Your Soil

There's so much more to soil than most of us know. Soil is the growing medium for plants. Its nutrients support healthy plant growth. Knowing and working with your soil's composition is a powerful strategy to maximize water efficiency. Healthy soil controls the behavior of water, how it moves through the soil and how long it holds on to it. In other words, healthy soil is essential to irrigation efficiency and plant health.

Get to know your soil and how to care for it and you will be rewarded with healthier soil and easier maintenance.

Before we figure out how to build better soil, we need to figure out what kind of soil we have. Clay, silt and sand are the basic soil types. The smallest particles create clay soil and the largest makes sandy soil, with loam (an equal blend of sand, silt and clay) considered ideal.

In general, sandy soil drains faster than clay soils. Soil structure is also vitally important - lifeless, compacted sandy soil will not absorb water, while healthy clay soil can behave more sponge-like, holding and releasing water when necessary.

What's Your Soil Type?

Determine your soil type using the jar test in Appendix C.

Build Great Soil

Great soil consists of elements we don't typically think of as soil at all. In fact, one of the most important aspects of soil is the space between the particles!

Soil space results from a process called **aggregation**. Under the right conditions, solid matter will aggregate forming space between the masses. This allows air and water to fill this area. Rain or irrigation water percolates through the soil and aggregate spaces hold it like a storage tank. When you have more space, you can store more water and irrigate less frequently.

Check your soil aggregation by looking at the soil you dig out during a drainage test. Does it have nice clumps or is it condensed and compacted?

Compaction is a common problem, especially in areas where grading has been done, foot traffic is heavy, or years of chemical use have killed the soil microbes. Compaction occurs when soil particles are pressed together, reducing pore space. Reduced pore space keeps air away from plant roots and stops water from infiltrating and draining.

Here's how to tell if you soil is compacted. Take a turning fork and plunge it slowly but firmly into the ground. If your garden has a foot or more of penetrable soil, your compaction is minimal. New roots will grow with ease and water will effectively penetrate and drain. Anything less and you probably have some soil compaction.

Using a turning fork, an aerator, or a tilling machine, you can create gaps in the soil to loosen compaction. Because it breaks up the fungal connections, it should only be done once to prepare your planting beds.

Follow all of these activities with a layer of compost to feed the soil food web that will help build the aggregate spaces. Mulch can also feed the soil and help loosen compaction over time.

Organic Matter is Structural

Organic matter is bits of leaves and twigs that function like rock particles, and feeds microbes living in the soil that make soil fluffy (think about bread rising because of yeast.)

Our job in garden renovation is to continuously feed as much organic matter as possible to the landscape -- first with compost and mulch, and eventually by just letting the plants feed themselves with their own leaf litter.

Compost is a soil amendment. It looks like soil and it's hard to tell what it once was. That is because it is food scraps, landscape debris and/or manure from livestock, or biosolids (human manure) and other organic matter that already has been partially consumed and mostly decomposed by micro-organisms. Good compost brings oxygen, water and life in one package.

Do-It-Yourself Soil Tests

Get up close and personal with your soil by conducting a soil test! Flip to Appendix C for several ways to check out your soil's health.

Compost can be store-bought or homemade. The compost-making process, or composting, involves creating optimal conditions for the microbes to do their transformative work. When compost looks like soil, it can be worked directly into the soil. The more coarse or visible the bits of the compost are, the more likely it is to be used as mulch on top of the soil rather than as an incorporated amendment.

Compost works its magic in several ways. First, the compost itself contains particles that improve soil structure. Next, as compost decomposes in soil it encourages the formation of soil macroaggregates. These resulting macroaggregates are composed of existing soil particles and decomposed organic matter, which combine to create a more stable and better functioning soil structure.

Mulch is a soil topping. Mulch may be organic or inorganic material that covers soil and looks like the recycled debris that it is. Mulch can be made from organic debris (grass clippings, leaf litter, and shredded wood trimmings) or inorganic materials such as gravel or decomposed granite.

The microbes in healthy, biologically diverse mulch structure and "knit" the organic matter together, forming a thick blanket. This cover protects soil and plant roots from temperature change, keeps moisture in by slowing evaporation from the surface of the soil and keeps weeds from sprouting by reducing sunlight penetration to the soil surface.

Shredded bark mulch

Mulch always stays on top of the soil, and is never worked in. Recycled organic debris is the most effective type of mulch, because it builds soil structure over time and provides a durable, protective surface barrier. The smaller the debris and the more mixed leaves with wood chips, the faster it decomposes. When building soil, small and mixed is best.

Composted material, especially coarse composts, also can be used as mulch. Artificial and inorganic mulches (decomposed granite, gravel, rubber chips, other rubble) are primarily decorative, since they do not contribute to soil life or plant health. They may be used in limited applications such as pathways.

Rainwater as a Resource

During the rainy season, run-off from non-permeable surfaces such as roofs and patios can be directed into your landscape instead of into storm drains and the ocean. Water stored in your soil means less additional water is needed during dry months.

- ❑ **Your yard is a mini-watershed**. Look at your yard as a mini-watershed. Water that runs off your roof or hardscape can be channeled into basins or dry streams on your property. Contour your landscape to slow it, store it, spread it and sink the water into your soil.
- ❑ **Where does water flow from?** Evaluate how water flows across your property. How can you divert its flow into a shallow basin or a dry stream bed and allow it to be retained long enough to sink into your soil? And think about how *much* water you will need to detain. Every 1,000 square feet of non-permeable surfaces like roofs or paving will generate 620 gallons of stormwater runoff. That's 83 cubic feet for every 1" of rainfall. To calculate how much water you can capture, see the appendix "Capture First Flush".
- ❑ **Where can that much water be retained?** Create a shallow basin in your landscape to hold water long enough so it can soak into the soil. The basin should be at least 5' from foundations, 3' from hardscape and 10' from neighboring buildings. A detention basin that is just 14' wide, 20' long and 4" deep will hold stormwater from a 1,000 square foot non-permeable surface. Add some plants to the basin with mulch around them to resemble a natural creekbed that captures and cleans stormwater.

Catch the Rain

To learn about ways to capture rainwater, watch our WaterSmart Landscape Makeover Videos On Demand at watersmartsd.org

4 Design Your WaterSmart Landscape

When designing your WaterSmart landscape, you want your new outdoor space to fit your house, your neighborhood, and your lifestyle. Finding that fit begins by asking a few basic questions.

How do I want to use my space? You have the power to significantly improve your home's water efficiency and meet your lifestyle needs at the same time. For example, you may want to use less water yet maintain some turf for your children and pets. Using a combination of low and moderate water use plan and leaving a small area of turf supported by high efficiency irrigation, you can achieve a WaterSmart landscape.

Maybe your goal is to lower your water use while creating an outdoor space for entertaining. Using mostly low water plants, a water feature and a moderate efficiency irrigation system, you can also achieve a WaterSmart landscape.

What if you're looking to reduce water use, minimize maintenance and create a landscape that will be the envy of your neighbors? Using a combination of very low and low water use plants and a highly efficient irrigation system, you too can achieve a WaterSmart landscape.

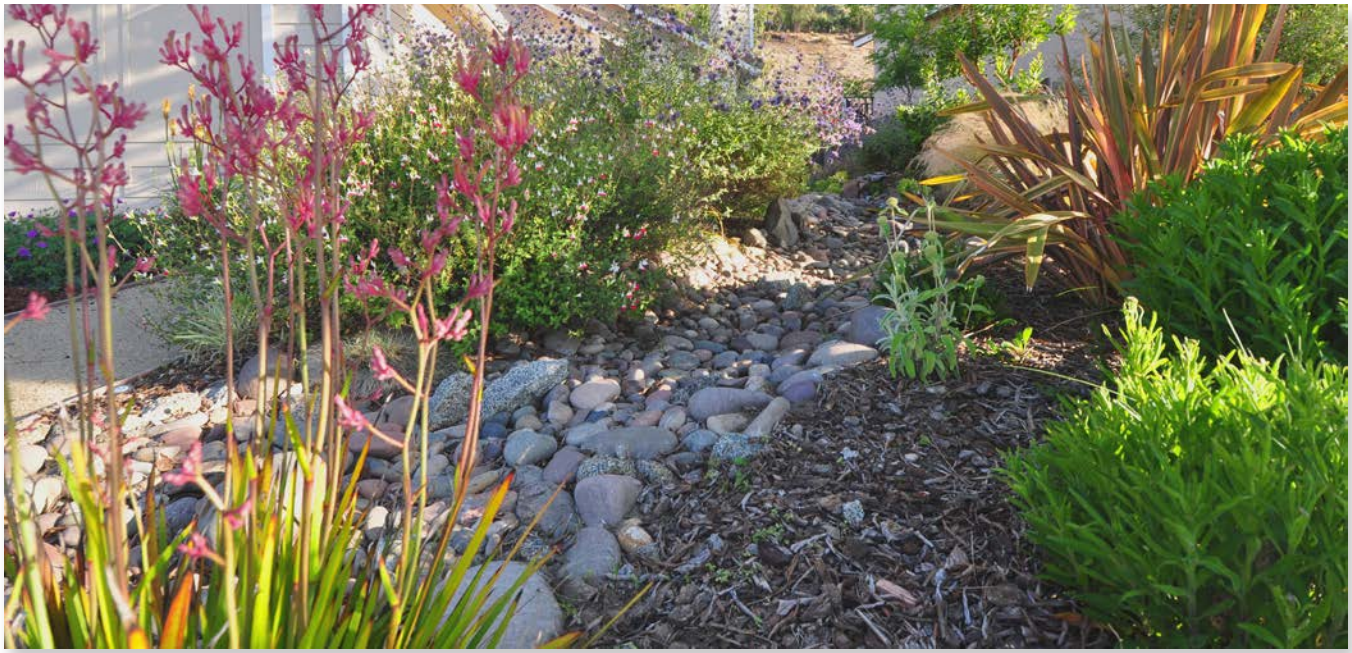
Are there alternatives to traditional turf grass? Yes! Consider alternatives such as low-water-use groundcover and mulch, or permeable hardscape like gravel or decomposed granite paving wherever possible. If an area of turf is important, especially for active play, utilize a more drought tolerant variety of grass in the warm season turf category.

How much can I spend? Keep your budget in mind when making choices about the different elements in your landscape. See the case study budget and tips at the end of this section.

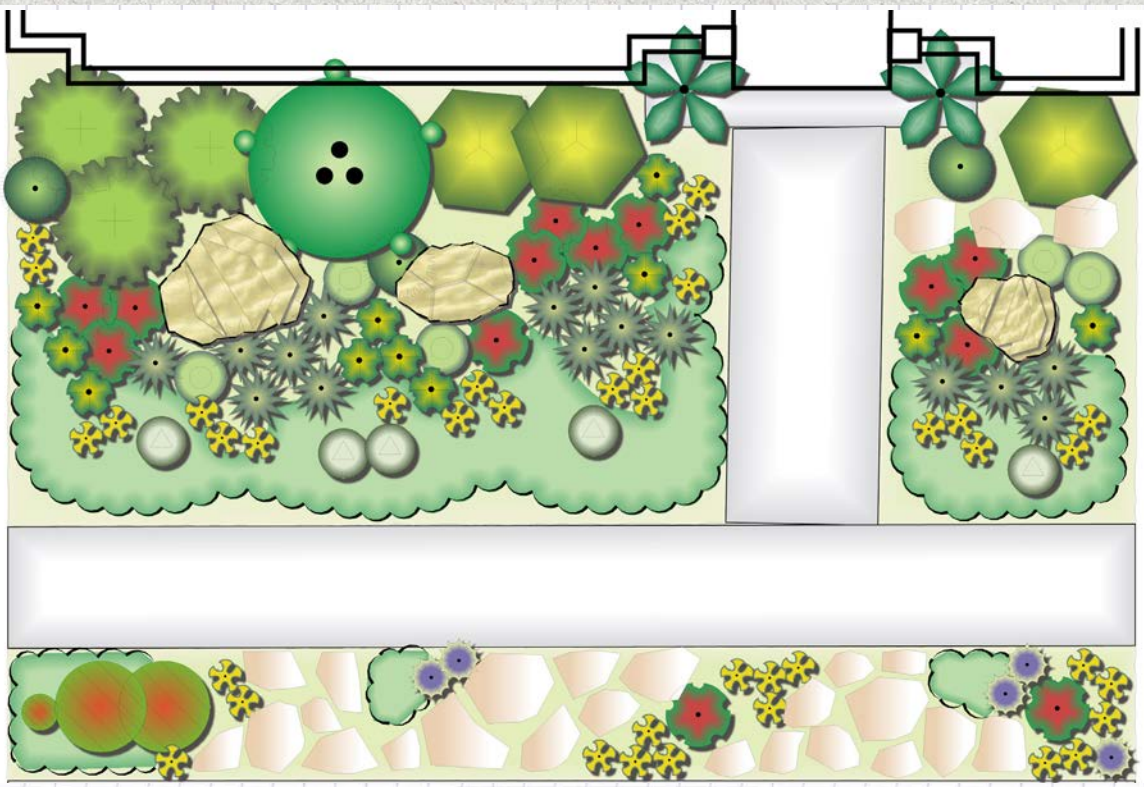
Planting Design

Before you start selecting plants, envision your overall planting design. Determine your landscape style and think in terms of plant size and characteristic (i.e. large background shrub, small colorful accent shrub, etc.)before moving into actual plant selection.

- ❑ **Landscape theme.** Take some time to consider the style of landscape you find appealing, that fits your home's architecture, your neighborhood, and your lifestyle. A heavy tropical look is often desirable, but requires careful low-water-use plant selection for our arid region. There are many palettes to choose with plants from our region or areas of the world with a similar climate. A selection of plant palettes, including Mediterranean, Contemporary, Native, Dry Shade, Asian and Tropical are included in the appendix.
- ❑ **Design for views and access.** Plants can be used to screen views and direct access. Are there any blank walls or fences that would look better with a nice



Case Study - Planting Design



Planting Legend

Planting Plan

Not to scale

NORTH

Shrubs	Botanical / Common Name	Water Use	Mature Size (H x W)
	Agave attenuata / Agave	Low	3' x 3'
	Aeonium canariense /Canary Island Aeonium	Low	2' x 2'
	Aeonium 'Mint Saucer' / Green Aeonium	Low	2' x 2'
	Arctostaphylos densiflora 'Howard McMinn' / Howard McMinn Manzanita	Low	6' x 6'
	Callistemon viminalis 'Little John' / Dwarf Weeping Bottlebrush	Moderate	3' x 3'
	Ceanothus `Concha` / California Lilac	Very Low	6' x 6'
	Iris douglasiana / Douglas Iris	Moderate	2' x 2'
	Othonna capensis/ Little Pickles	Low	1' x 2'
	Salvia greggii / Autumn Sage	Low	3' x 3'
	Senecio barbertonicus / Succulent Bush Senecio	Low	4' x 4'
	Tetraneuris acaulis / Angelita Daisy	Low	1' x 1'
	Yucca pallida / Twistleaf Yucca	Low	2' x 2'
	Existing Shrub	Very Low	
	Dymondia margeratae / Dymondia	Low	2' x 1'

Note: As you prepare to upgrade to your WaterSmart landscape, collect photos of landscapes and plants that inspire you to help guide your design.

looking shrub in front of them? You might want to frame the view out a window but you probably don't want a large shrub in front of the window blocking the view. Is access from the side of the house needed to bring out the garbage cans to the curb? If so, make sure you accommodate that in your design.

- ❑ **Tree placement.** Typically a planting design will include a tree or two for shade. Placing a deciduous tree on the south or west side of your home will shade your house during the summer to keep it cool, and allow more light and sun exposure in the winter. Keep trees at least 10' from foundations. In fire hazard areas, trees should be placed so the mature canopy is at least 10 feet away from any structures.
- ❑ **Shrub placement.** Shrub and groundcover planting is typically designed with a variety of heights. Medium size (3 to 4 foot) shrubs are usually placed closer to the house to create a "foundation" or back drop. Smaller 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 provide interest and focus views on locations in the landscape. Highlight your entrance walk with special accent plants. This places a higher emphasis on your entry, which is where you want visitors to be directed to. 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 Mediterranean landscapes by utilizing water only in the areas that are the most important. If you have some high water use plants that you particularly want to include, they can be used. However, as a general rule of thumb, your total landscape should include no more than 10% high water use plants or water features. Don't forget that any higher water use plants should be on a separate irrigation valve so that you can water them differently than the rest of the garden. Water features were also historically used in Mediterranean landscapes as the sound of water is pleasant and calming. The water area of the fountain will lose water at about the same rate as cool season turf grass or another high water use plant. Minimize the square footage of open water, and a water feature can fit well into the WaterSmart landscape.


Ceanothus spp./California Lilac


Gaillardia grand./Blanket Flower


Grevillea 'Moonlight'/Grevillea


Salvia spp./Sage


Cistus x purp./Orchid Rockrose


Achillea spp./Yarrow


Heteromeles arbutifolia / Toyon


Leonotis leonurus / Lion's Tail


Romneya coulteri/Matilija Poppy


Callistemon spp./Bottlebrush


Penstemon spp./Beard tongue


Rosemary officinalis/Rosemary

Plant Selection

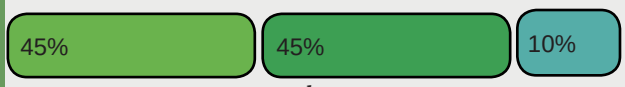
From your WaterSmart landscape target identified in Step 1, select plants that fit within that plant water use category to ensure you meet your WaterSmart water conservation goals.

- ❑ **Select WaterSmart plants.** Select plants that are locally native or from similar climatic regions. See the garden ideas on these two pages for examples of WaterSmart California landscapes.
- ❑ **Design for mature plant size.** Allow enough space for the plants you select to grow to their full size to avoid overcrowding or the need for excessive pruning.
- ❑ **Growing conditions.** Select plants suited for your microclimate, soil type, and soil drainage to achieve optimum plant growth.
- ❑ **Minimize turf.** Limit the amount of turf in your design as much as possible. If you choose to incorporate turf, consider a warm season turf that uses less water than a traditional cool season turf. Warm season turf such as Hybrid Bermuda or UC Verde Buffalo Grass thrive in the hot months of the year and naturally go dormant in winter. Another less thirsty grass to consider is *Carex praegracilis*/ California Field Sedge.
- ❑ **Group plants according to their water use.** 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 of similar water use together, known as planting in hydrozones, makes it easier to irrigate efficiently by letting you concentrate additional water only where it is needed.

Ceanothus sp./California Lilac (low water use)

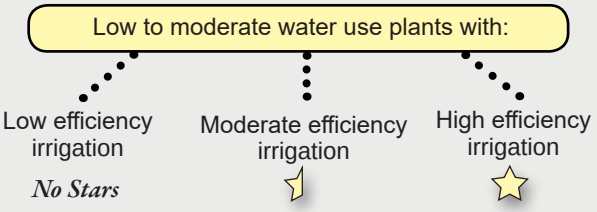
Low to Moderate Water Use Planting

Low to moderate water use plants category should include a mix of low and moderate water use plants with no more than 10% turf or other high water use plants.



Mediterranean Effect

Botanical Name/Common Name	Water Use
Trees	
Arbutus 'Marina'/Marina Strawberry Tree	Low
Chamaerops humilis/Mediterranean Fan Palm	Moderate
Laurus nobilis/Sweet Bay	Low
Olea europaea 'Swan Hill'/Fruitless Olive	Low
Shrubs	
Agave attenuata/Agave	Low
Aloe striata/Coral Aloe	Low
Bougainvillea 'Crimson Jewel'/Bougainvillea	Low
Distictis buccinatoria/Blood-red Trumpet Vine	Moderate
Feijoa sellowiana/Pineapple Guava	Low
Lavandula a. 'Munstead'/English Lavender	Low
Rosmarinus officinalis/Upright Rosemary	Low
Salvia leucantha/Mexican Sage	Low
Groundcover	
Rosmarinus officinalis 'Prostratus'/ Trailing Rosemary	Low
Senecio mandraliscae/Blue Chalk Sticks	Low
Thymus serpyllum	Moderate
Turf	High



Low Water Use Planting

Low water use plants category should include predominantly low water use plants with no more than 10% turf or other high water use plants.

90% | 10%

Low water use — *High water use*

Contemporary Effect

Botanical Name/Common Name	Water Use
Trees	
Agonis flexuosa 'After Dark'/Peppermint Willow	Low
Cercidium x 'Desert Museum'/ Desert Museum Palo Verde	Very low
Shrubs	
Agave attenuata/Agave	Low
Aeonium 'Mint Saucer'/Green Aeonium	Low
Arctostaphylos densiflora 'Howard McMinn'/ Howard McMinn Manzanita	Low
Ceanothus 'Concha'/California Lilac	Very low
Euphorbia tirucalli 'Sticks on Fire'/ Pencil Tree	Very low
Othonna capensis/Little Pickles	Low
Phormium tenax/New Zealand Flax	Low
Salvia greggii/Autumn Sage	Low
Senecio barbertonicus/Succulent Bush Senecio	Low
Tetraneuris acaulis/Angelita Daisy	Low
Yucca pallida/Twistleaf Yucca	Low
Groundcover	
Dymondia margaretae/Dymondia	Low
Turf	High

Low water use plants with:

- Low efficiency irrigation — *No Stars*
- Moderate efficiency irrigation — ☆½
- High efficiency irrigation — ☆☆

Very Low Water Use Planting

Very low water use plants category should include a mix of low and very low water use plants, such as California native plants or succulents.

50% | 50%

Very low water use — *Low water use*

Native Garden Effect

Botanical Name/Common Name	Water Use
Trees	
Chilopsis linearis/Desert Willow	Very low
Quercus agrifolia/Coast Live Oak	Low
Shrubs	
Agave shawii/Shaw's Agave	Low
Arctostaphylos 'Sunset'/Sunset Manzanita	Low
Ceanothus 'Concha'/California Lilac	Low
Dudleya brittonii/Giant Chalk Dudleya	Very low
Encelia californica/California Encelia	Very low
Galvezia speciosa/Island Snapdragon	Very low
Heteromeles arbutifolia /Toyon	Very low
Muhlenbergia rigens/Deer Grass	Low
Rhus integrifolia/Lemonade Berry	Very ow
Salvia clevelandii/Cleveland Sage	Very low
Low Shrubs and Groundcover	
Baccharis pilularis 'Pigeon Point'/ Dwarf Coyote Brush	Low
Ceanothus g. horizontalis/Carmel Creeper	Very low

Very low water use plants with:

- Low efficiency irrigation — *No Stars*
- Moderate efficiency irrigation — ☆☆½
- High efficiency irrigation — ☆☆☆

Irrigation Design

Start by reviewing the target irrigation type you identified in Step 1. This will help you decide which irrigation type 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 main design decisions involved in irrigation design.

- ❑ **Water pressure.** Check your available water pressure to ensure that you are maximizing the efficiency of your system and to choose the right irrigation equipment for your home. To determine your water pressure, follow one of these two steps: (1) Contact your local water agency and request a pressure reading. (2) Check your pressure with a gauge (available at your local landscape supply store) at a hose bib. If your house has a hose bib located on the water line before the line enters the house, the pressure at that location may be the available pressure after water passes through a 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), a pressure regulator for the house and irrigation system may be needed to avoid misting and irrigation system damage. 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 you can 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**, **in-line drip emitters** or **bubblers**. **Pressure compensating devices** are always the most efficient option. Low flow irrigation is a good choice for trees and shrub areas and should be used in any landscape areas next to hardscape and in areas less than 8 feet wide to prevent runoff from overspray. When using drip emitters, reduce maintenance and ensure long term durability by selecting good quality tubing and designing for at least two emitters per shrub.
- ❑ **Moderate efficiency irrigation.** The next most efficient types of irrigation include **rotating or low-precipitation** (typically for spaces 8 to 30 feet in size). These nozzles are a better choice than conventional spray heads for watering turf because they have a lower application rate - they water slowly. Your watering times will increase but these sprinklers do not produce mist and they apply water at a rate at which turf can absorb it, reducing runoff.
- ❑ **Low efficiency irrigation.** The least efficient types of automatic irrigation include **conventional spray irrigation** and **impact rotors**. These types of high precipitation irrigation distribution systems generally apply water faster than the soil can absorb it. Installing a new system with low efficiency irrigation is not recommended, but if you have an existing conventional spray system, you can easily retrofit with new low precipitation nozzles as noted above.

*Note: To compare the features of each irrigation type shown in **bold** above, see the definitions in the appendix.*

Drip irrigation can be installed at grade or a few inches below the surface of the soil.

Weather-based controllers often have a sensor that should be mounted outside, free of obstructions, and be connected back 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 either weather-based or has historic weather data included as a reference. Some systems allow for the addition of a weather sensor or moisture detection system that automatically adjusts your watering schedule in response to current weather or soil moisture level. Smart controllers have the ability to turn off your sprinklers when it rains and increase the frequency and/or duration of watering in hotter weather. Locate the controller in a place that is easy for you to access, such as the garage.

- ❑ **Irrigation layout.** The goal of WaterSmart landscape irrigation is to apply water as efficiently as possible. This means using low flow drip or bubblers whenever possible and in areas with overhead sprays, provide the correct pressure and equipment layout to ensure even coverage to maximize efficiency.

  Once you have determined what type of irrigation you would like to use, divide your yard into zones and note what type of irrigation you plan to use in each zone. Contact some of the major irrigation manufacturers to obtain an irrigation design guide which will help you with the specifics of your irrigation layout. Some irrigation manufacturers even offer free irrigation design services.

Layout Tips

For bigger projects it can be advantageous to use more than one type of irrigation (i.e. large rotors on a back slope, and drip irrigation in all other areas). **Important:** If you use more than one type of irrigation, do not mix different sprinkler types in one zone.

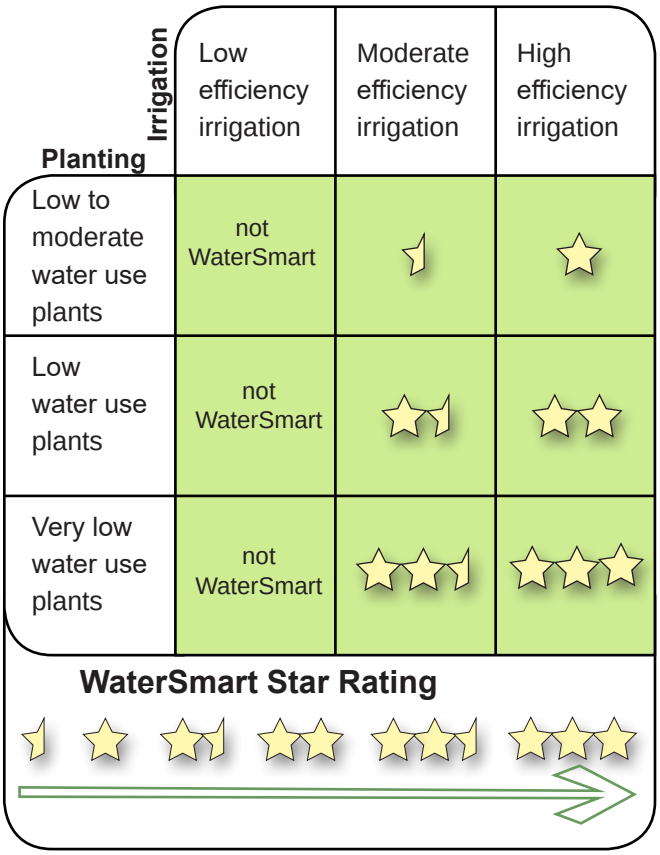
Other key elements to locate on your layout plan are the locations of mainline pipes (pressurized) and lateral line pipes (non-pressurized, except when valves are open), connection to your household water supply, and backflow preventer, if required.

Verify Your New Landscape Water Use

Now that you have designed your WaterSmart landscape, it is important to double check to make sure your design meets the target landscape water use you set in Step 1. If necessary, adjust the design to meet your target to maximize water savings.

- ❑ **Verify your overall plant water use.** Review your planting design and determine, based on area, what percentage of shrubs are very low, low, moderate, or high water use. If the planting 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.



Case Study - Budget

Below is an overview of the budget used for the San Diego residence in our case study. Note that costs will vary depending on the size of the site, type of materials, and level of craftsmanship employed.

The following example is based on 2015 unit costs and represents costs for material and labor to install each item.

Cost Estimate, 2015

Demolition/Soil Preparation	Quantity	Unit	Price	Total
Clear and Grub	630	Square Feet	$0.50	$315.00
Soil Test	1	Each	$95.00	$95.00
Soil Amendments/Fine Grading	3	Cubic Yard	$140.00	$420.00
Subtotal				$810.00

Hardscape	Quantity	Unit	Price	Total
Install Boulder Accents	3	Each	$400.00	$1,200.00
Install Flagstone Paving on Concrete Base	70	Square Feet	$30.00	$2,100.00
Subtotal				$3,300.00

Irrigation	Quantity	Unit	Price	Total
High Efficiency Irrigation Upgrade	555	Square Feet	$2.50	$1,387.50
(includes 50 micro-spray heads, 200 linear feet of PVC pipe, 50 swing joints with fittings, 20 pipe fittings, 3 above ground atmospheric vacuum breaker valves, and 1 isolation ball valve)				
Smart Controller, Weather-based	1	Each	$300.00	$300.00
(includes 18 gauge multi-strand wiring from controller to valves, waterproof wire nuts, and rain shutoff device)				
Subtotal				$1,687.50

Landscaping	Quantity	Unit	Price	Total
1 Gallon Shrubs	94	Each	$12.00	$1,128.00
5 Gallon Shrubs	9	Each	$35.00	$315.00
Flats of Groundcover	2	Each	$30.00	$60.00
Mulch	3.5	Cubic Yards	$75.00	$262.50
Subtotal				$1,765.50
			Total	**$7,563.00**

Note: Prices include materials and labor.

Budget Tip: In the case study cost estimate, the homeowners designed and will maintain the landscape themselves, so the cost of design and maintenance is not included. If you plan to hire a professional for any services, be sure to budget for those costs and account for any available rebates as well.

5 Implement Your Plan

Now it is time to begin the physical construction work of upgrading your landscape.

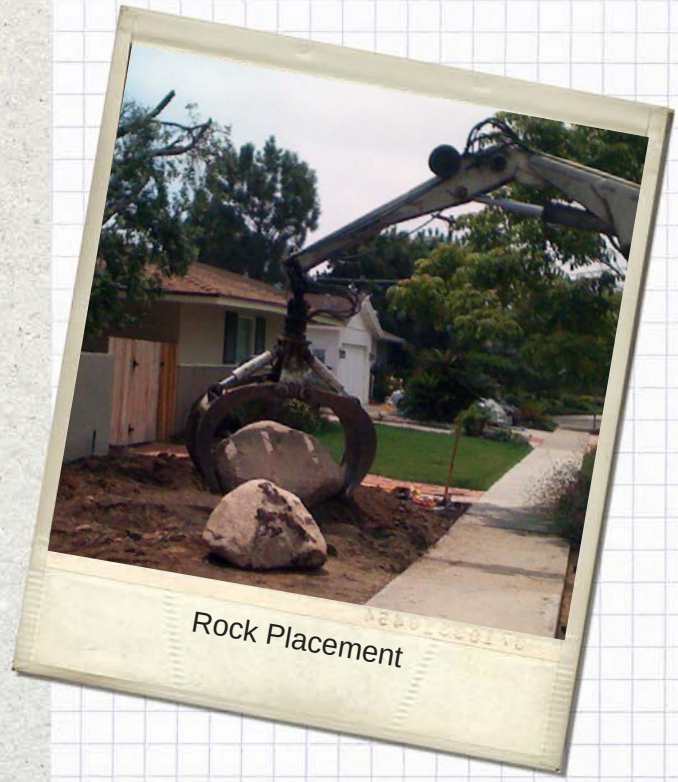
Demolition

Remove existing turf or other materials from the areas that you plan to renovate. Reclaiming an area of unwanted turf requires diligence. No matter what method of turf removal used, weeding and/or herbicide application may be needed every two weeks for the first three months for more the more-difficult-to eradicate warm-season turf types.

- ❑ **Natural turf removal.** A natural way to remove turf and preserve the soil's ecology is to strip the turf, and for the next two weeks, water the area to encourage grass to re-sprout, and hand pull all new growth.
- ❑ **Sheet mulching.** Rather than removing turf and taking it to the landfill you can compost it in place. Begin by removing several inches of turf and soil from the edges near your hardscape. Wet the turf area and cover with several layers of newspaper. Water again and cover with cardboard. Water again and cover with three inches of shredded mulch. The optimal approach is to allow several months for the soil microbes to decompose the turf and turn it into friable soil for plants.
- ❑ **Solarization.** Another natural alternative is solarization, which works best in the spring or summer. This involves covering the turf with rolls of plastic and allowing the sun to heat up the soil to levels that will kill the turf and weed seeds. The cover must be airtight with no holes and left in place for six to eight weeks. Apply compost to restore soil biology.
- ❑ **Turf removal with herbicide.** If you choose to use an herbicide, consult with your local landscape supply store and read the manufacturer's label for best use practices and safety considerations. Since Bermuda grass and some other grasses are dormant in the winter, they must be treated when they are actively growing in the remainder of the year (May to October).

Sheet mulching is a natural turf removal option.

Case Study – Installation



Rock Placement

Irrigation Installation

Plant Placement

Planting Installation

Grading

- ❑ **Grading.** Set the soil level so that it will direct water away from the house. To help slow down water runoff from your garden, try creating small depressions away from structures, walls or paving 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, and downstream at local beaches.
- ❑ **Reduce runoff.** Runoff carries with it soil particles and pollutants. Reduce runoff by using mulch.

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 should be tilled into the top layer of soil. **Compost** (15-30% by volume), gypsum and fertilizer are typical amendments in arid climates. The goal is to achieve healthy soil containing microbes which feed plants, 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.

1. Read the instructions from the manufacturer and familiarize yourself with the parts.
2. Starting from the main connection to the water line, dig trenches for all 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 regulated by a separate pressure regulator.
3. Lay an extra pipe sleeve or two under any new hardscape elements 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 covering and mark the location on your landscape plan.
4. 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 of the plant to prevent rot.
5. Consult your local irrigation supply store or some of the major irrigation manufacturers 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 help you through the plant placement and installation process.

1. Use a garden hose to outline groundcover areas to help you visualize the design before you start installation.
2. 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 any plants. Many drought tolerant landscapes look sparse for the first few years but will fill in over time. Be sure to allow proper spacing to allow each plant to grow to its full size.
3. Dig plant holes twice the width of the plant root ball, and just deep enough to bury the roots. Water the hole before placing the plant. When planted, the top of the root ball should be even with or slightly above soil level.
4. Once in the hole, the plant should be packed firmly into place with the original, compost-amended soil from the hole. Extra soil can be used to create a berm around the plant to hold water.
5. Cover the planting area with a 2 or 3 inch deep layer of mulch. Keep a few inches clear of mulch around the plant stems to prevent rot. Mulch has many benefits. It can help suppress weeds, enrich the soils, protect plant roots from compaction, provide a finished look to your garden, and conserve water!
6. Monitor your garden to ensure it receives adequate water. Even natives and drought tolerant plants need water to get established. To minimize watering needs during establishment, install your landscape in the fall before the rains.

6 Care For Your WaterSmart Landscape

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

- ❑ **Plan ahead.** Keep a copy of the plant legend, irrigation plan and runtime schedule to make it easy to buy replacement plants and parts or find pipes to make repairs or adjustments if 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 weather. To maximize water savings, you should 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 inch of soil is dry. If you see runoff before the end of the irrigation cycle, adjust the schedule to run several times with a shorter duration each time. This will allow water to infiltrate the soil between cycles. In order to schedule your irrigation properly you will need to know your equipment type, plant water use, soil texture and watering zone. Use the Watering Calculator on **bewaterwise.com** to create a basic watering schedule for your property. Then observe your plants and adjust watering as needed for optimum plant growth and water efficiency.
- ❑ **Water at appropriate times.** Consult your local water agency to determine the hours you are allowed to water. If possible, 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 mid-day to eliminate excessive evaporation.

Rotator nozzles throw streams of water with larger water droplets which helps to prevent misting and runoff, but each nozzle still needs to be checked periodically to ensure it is running 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 and after severe weather changes to check for potential problems. Check drip systems to ensure emitters are working and clean out filters as needed. Over time, drip emitter locations may need to be shifted to the outer edge of the plant root balls as your plants grow. Adjust spray sprinklers to prevent overspray and runoff onto roads, sidewalks, driveways and patios and repair any problems.
- ❑ **Fertilize smart.** Use an organic fertilizer or compost. This can be store-bought or made from products from around the home. Compost can be

made from garden waste and some kitchen waste to continually enrich your soil. For more information and recipes for do-it-yourself compost, see the Water Authority's **eGuide to a WaterSmart Lifestyle.**

- ❑ **Weed smart.** Weed naturally whenever possible. The common use of herbicides can be costly and, if not properly applied, can be very damaging to the environment. Designing and maintaining a healthy landscape 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. You may also want to monitor and remove weeds from nearby landscapes to prevent weed seeds from blowing onto your property.
- ❑ **Manage pests.** The key to controlling pests and diseases is to maintain healthy soil and select plant species that are not prone to pest problems. Consider following **Integrated Pest Management (IPM)** practices and use chemical control only as a last resort. Try spraying pests with a blast of water, releasing beneficial bugs (ladybugs and lacewings), spraying insecticidal soap, or using compost tea. Also consider replacing pest-prone plants with an alternative species. See our **eGuide** for more information on natural pestcontrol and compost tea. If deciding to use chemical control, always follow the manufacturer's dosage, application and safety information.
- ❑ **Mulch.** Maintain a 2 to 3 inch layer of mulch. Replace the mulch as 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 your plant list and make a checklist of maintenance requirements for each plant.
- ❑ **Find incentives.** Take advantage of financial incentives offered by the San Diego County Water Authority and other local water agencies.

Maintain a 2 to 3 inch layer of mulch.

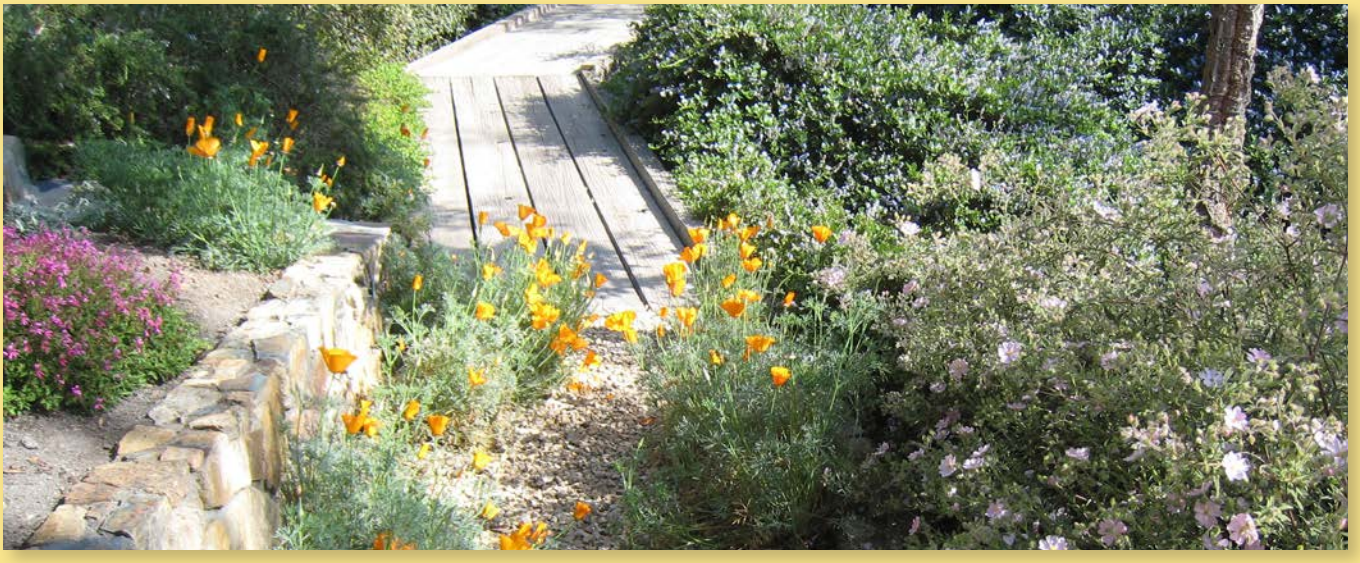
- ❑ **Monitor.** Monitor monthly costs and water use on an ongoing basis.
- ❑ **Celebrate!** Enjoy the peace of mind that comes from knowing you did your part to protect our natural resources and the environment.
- ❑ **Learn more.** Visit **watersmartsd.org.**

Create a maintenance calendar.

Case Study - Finished WaterSmart Garden

BEFORE

AFTER
(one year after installation)



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 **Identify your landscape target.** Identify your target plant and irrigation types in the beginning to guide you through the design.

Step 2 **Create a basic plot plan.** Making a plan of your existing landscape will help you visualize your future landscape.

Step 3 **Evaluate your site.** Evaluate site elements such as soil, drainage, sun exposure, and views to identify opportunities and constraints that will help you make design decisions as you start the design process. Pay special attention to how you can retain stormwater.

Step 4 **Design your WaterSmart landscape.** Even if you don't plan to install the whole project at one time, lay out the master plan for your landscape so you can verify that the final product will be unified. Include a WaterSmart planting and irrigation design. Verify your planned water use before you start construction, and adjust if it doesn't meet your original landscape target.

Step 5 **Implement your plan.** When implementing your plan, take your time. Hire a professional if needed -- get it right the first time.

Step 6 **Care for your WaterSmart landscape.** Learn the best practices for maintaining your landscape and consider creating a maintenance schedule to help you keep on track. You can even use these maintenance techniques to help you save money in existing landscape areas that have not been upgraded.

water smart
SAN DIEGO COUNTY
WATER AUTHORITY

Appendix A

WaterSmart Resources

Design

Garden Magazines, Tours, Shows and Classes

San Diego Native Garden Tour
cnpssd.org/events/gardentour2019
San Diego Horticultural Society Spring Garden Tour
sdhort.org/event-3161812
Encinitas Garden Festival and Tour
Encinitasgardenfestival.org
Coronado Flower Show coronadoflowershow.com
California Native Plant Society cnpssd.org
Mediterranean Garden Society
mediterraneangardensociety.org
Pacific Horticulture pacifichorticulture.org
Sunset Magazine sunset.com/garden

Landscape Makeover Videos On Demand

This instructor-lead series of short lessons for homeowners on landscaping essentials is based on A Homeowners Guide to a WaterSmart Landscape. Learn how to:

- Build healthy soil
- Shape outdoor spaces
- Create curb appeal
- Irrigate like a pro

Available 24/7 – whenever and wherever you are! Find them online at landscapemakeover.watersmartsd.org.

Landscape Design

A Homeowner's Guide to a WaterSmart Landscape
watersmartsd.org

Planning

DIG Alert Dial 811 digalert.org

Plants

Fire Protection Landscaping

Fire Resistive Plant List watersmartsd.org
Fire-Safe Landscaping Can Save your Home
sandiegocounty.gov/dplu/docs/Fire-Guidelines.pdf
Will you be prepared for the next wildfire?
readysandiego.org
Native Plant Landscaping to Reduce Wildfire Risk
tinyurl.com/y2lnshuw
Ready for Wildfire readyforwildfire.org/
Sustainable and Fire Safe Landscapes
ucanr.org/sites/SAFELandscapes/
Fire, Plants, Defensible Space and You
sandiegocounty.gov/pds/docs/DPLU199.pdf

Turf Maintenance and Removal Advice

Solarization Techniques ipm.ucanr.edu/
Bermuda grass eradication ipm.ucanr.edu
UC Riverside sheet mulching instructions
ucanr.edu/sites/sacmg/files/163135.pdf

Integrated Pest Management

http://www2.ipm.ucanr.edu/WhatIsIPM/

Plant Choices

Arboretum All-Stars
arboretum.ucdavis.edu/arboretum_all_stars.aspx
California Native Plant Library
theodorepayne.org/nativeplantdatabase
California plants database calflora.org/
Gardening With California Native Plants
cnpssd.org/gardening-and-landscaping-with-california-native-plants
Monrovia Nursery Plantfinder Monrovia.com
Nifty Fifty List of Plants for California-Friendly Landscapes watersmartsd.org
Searchable Water Use Classification (WUCOLS)
waterwonk.us/
WaterSmart Landscaping in San Diego County
watersmartsdlandscaping.org

San Diego County Plant Finder

If you're looking to upgrade your landscape or just love gardens, then**watersmartsdlandscaping.org** is for you. Our WaterSmart landscaping website has thousands of pictures of plants and garden designs that are well-suited to our Mediterranean climate.

Pictures are organized by landscape category to make them easy to find. Explore galleries of ideas for back yards, front yards, hillsides, patios, planters and other outdoor living areas.

Invasive Plants

California Invasive Plants Council cal-ipc.org
Don't Plant A Pest cal-ipc.org/wp-content/uploads/2018/05/InvasivePlantChecklistforCaliforniaLandscaping.pdf
Plant Right! Avoid Invasive Plants plantright.org

Appendix A

WaterSmart Resources

Trees
San Diego Regional Urban Forests Council
http://sdrufc.com/treewatering/
Select the Right Tree selectree.calpoly.edu
Tree of Life Plant Re-specifier
californianativeplants.com/plants/planning-tools/plant-respecifier/
USDA Plants Database plants.usda.gov/java

Turf Maintenance and Removal Advice
Solarization Techniques ipm.ucanr.edu/
Bermuda grass eradication ipm.ucanr.edu
UC Riverside sheet mulching instructions
ucanr.edu/sites/sacmg/files/163135.pdf

Nurseries and Garden Centers
Armstrong Garden Centers armstronggarden.com
Evergreen Nursery evergreennursery.com
Grangettos Farm and Garden Supply grangettos.com
Home Depot homedepot.com
Lowe's lowes.com
Village Nurseries villagenurseries.com*

North County Coastal
Anderson's La Costa Nursery
andersonslacostanursery.com
Sunshine Gardens sunshinegardensencinitas.wordpress.com
Barrels And Branches barrelsandbranches.com
Gardens By The Sea gardensbytheseanursery.com
Glorious Gardens agloriousgarden.com
Solana Succulents solanasucculents.com

North County Inland
Briggs Tree Nursery briggstree.com
Green Meadow Growers greenmeadowgrowers.com
Waterwise Botanicals waterwisebotanicals.com
Walter Andersen walterandersen.com
Oasis Water Efficient Gardens oasis-plants.com
Moosa Creek Nursery moosacreeknursery.com

Central
Walter Andersen walterandersen.com
City Farmers cityfarmersnursery.com
Mission Hills Nursery missionhillsnursery.com
Green Gardens greengardenssd.com

East County
Bonita Creek Nursery bonitafruittrees.com
Mission Hills Nursery missionhillsnursery.com
Summers Past Farms summerspastfarms.com

South Bay
Recon Native Plants reconnativeplants.com
Terra Bella Nursery terrabellanursery.com

Soil

Carbon Storage in Soil
ars.usda.gov/is/ar/archive/sep02/soil0902.htm

Mulch and Compost
El Corazon Oceanside Resident Program
ci.oceanside.ca.us/gov/water/services_programs/recycling/guidelines/compost.asp
Miramar Greenery sandiego.gov/environmental-services/miramar/greenery/index.shtml
San Diego Tree Care sandiegotreecare.com/freemulch.htm
San Pasqual Valley Soils spvsoils.com
The Forestry Group theforestrygroup.com/mulch-program
Atlas Tree Service atlastree.com/mulch.php

Water

WaterSmart Resources

watersmartsd.org is your online source for water-use efficiency programs, incentives, tools and more. Use our interactive locator tool to find information specific to your local water agency.

Irrigation
A Homeowner's Guide to a WaterSmart Landscape
watersmartsd.org
Irrigation Tutorials irrigationtutorials.com
Landscape Watering Calculator (City of San Diego)
apps.sandiego.gov/landcalc
WUCOLS ucanr.edu/sites/WUCOLS
California Irrigation Management Information System (CIMIS) cimis.water.ca.gov

Rainwater Capture
American Rainwater Catchment Systems Association
arcsa.org

Water Conservation
San Diego County Water Authority watersmartsd.org

Be Water Wise (MWD) bewaterwise.com
SoCal Water$mart rebates socalwatersmart.com
Water Use it Wisely wateruseitwisely.com

Water Quality
Project Clean Water ProjectCleanWater.org
Think Blue San Diego sandiego.gov/thinkblue

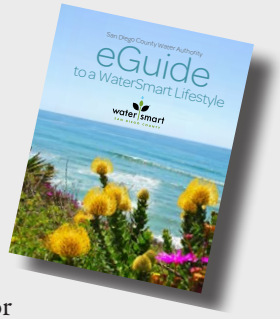
Integrated Pest Management
http://www2.ipm.ucanr.edu/WhatIsIPM/

WaterSmart Gardens

There's nothing like experiencing the beauty, texture and scents of WaterSmart gardens in person. Several neighborhood nurseries and regional gardens across San Diego County are dedicated to showcasing climate appropriate plants and landscapes. Take advantage of tours, classes and one-on-one design consultations offered by these resources. Great places to start are:

- ❑ The Water Conservation Garden at Cuyamaca College **TheGarden.org**
- ❑ San Diego Botanic Garden **SDBGarden.org**
- ❑ South Bay Botanic Garden at Southwestern College **swccd.edu/swc-community/south-bay-botanic-garden/**

eGuide to a WaterSmart Lifestyle



The digital magazine, "eGuide to a WaterSmart Lifestyle," is your go-to resource for water-efficient living in San Diego County. Visit the eGuide at **WaterSmartSD.org/residential-guide** for inspirational plant and garden photos, landscape ideas, helpful videos, plant finders, design tools, garden calculators, links to certified landscape professionals and much more.

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, visit the American Society of Landscape Architects website **(www.asla-sandiego.org)** and the State Licensing Board website **(latc.ca.gov/consumers/license_verification.shtml)**.

Landscape Designer. A person who provides landscape design and horticulture services, such as design concepts, planting plans, and selection of materials. For more information, visit the California Association of Professional Landscape Designers website **(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, visit the California Contractors Association website **(www.clcasandiego.org)** and the State Licensing Board website **(cslb.ca.gov/Consumers/Hire_A_Contractor/)**.

QWEL (Qualified Water Efficient Landscaper) **qwel.watersmartsd.org/**
Trained in water-wise landscape practices including plant selection, irrigation system design and water management, a QWEL graduate will help meet your landscape needs while keeping your outdoor water use in check.

Irrigation Designer. A person who provides irrigation design services. Irrigation designers may achieve certification with the Irrigation Association. Visit their website for more information **(www.irrigation.org)**.

Tips on Hiring a Professional

Refer to our eGuide to a WaterSmart Lifestyle for additional information at WaterSmartSD.org.

Appendix B
Definitions

Aggregation. Aggregation is the arrangement of primary soil particles (sand, silt, clay) around soil organic matter and through particle associations. Aggregate stability is a good indicator of soil health. When you pick up a handful of soil, and it breaks apart into little pieces, you are looking at soil aggregates.

Bubblers. Bubblers are emission devices that flow from one point source and can have a full or a multi stream pattern. For typical landscape projects a low flow model should be selected; this will help water infiltrate the soil and prevent runoff.

Compaction. Soil compaction occurs when the air pockets between soil components collapse. Common causes of compaction include commercial grading and heavy foot or machinery traffic. For plants, compacted soil means their roots have to work harder to grow into soil, resulting in fewer roots to take up nutrients and water.

Compost. Compost is used when planting to condition the soil. It is a deep, rich brown and should have a pleasant, earthy smell. Mix up to 30% into backfill soil when planting. Use about half that amount when planting very low water use succulents or native plants in disturbed, urban soil. If soil is untouched, no amendment is recommended for natives.

Conventional spray irrigation. Conventional spray irrigation is one of the least efficient types of irrigation. It is a type of fixed overhead spray with a fan shaped pattern of water and a spray range of 4 to 20 feet.

Drip emitters. Drip emitters are one of the most efficient ways to deliver water to your garden. They convey water through low flow emission devices to each plant. The most efficient systems incorporate pressure compensating devices, and all drip systems should be installed with a filter.

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

First flush. The first inch of rain after a dry spell.

Gear rotors. Rotors are classified as moderately efficient, high-flow overhead irrigation. Multiple rotating streams distribute water evenly, but rotors typically have a spray range of 25 feet and larger, so are best suited to large areas.

Evapotranspiration. Evapotranspiration (ET) is the process by which water is transferred from the land to the atmosphere by evaporation from the soil and other surfaces and by transpiration from plants. ET is a key descriptive element of climate in a particular area.

Hydrozoning. Hydrozoning is the practice of grouping plants with similar water needs. Through hydrozoning, it is possible to customize irrigation schedules for each area's needs, improving efficiency and avoiding overwatering and underwatering plants.

Impact rotors. Impact rotors are one of the least efficient methods of automatic irrigation which throw rotating streams of water and have the distinct sound when it throws busts of water across the landscape. Impact rotors are quickly being replaced by gear rotors and other types of irrigation which are quieter. They have a spray range of 20 to 40 feet.

Impermeable. On your property, impermeable surfaces such as sidewalks, patios and driveways are solid surfaces that don't allow rainwater to penetrate, forcing it to run off. Permeable surfaces such as soil, grass, gravel and pavers allow rainwater to percolate into the ground and nourish plant roots.

In-line emitters. In-line drip emitters are one of the most efficient ways to deliver water to your garden. They convey water through drip tubing with low flow emitters which are installed at regular intervals along the tubing. The drip tubing can be installed at grade or just beneath the surface. The most efficient systems incorporate pressure compensating devices, and all drip systems should be installed with a filter.

Integrated Pest Management (IPM). IPM is an ecosystem-based strategy that focuses on the long-term prevention of pests or their damage through a combination of techniques such a biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. Pesticides are used only after monitoring indicates they are needed according to established guidelines, and treatments are made with the goal of removing on the target organism. Pest control materials are selected and applied in a manner that minimizes risks to human health, beneficial and non-target organisms and the environment.

Microclimate. A microclimate is a local set of atmospheric conditions that differ from those in the surrounding areas, often with a slight difference but sometimes with a substantial one.

Micro-spray. Micro spray is a type of low flow spray irrigation. It has a spray range of up to 6 feet, so is best suited to small areas.

Mulch. Mulch is used to cover the soil surface after planting. Shredded mulch provides food for beneficial soil microorganisms which feed plants, improve pest resistance, and create healthy, living soil. Use shredded mulch to provide the best environment for your plants and for you. Mulch reduces weeds, evaporation and runoff, and allows the soil to retain moisture. Shredded mulch will stay on hillsides and resist high winds. Always leave several inches of unmulched area around the crown of the plant. As a rule of thumb, 1 cubic yard of mulch will cover 100 square feet 3" thick.

Pressure compensating devices. These devices regulate pressure either at the valve or at the emitter and maintain a constant flow regardless of incoming pressure.

Plant factor. Plant factors (PF) categorize each plant's water requirement. This is determined by gathering information about that plant and comparing it to the amount of water needed by cool season grass in your climate zone.

Reference evapotranspiration (ETo). ETo is a baseline against which all plant water needs are measured. ETo is the locally calculated amount of water in inches over some period of time required by a reference plot of cool season turfgrass.

Rotating nozzles. Rotary nozzles are the most water efficient type of overhead spray for areas 10 to 30 feet in width. Rotary nozzles throw water with multiple rotating streams similar to gear rotors, but the advantage is that the nozzles are small enough to fit on conventional spray bodies. Compared to conventional spray nozzles, rotary nozzles throw larger water droplets at a slower rate which helps to prevent misting and runoff.

Sheet mulching. Sheet mulching is a layered mulch system that nurtures the soil and replaces existing lawns or other vegetation, eliminating the need to remove unwanted plant material.

Smart controller. A smart controller has a timer or clock and is either weather-based or has a moisture detection system that automatically adjusts watering times in response to environmental changes. Smart controllers respond to the climate by increasing irrigation in dry months and reducing irrigation during wet months.

Solarization. Soil solarization is a nonchemical method for controlling soilborne pests using high temperatures produced by capturing radiant energy from the sun. The method involves heating the soil by covering it with a clear plastic tarp for 4 to 6 weeks during a hot period of the year when the soil will receive the most direct sunlight.

Stormwater runoff. Stormwater runoff is rainfall that flows over the ground surface. It is created when rain falls on roads, driveways, parking lots, rooftops and other paved surfaces that do not allow water to soak into the ground.

Swale. A swale is a shallow trench dug along the land's contour, with a berm on the downhill side. A swale is an important tool for irrigating your landscape, mitigating stormwater runoff, and reducing erosion. Catching rainwater in the landscape can be an efficient way to irrigate and improve soil quality at the same time.

WaterSmart. WaterSmart is where our San Diego lifestyle and water efficiency meet. A WaterSmart landscape incorporates smart choices to reduce outdoor water use with beautiful, climate-appropriate plants and efficient irrigation.

Appendix C

Soil Tests

Soil is essential to a healthy landscape and efficient water use. Get to know your soil and how to care for it and you will be rewarded with easier maintenance, a healthier environment, and a more beautiful landscape. Here are some simple tests to help you evaluate your soil:

Drainage Test

Here's a simple way to evaluate your soil drainage.

Dig a hole 12 inches wide x 12 inches deep, putting the soil to the side to be used for the Squeeze Test and the Worm Test.

Fill the hole with water and let it drain overnight.

Use a stick to span the hole from the top of the stick to the bottom of the pit. Measure the distance again in one hour.

Evaluate your results based on drainage rate.

- ❑ **Drainage less than 1" per hour.** Drainage is considered poor. This may be due to high clay content or soil compaction. Add compost to the soil before planting to improve soil aggregation and water infiltration. Select plants that can tolerate poor drainage or consider using raised beds or mounds. Regular surface applications of shredded mulch may be helpful for long term management. Irrigation should be scheduled for short cycles and long soak periods to meet plant water demand and avoid runoff.
- ❑ **Drainage is between 1" and 3" per hour.** Your drainage is considered acceptable.
- ❑ **Drainage is greater than 3" per hour.** Water moves too quickly through your soil. Add compost before planting to hold the water in the root zone longer and select plants tolerant of fast drainage. Regular surface applications of shredded mulch may be helpful for long term management. Irrigation scheduling may require longer watering times to ensure plants have enough available water at the root zone.

Soil Health: The Worm Test

A worm test provides insight into the health of your soil biology and is as simple as counting the number of worms in your soil. Sift through the soil from your drainage test hole. If you can't find at least ten earthworms, your soil is low on organics and will benefit from the addition of compost when planting. Use shredded mulch after planting to continue to feed the beneficial organisms. Worms help reduce soil compaction, allowing water and air to move into the soil to provide healthy growing conditions and maximize efficient water usage.

What Type Is Your Soil: The 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.

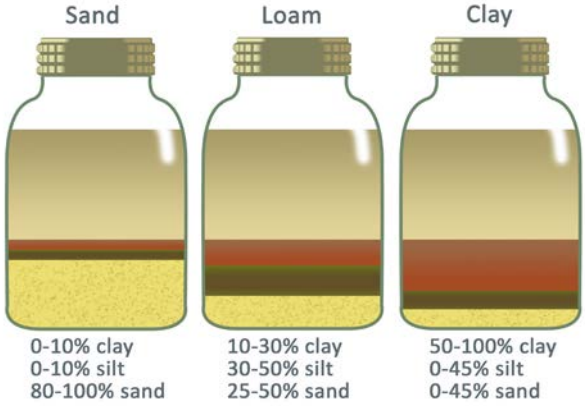
Loam is generally considered to be ideal soil because it retains moisture and nutrients but doesn't stay soggy.

- ❑ **High clay content soil.** Holds its shape and does not crumble when you poke it lightly.

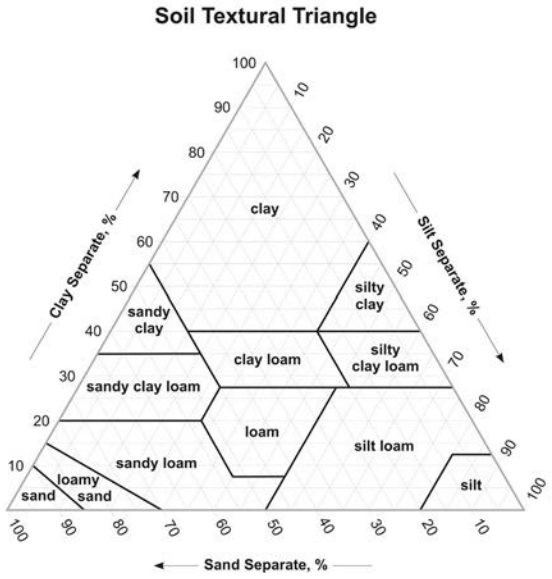
Clay is typically nutrient rich, but has poor drainage. Drainage can sometimes be improved by deep cultivation which breaks up the hard layer of soil.

What Type Is Your Soil: The Jar Test

1. Use a 1-quart size glass container.
2. Add 1 cup of soil from the garden. Select one area per container, or take samples from several holes and blend them together.
3. Add 3 cups of distilled water.
4. Shake until all solids are suspended in water.
5. Place container on a shelf and wait 24 hours.
6. If the container is cloudy, then wait another 24 hours.
7. After 48 hours, the layers should be settled: sand on the bottom, silt in the middle, and clay on top.
8. Measure the layers in proportion to each other.
9. Use the graphic to determine your soil type based on the proportions of sand, silt and clay.



10. Refer to the USDA soil triangle to with the soil separation percentages to determine your toil texture.



Appendix D

WaterSmart Plant Lists

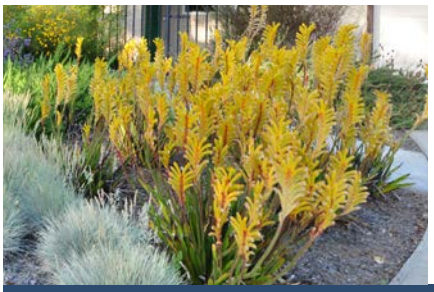
The following five plant themes are an inspirational guide of plants appropriate to our region. Refer to the WUCOLS (Water Use Characteristics of Landscape Species) rating system as a resource to identify water use for other plants that are not included in these sample plant lists.

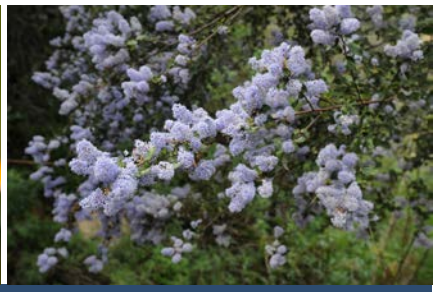
http://ucanr.edu/sites/WUCOLS/Plant_Search/

WaterSmart Landcape
MAKEOVER SERIES

WaterSmart Asian Effect:

Type	Scientific Name	Common Name	Mature Size	WUCOLS			Design Feature
				3	4	6	
			HT x WIDTH	Coastal	Inland	Desert	
Tree	Agonis flexuosa	Peppermint Tree	25-40' x 15-25'	L	M	/	EV
	Albizia julibrissin	Silk Tree	30' x 30'	M	M	M	FL
	Cercis canadensis 'Forest Pansy'	Eastern Redbud	20' x 25'	M	M	/	FL
	x Chitalpa tashkentensis	Chitalpa	20-25' x 20-25'	L	L	M	FL
	Gleditsia triacanthos 'Moraine'	Thornless Honeylocast	40' x 40-45'	M	L	L	FA
	Koelreuteria paniculata	Golden Rain Tree	20-30' x 25-35'	L	L	M	FL
	Lagerstroemia indica	Crape Myrtle	15-20' x 15'	M	M	M	FL
	Prunus ilicifolia	Holly Leaf Cherry	15-25' x 10-15'	VL	VL	/	EV
	Vitex agnus-castus	Chaste Tree	12-16' x 10-15'	L	M	M	FL
	Zelkova serrata	Saw Leaf Zelkova	50' x 50'	L	M	M	FA
Large Shrub	Dodonaea v. 'Purpurea'	Purple Hopseed Bush	12' x 6-8'	L	M	M	FA
	Elaegnus pungens 'Fruitlandii'	Silverberry	12-15' x 15-18'	L	L	L	FL
	Hibiscus syriacus	Rose of Sharon	8-12' x 6-10'	M	M	M	FL
	Pittosporum t. 'Silver Sheen'	Silver Sheen Kohuhu	12-16' x 6-8'	M	M	/	EV
	Nandina domestica	Heavenly Bamboo	6-8' x 3'	L	M	M	FA
Medium Shrub	Grevillea r. 'Scarlet Sprite'	Scarlet Sprite Grevillea	4-5' x 6-8'	L	L	M	FL
	Juniperus sabina	Savin Juniper	4-6' x 5-10'	L	M	M	EV
	Myrsine africana	African Boxwood	6-8' x 4-5'	L	M	/	EV
	Rhaphiolepis indica 'Clara'	Clara Indian Hawthorn	4-5' x 4-5'	M	M	M	FL
	Symphoricarpos albus	Snowberry	4-5' x 4-5'	L	L	/	FR



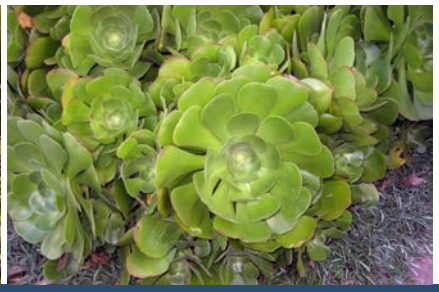


WaterSmart Landcape
MAKEOVER SERIES

WaterSmart Asian Effect:

Type	Scientific Name	Common Name	Mature Size HT x WIDTH	WUCOLS 3 Coastal	WUCOLS 4 Inland	WUCOLS 6 Desert	Design Feature
Small Shrub	Berberis t. 'Crimson Pigmy'	Dwarf Japanese Barberry	2' x 3'	L	L	M	AC
	Grevillea 'Cherry Royal'	Cherry Royal Grevillea	2-3' x 3-4'	L	L	M	FL
	Jasminum floridum	Showy Jasmine	3-4' x 4-5'	M	M	M	FL
	Myrtus communis 'Compacta'	Dwarf Myrtle	2-3' x 2-3'	L	M	M	EV
	Nandina domestica 'Gulf Stream'	Heavenly Bamboo	3' x 3'	L	M	M	FA
	Pittosporum t. 'Wheeler's Dwarf'	Dwarf Mock Orange	3-4' x 4-5'	M	M	M	EV
Vine	Clematis lasiantha	Pipestem Clematis	20-30' tall	VL	L	/	FL
	Lonicera j. 'Halliana'	Hall's Honeysuckle	15' tall	L	L	M	FL :(
	Wisteria sinensis	Chinese Wisteria	25' tall	M	M	M	FL
GC	Convolvulus mauritanicus	Ground Morning Glory	1' x 1 1/2-3'	L	L	M	FL
	Cotoneaster d. 'Coral Beauty'	Bearberry Cotoneaster	1' x 6-8'	M	M	M	EV
	Juniperus conferta 'Blue Pacific'	Shore Juniper	1' x 6-8'	L	M	M	EV
	Juniperus horizontalis 'Wiltonii'	Creeping Juniper	6" x 6-8'	L	M	M	EV
	Juniperus s. 'Tamariscifolia'	Tamarix Juniper	18-30" x 10'	L	M	M	EV
	Ophiopogon japonicus	Mondo Grass	12-15" x 12-15"	M	M	M	GRS

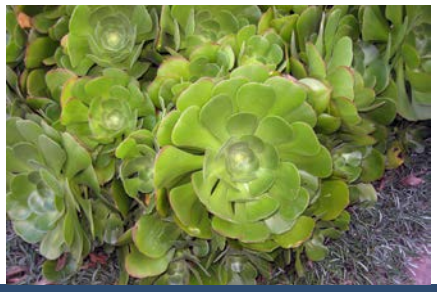
Design Feature Key
AC = Accent
EV = Evergreen
FA = Fall Color
FDN = Foundation
FL = Flower
FR = Fruit
GRS = Ornamental Grass


WaterSmart Landcape
MAKEOVER SERIES

WaterSmart Contemporary Effect:

Type	Scientific Name	Common Name	Mature Size HT x WIDTH	WUCOLS 3 Coastal	WUCOLS 4 Inland	WUCOLS 6 Desert	Design Feature
Tree	Agonis flexuosa 'After Dark'	Peppermint Willow	15-25' x 10-15'	L	L	L	AC
	Cercidium x 'Desert Museum'	Desert Museum Palo Verde	25' x 25'	VL	L	L	FL
	Chorisia speciosa	Floss Silk Tree	40-60' x 20-40'	L	L	M	AC
	Dracaena draco	Dragon Tree	15-25' x 15-25'	VL	L	/	AC
	X Chitalpa tashkentensis	Chitalpa	20-30' x 20-30'	L	L	M	FL
Large Shrub	Agave a. v. attenuata	Agave	4-5' x 6-8'	L	L	L	AC
	Agave weberi	Weber Agave	5' x 6-10'	L	L	L	AC
	Arctostaphylos 'H. McMann'	Manzanita	6-10' x 6-12'	L	L	/	EV
	Caesalpinea gilliesii	Desert Bird of Paradise	10' x 8'	L	L	M	FL
	Euphorbia tirucalli	Sticks on Fire	4-8' x 3-5'	VL	/	L	AC
	Hesperaloe funifera	Giant Hesperaloe	6' x 6'	VL	L	L	AC
	Leonotis leonurus	Lion's Tail	4-8' x 4-6'	L	L	M	FL
Medium Shrub	Artemisia ludoviciana	Prairie Sagebrush	3' x 6'	L	L	L	AC
	Dasylirion texanum	Green Desert Spoon	5' x 5'	L	L	L	AC
	Eremophila m. brevifolia	Spotted Emu Bush	2-4' x 2-4'	L	L	L	FL
	Helictotrichon sempervirens	Blue Oat Grass	1-2' x 1-2'	M	M	M	GRS
	Hesperaloe parviflora	Red Yucca	3-4' x 2-4'	VL	L	L	AC
	Leucophyllum f. 'Compacta'	Compact Texas Ranger	5' x 5'	L	L	L	FL
	Leymus c. 'Canyon Prince'	Wild Rye	2-3' x 2-3'	M	M	?	GRS
	Nolina macrocarpa	Bear Grass	3' x 4'	VL	VL	L	AC
	Phormium 'Evening Glow'	New Zealand Flax	3' x 4-6'	M	M	M	AC
	Salvia gregii	Autumn Sage	2-4' x 2-3'	L	L	M	FL

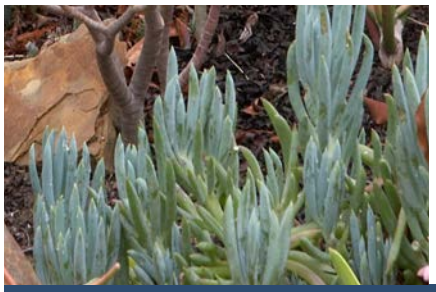

WaterSmart Landcape

MAKEOVER SERIES

WaterSmart Contemporary Effect:

Type	Scientific Name	Common Name	Mature Size HT x WIDTH	WUCOLS 3 Coastal	WUCOLS 4 Inland	WUCOLS 6 Desert	Design Feature
Small Shrub	Aloe x 'Blue Elf'	Coral Aloe	18" x 2'	L	L	L	FL
	Bulbine frutescens	Stalked Bulbine	12" x 18"	L	L	L	FL
	Hesperaloe p. 'Perpa'	Breaklights Red Yucca	2' x 2'	VL	L	L	FL
	Kalanchoe thyrsiflora	Paddle Plant	12-18" x 12-18"	L	L	M	AC
	Sisyrinchium bellum	Blue-eyed Grass	12-18" x 12-18"	L	L	M	GRS
	Yucca rupicola	Twisted Leaf Yucca	2' x 2-3'	L	L	L	AC
Vine	Passiflora caerulea	Blue Passion Vine	10-15' tall	M	M	M	FL
	Distictis buccinatoria	Blood Red Trumpet Vine	30' tall	M	M	M	FL
GC	Dalea greggii	Trailing Indigo Bush	2' x 6-8'	L	L	L	AC
	Dymondia margaretae	Dymondia	2-3" x 20"	L	L	/	EV
	Echeveria imbricata	Blue Rose Echeveria	12" x 12"	L	L	M	AC
	Festuca glauca	Blue Fescue	12" x 12"	M	M	M	GRS
	Othonna capensis	Little Pickles	2" x 1'	L	?	?	AC
	Sedum reflexum 'Blue Spruce'	Blue Spruce Stonecrop	3" x 10"	L	L	L	AC
	Sedum spathulifolium	Stonecrop	2-4" x 24"	L	L	L	AC
	Sempervivum 'Black'	Black Hens and Chicks	4-6" x 12"	L	L	L	AC

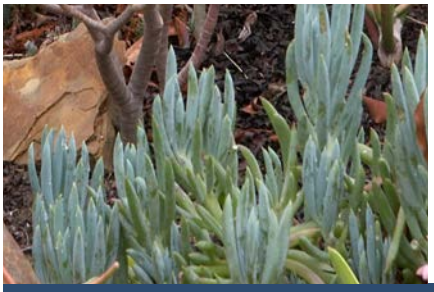
Design Feature Key
AC = Accent
EV = Evergreen
FA = Fall Color
FDN = Foundation
FL = Flower
FR = Fruit
GRS = Ornamental Grass



WaterSmart Landcape
MAKEOVER SERIES

WaterSmart Mediterranean Effect:

Type	Scientific Name	Common Name	Mature Size	WUCOLS			Design Feature
				3	4	6	
			HT x WIDTH	Coastal	Inland	Desert	
Tree	Arbutus 'Marina'	Marina Strawberry Tree	20-30' x 20-30'	L	L	M	FR
	Brahea armata	Blue Hesper Palm	25-40' x 6-8'	L	L	L	AC
	Chamaerops humilis	Mediterranean Fan Palm	8-12' x 10-15'	M	M	M	AC
	Cupressus sempervirens	Italian Cypress	40-60' x 8-12'	L	L	M	AC
	Laurus nobilis	Sweet Bay	20-30' x 10-20'	L	L	M	EV
	Olea europaea 'Swan Hill'	Swan Hill European Olive	15-25' x 15-20'	L	L	M	EV
	Pinus halepensis	Aleppo Pine	50-60' x 60-80'	L	L	L	EV
Large Shrub	Agave attenuata	Foxtail Agave	2-5' x 3-5'	L	L	L	AC
	Carpenteria californica	Bush Anemone	6-8' x 4-5'	L	M	/	FL
	Cistus ladanifer	Crimson-spot Rockrose	4-5' x 4-5'	L	L	L	FL
	Rhaphiolepis indica	Indian Hawthorn	4-5' x 4-5'	L	M	M	FDN
	Feijoa sellowiana	Pineapple Guava	12-20' x 10-15'	L	L	M	FL
	Westringia 'Wynyabbie Gem'	Coast Rosemary	6-8' x 4-6'	L	L	M	FDN
Medium Shrub	Cistus x purpureus	Purple Rockrose	4' x 4-6'	L	L	L	FL
	Correa 'Ivory Bells'	Australian Fuchsia	4-5' x 4-5'	L	L	M	FL
	Rosmarinus o. 'Blue Spires'	Blue Spires Rosemary	4-5' x 2-3'	L	L	M	FDN
	Salvia leucantha	Mexican Sage	3-4' x 4-6'	L	L	M	FL



WaterSmart Landcape

MAKEOVER SERIES

WaterSmart Mediterranean Effect:

Type	Scientific Name	Common Name	Mature Size	WUCOLS			Design Feature
				3	4	6	
			HT x WIDTH	Coastal	Inland	Desert	
Small Shrub	Agave parryi	Artichoke Agave	2-4' x 2-4'	L	L	L	AC
	Aloe striata	Coral Aloe	1-2' x 2-3'	L	L	L	AC
	Convolvulus cneorum	Bush Morning Glory	2-4' x 2-4'	L	L	L	FL
	Correa 'Dusky Bells'	Australian Fuchsia	1-2' x 2-3'	L	L	M	FL
	Lavandula a. 'Munstead'	English Lavender	1-2' x 1-2'	L	L	M	FL
	Myrtus communis ' Compacta'	Dwarf Myrtle	2-3' x 2-3'	L	M	M	FDN
	Salvia greggii 'Furman's Red'	Autumn Sage	2-4' x 2-3'	L	L	M	FL
Vine	Bougainvillea var.	Bougainvillea	20-30' tall	L	L	M	FL
	Distictis buccinatoria	Blood-red Trumpet Vine	20-30' tall	M	M	M	FL
	Pyrostegia venusta	Flame Vine	20-30' tall	M	M	M	FL
GC	Cistus 'Sunset'	Magenta Rockrose	1-2' X 6-8'	L	L	L	FL
	Juniperus c. 'Blue Pacific'	Shore Juniper	1' x 6-8'	L	L	M	EV
	Myroporum p. 'Pink'	Pink Myoporum	1' x 4-5'	L	L	M	EV
	Rosmarinus o. 'Prostratus'	Trailing Rosemary	1' x 5'	L	L	M	EV
	Sedum reflexum	Sedum	6-10" x 24"	L	L	L	AC
	Senecio mandraliscae	Blue Chalksticks	1-2' x 2-3'	L	M	M	AC
	Thymus serpyllum	Creeping Thyme	1-2" x 12-15"	M	M	M	FL

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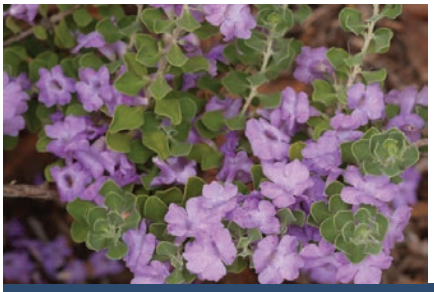
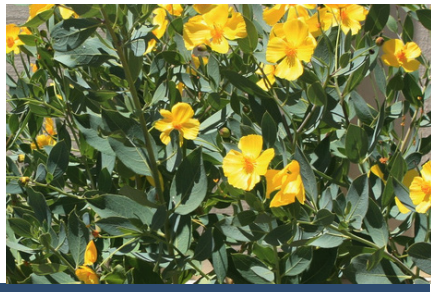


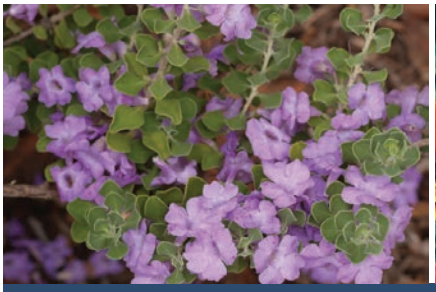


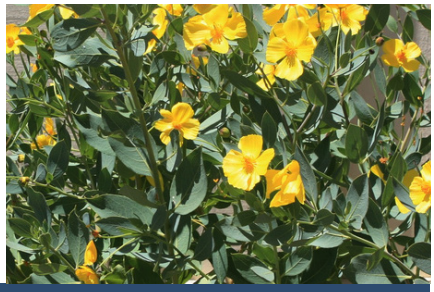
water smart
SAN DIEGO COUNTY WATER AUTHORITY

WaterSmart Landcape
MAKEOVER SERIES

WaterSmart Native Garden Effect:

Type	Scientific Name	Common Name	Mature Size	WUCOLS			Design Feature
				3	4	6	
			HT x WIDTH	Coastal	Inland	Desert	
Tree	Cercidium x 'Desert Museum'	Desert Museum Palo Verde	25' x 25'	VL	L	L	AC
	Cercis occidentalis	Western Redbud	12-20' x 10-15'	L	L	/	FL
	Chilopsis linearis	Desert Willow	30' x 25'	VL	L	M	FL
	Myrica californica	Pacific Wax Myrtle	20-30' x 10-20'	L	M	/	FL
	Pinus torreyana	Torrey Pine	40-60' X 30-50'	L	M	/	EV
	Quercus agrifolia	Coast Live Oak	40-60' x 40-50'	L	L	M	EV
Large Shrub	Calliandra californica	Baja Fairy Duster	6' x 6'	VL	L	L	FL
	Ceanothus 'Concha'	California Lilac var.	6-8' x 6-12'	VL	L	/	FL
	Heteromeles arbutifolia	Toyon	15-20'x15-20'	VL	L	/	EV
	Rhus integrifolia	Lemonade Berry	6-10' x 10-15'	VL	L	/	EV
	Ribes speciosum	Flowering Gooseberry	4-8' x 4-6'	L	M	/	FL
	Rosa californica	California Rose	5' x 5'	L	L	/	FL
Medium Shrub	Arctostaphylos d. 'Sunset'	Sunset Manzanita	3-4' x 3-4'	L	L	/	EV
	Encelia californica	Coast Sunflower	3-4' x 3-4'	VL	L	L	FL
	Galvezia speciosa	Island Snapdragon	3-4' x 4'-5'	VL	L	M	FL
	Muhlenbergia rigens	Deer Grass	4-5' x 4-6'	L	M	M	GRS
	Salvia alpiana	White Sage	4-5' x 4-5'	VL	VL	L	EV
	Salvia clevelandii	Cleveland Sage	4-5' x 4-5'	VL	VL	L	FL
	Yucca whippelei	Our Lord's Candle	2-3' x 3-4'	L	L	L	AC
Small Shrub	Agave desertii	Desert Agave	1-2' x 2-3'	L	L	L	AC
	Agave shawii	Shaw's Agave	2-3' x 3-4'	L	L	L	AC
	Dudleya brittonii	Chalk Liveforever	1- X 1-2'	VL	L	/	AC
	Eriogonum g. rubescens	Buckwheat	1-2' x 2-3'	VL	L	L	FL





WaterSmart Landcape

MAKEOVER SERIES

WaterSmart Native Garden Effect:

Type	Scientific Name	Common Name	Mature Size	WUCOLS			Design Feature
				3	4	6	
			HT x WIDTH	Coastal	Inland	Desert	
Vine	Clematis pauciflora	Clematis	12' tall	VL	L	?	FL
	Lonicera subspicata	Chaparral Honeysuckle	3-8' tall	L	VL	?	FL
	Vitis californica	California Wild Grape	30' tall	VL	L	M	FR
GC	Achillea millefolium	Yarrow	1-2' x 2-3'	L	L	M	FL
	Arctostaphylos e. 'Carmel Sur'	Carmel Sur Manzanita	1' x 10'	L	L	/	EV
	Arctostaphylos 'Pacific Mist'	Pacific Mist Manzanita	2-3' x 6-12'	L	L	/	EV
	Baccharis p. 'Pigeon Point'	Dwarf Coyote Bush	2' x 8'	L	L	/	EV
	Ceanothus g. horizontalis	California Lilac var.	1-2' x 10-015'	VL	L	/	FL
	Ceanothus 'Joyce Coulter'	California Lilac var.	2-3' x 10-15'	VL	L	/	FL
	Fragaria chiloensis	Sand Strawberry	6"-12" x 2'	M	M	M	EV
	Mahonia repens	Creeping Mahonia	18-24" x 3-4'	L	M	/	EV

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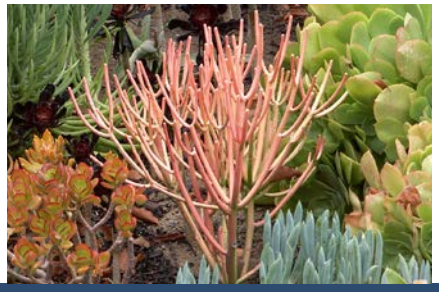


WaterSmart Landcape
MAKEOVER SERIES

WaterSmart Tropical Effect:

Type	Scientific Name	Common Name	Mature Size	WUCOLS			Design Feature
				3	4	6	
			HT x WIDTH	Coastal	Inland	Desert	
Tree	Bauhinia x blakeana	Hong Kong Orchid Tree	20' x 20'	M	M	M	FL
	Brahea armata	Blue Hesper Palm	25-40' x 6'-8'	L	L	L	AC
	Erythrina crista-galli	Cockspur Coral Tree	15-20' x 15-20'	L	L	M	FL
	Cassia splendida 'Golden'	Golden Wonder Senna	15-18' x 15'	L	L	L	FL
	Phoenix dactylifera	Date Palm	80-100' x 20'	L	L	M	AC
	Strelitzia nicolai	Giant Bird of Paradise	30' x 5-7'	M	M	M	AC
Large Shrub	Alyogyne huegelii 'Monle'	Blue Hibiscus	6' x 4'	L	L	L	FL
	Anigozanthos 'Big Red'	Big Red Kangaroo Paw	4-6' x 2-3'	L	L	M	AC
	Aucuba japonica	Aucuba	4-6' x 4-5'	M	M	M	EV
	Cistus x purpureus	Purple Rockrose	4-6' x 4-6'	L	M	M	AC
	Lantana camara 'American Red'	American Red Lantana	4-6' x 4-6'	L	L	M	FL
	Phormium tenax	New Zealand Flax	3-8' x 3-8'	L	M	M	AC
	Teucrium fruiticans 'Asureum'	Azure Bush Germander	4-6' x 4-6'	L	L	M	FL
Medium Shrub	Acanthus mollis	Bear's Breech	4' x 4'	M	M	M	AC
	Anigozanthos 'Bush Gold'	Bush Gold Kangaroo Paw	2-3' x 1-2'	L	L	M	AC
	Bougainvillea 'Singapore White'	Bougainvillea	3-4' x 3-4'	L	L	M	FL
	Callistemon c. 'Little John'	Dwarf Bottlebrush	3' x 5'	L	L	M	FL
	Convolvulus cneorum	Bush Morning Glory	2-4' x 2-4'	L	L	L	FL
	Coreopsis gigantea	Giant Coreopsis	3-5' x 3-5'	VL	L	/	FL
	Strelitzia reginae	Bird of Paradise	3-5' x 3-5'	M	M	M	AC



WaterSmart Landcape

MAKEOVER SERIES

WaterSmart Tropical Effect:

Type	Scientific Name	Common Name	Mature Size	WUCOLS			Design Feature
				3	4	6	
			HT x WIDTH	Coastal	Inland	Desert	
Small Shrub	Aeonium canarience	Giant Velvet Rose	1-2' x 2-3'	L	L	L	AC
	Anigozanthos viridis 'Phar Lap'	Green Kangaroo Paw	1-2' x 1-2'	L	L	M	AC
	Clivia miniata	Kaffir Lily	1-2' x 1-2'	L	M	M	FL
	Coreopsis auriculata 'Nana'	Dwarf Coreopsis	6-8" x 2'	L	L	M	FL
	Euphorbia rigida	Silver Spurge	1-2' x 2-3'	VL	L	L	AC
Vine	Bougainvillea spectabilis	Bougainvillea	20-30' tall	L	L	M	FL
	Macfadyena unguis-cati	Cat's Claw Vine	20-30' tall	L	L	L	FL
	Passiflora j. 'Coral Seas'	Coral Seas Passion Flower	15-20' tall	M	M	M	FL
	Pyrostegia venusta	Flame Vine	20-30' tall	M	M	M	FL
GC	Crassula capitera 'Campfire'	Campfire Crassula	6" x 2-3'	L	L	L	AC
	Fragaria chiloensis	Sand Strawberry	8-12" x 3-6'	M	M	M	EV
	Lantana montevidensis	Trailing Lantana	8-12" x 3-6'	L	L	M	FL
	Sedum s. 'Cape Blanco'	Cape Blanco Stonecrop	2-4" x 24"	L	L	L	AC
	Sedum makinoi 'Limelight'	Japanese Stonecrop	2-4" x 8-12"	L	L	L	AC

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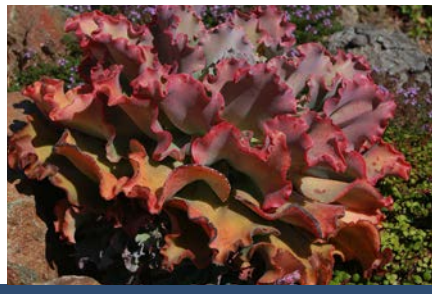

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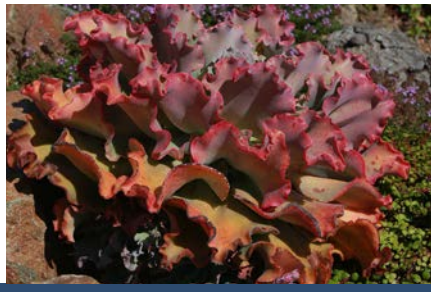
WaterSmart Landcape
MAKEOVER SERIES

WaterSmart Dry Shade Plants:

Type	Scientific Name	Common Name	Mature Size	WUCOLS			Design Feature
				3	4	6	
			HT x WIDTH	Coastal	Inland	Desert	
Large Shrub	Arbutus unedo	Strawberry Tree	6-8' x 5-6'	L	L	M	FR
	Arctostaphyllos d. 'H. Mcminn'	Manzanita	6-10' x 6-12'	L	L	/	EV
	Aucuba japonica	Gold Dust Plant	6-10' x 6-10'	M	M	M	EV
	Coprosma repens	Mirror Plant	10' x 6'	M	M	/	EV
	Frangula californica	Coffeeberry	3-15' x 8'	VL	L	M	EV
	Nandina domestica	Heavenly Bamboo	6-8' x 3-4'	L	M	M	FA
	Phormium tenax	New Zealand Flax	9' x 5'	L	M	M	AC
	Portulaca afra	Elephant's food	8-12' x 4-6'	VL	L	L	EV
	Rhus integrifolia	Lemonade Berry	6-10' x 10-15'	VL	L	/	EV
	Rhus ovata	Sugar Bush	4-10' x 4-10'	VL	L	L	EV
Medium Shrub	Agapanthus africanus	Lily of the Nile	3-4' x 2-3'	M	M	M	AC
	Agave attenuata	Foxtail Agave	4-5' x 6-8'	L	L	L	AC
	Bromelia balansae	Bromeliads	4' x 4-6'	L	?	?	FL
	Crassula ovata	Jade Plant	1-1.5' x 3'	L	L	L	EV
	Muhlenbergia capillaris	Pink Muhly Grass	3' x 6'	L	L	M	GRS
	Myrtus communis	Myrtle	5-6' x 4-5'	L	M	M	FDN
	Rhus trilobata	Basket bush	3-5' x 5'	L	L	?	EV
	Ribes viburnifolium	Catalina Perfume	3-6' x 12'	VL	M	?	FL
	Rosa californica	California Rose	5' x 5'	L	L	/	FL
	Sansevieria trifasciata	Snake Plant	4' x 2'	L	L	M	EV
Small Shrub	Acanthus mollis	Bear's Breech	3-4' x 2-3'	M	M	M	AC
	Aspidistra elatior	Cast Iron Plant	2-3' x 2-3'	M	M	M	EV
	Carex tumulicola	Berkeley Sedge	1.5' x 2'	L	L	M	GRS
	Clivia miniata	Kaffir Lily	1-2' x 1-2'	L	M	M	FL
	Correa pulchella	Australian Fuschia	2.5-5' x 8'	L	L	M	FL





WaterSmart Landcape
MAKEOVER SERIES

WaterSmart Dry Shade Plants:

Type	Scientific Name	Common Name	Mature Size HT x WIDTH	WUCOLS 3 Coastal	WUCOLS 4 Inland	WUCOLS 6 Desert	Design Feature
Small Shrub	Dianella revoluta	Flax Lily	1-2’ x 2-3'	L	L	?	GRS
	Ilex vomitoria ‘Stokes’	Stokes Dwarf	3-4' x 3-4'	M	L	M	FDN
	Iris douglasiana	Douglas Iris	1-2’ x 2-3'	L	M	?	FL
	Mahonia repens	Dwarf Mock Orange	1-2' x 3-4'	L	L	/	EV
	Sedum dendroideum	Stonecrop	1-3’ x 3-4’	L	L	/	AC
	Trachelospermum jasminoides	Star Jasmine	2’ x 10’	M	M	M	FL
GC	Achillea tomentosa	Wooly Yarrow	1-2’ x 2-3'	L	L	M	FL
	Ajuga reptans	Carpet bugle	<1' x 2-3’	M	M	M	EV
	Arctostaphyllos u. ‘Pt. Reyes’	Point Reyes Manzanita	1-1.5' x 1.5’	L	L	/	EV
	Crassula multicava	Fairy crassula	1-1.5’ x 3’	L	L	L	FL
	Cyclamen hederifolium	Ivy Leaf Cyclamen	3-4” tall	L	L	?	FL
	Erigeron karvinskianus	Sta. Barbara Daisy	10-20” x 3’	L	M	M	FL
	Fragaria chiloensis	Sand Strawberry	4-8” tall	VL	L	M	FL
	Geranium incanum	Cranesbill	6-10” x 2'	L	L	M	FL
	Heuchera sanguinea	Coral bells	1-1.5’ x 10-12”	M	M	M	AC
	Ruscus hypoglossum	Butcher’s broom	1.5’ x1.5’	L	L	?	EV

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