



MARIN MUNICIPAL  
WATER DISTRICT

# Watershed Approach to Landscaping





# MARIN MUNICIPAL WATER DISTRICT

This Guidebook provides more than 110 water-wise plants, landscape design tips, gardening how-to, nurseries and other resources for Marin Municipal Water District customers.

The following people are gratefully acknowledged for their energetic contributions to completing this guidebook:

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# Watershed Approach Landscapes

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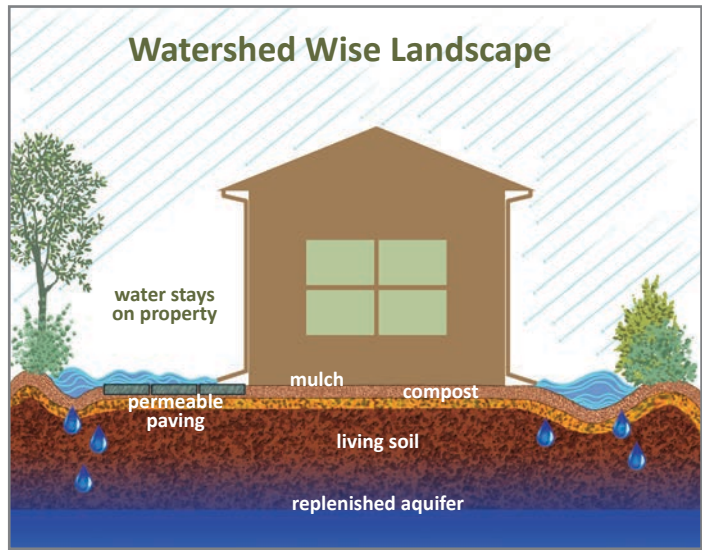
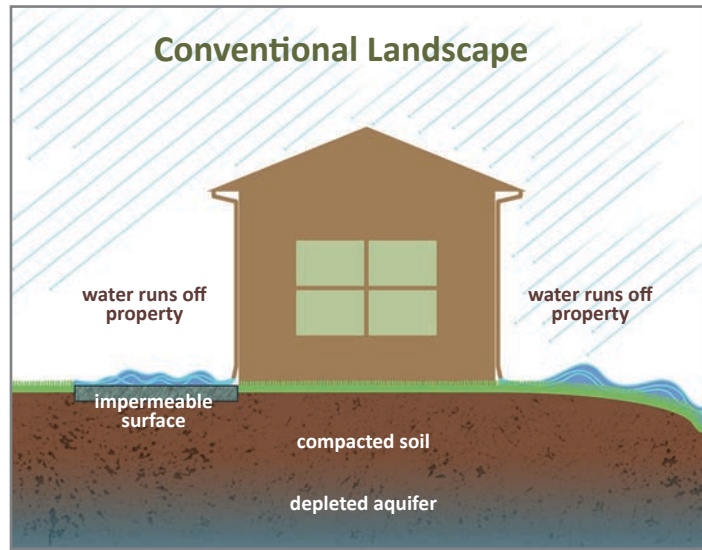
## These Beautiful gardens...

require less water, but don't look dry; they are attractive, lush and evergreen because they were created following the principles of the watershed approach to landscaping.

While conventional landscapes allow water to run off the property and often waste water, watershed wise landscapes are designed to hold on to rainwater and reduce the demand for supplemental irrigation. In the pages that follow, you'll see inspirational gardens that allow us to continue enjoying Marin County's varied and amazing climate and outdoor lifestyle, while conserving valuable natural resources and creating a diverse habitat of plants and insects.

If we want Marin County landscapes that are truly resilient to the effects of a changing climate, then we need to go beyond sustainable and water wise principles to begin managing each property as though it were a mini-watershed. By paying attention to the design of the garden, building soil and keeping rain on our properties, selecting climate-appropriate plants and managing supplemental irrigation, we transform our landscapes into abundant watershed wise enhancements to our properties and neighborhoods.

### Now dig in!



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# In three **Easy Steps**

## Healthy **Living Soil** captures **Rainwater**.

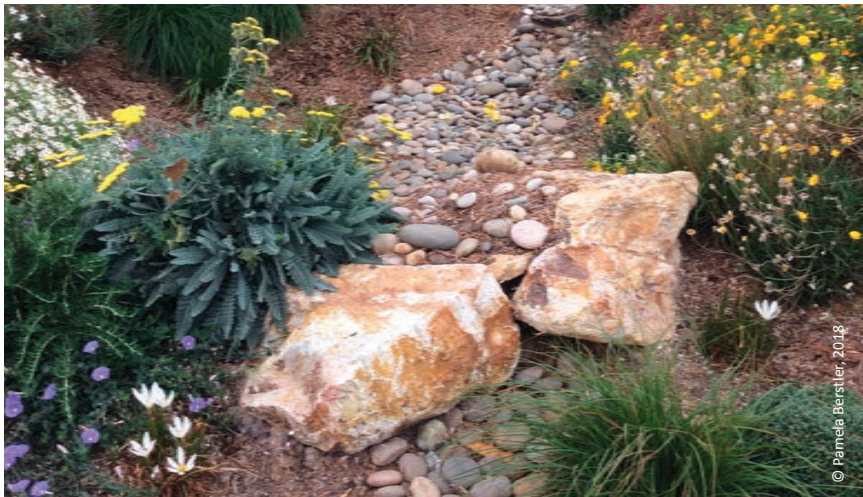


Healthy living soil is made by adding compost to your soil, covering your garden with mulch, and by avoiding soil disturbance as much as possible. Compost boosts soil organisms that reduce diseases and pests. There's no need for adding fertilizers or pesticides on watershed wise gardens.

Maintaining 2" - 4" of small-size organic mulch on top of every open space in the landscape keeps the garden looking clean while slowly building the soil. The mulch holds in water, so less irrigation is required (see p. 40).

When downspouts are directed to these landscapes, living soil becomes a giant sponge that helps keep plants healthy and happy, whether it's raining or we're in a drought (see p. 42).

## Climate-appropriate **Plants Reduce Irrigation** needs.



Selecting climate-appropriate plants like those from Mediterranean climates and, even better, from Marin County's own native plant communities, makes your garden automatically adapted to the seasonal summer drought, wet winter months, and various Marin microclimates (see p. 30). Many plants from the five Mediterranean climates, (South Africa, area around the Mediterranean Sea, Chile, Australia, and certain regions of California) are appropriate for our gardens.

Local native plants benefit the local native birds and insect species by providing food and nesting materials! There are many dry-adapted evergreen and long-flowering California native plants. When you use them in your garden, you get year-long interest and a garden filled with life, on reduced summer irrigation (see p. 52).

## **Efficient Irrigation** supplements rain.



There may be years when there isn't enough winter rain, or you may have plants you love that struggle to thrive in the long, hot, dry summers. In those cases, you want to apply supplemental water through a highly efficient irrigation system.

Efficient irrigation makes sure every drop of water applied to the landscape stays there for the benefit of the plants. By using soil moisture sensors and/or weather-based "smart" irrigation controllers, low flow spray nozzles, and drip irrigation, you can keep your landscape healthy without wasting water (see p. 51).

You also can reduce your irrigation use just by paying closer attention to it. Grab a cup of coffee and get to know your irrigation controller!

# Gardening in MMWD Watersheds



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**Marin’s Varied Microclimates** are characterized by long, dry summers and short cooler wet winters. Annual rainfall is unpredictable. Since record keeping began, it has ranged from a low of 19 inches per year to a high of 112 inches, with an average of 52 inches. Throughout MMWD’s service area, average annual rainfall ranges from 18 inches in Pt. San Pedro to 50 inches or more along the ridgeline of Mt. Tamalpais. As warm air is forced upward over Mt. Tamalpais, it quickly cools down and humidity rises, forming clouds that drop elevated rainfall in the central portion of the county.

Marin offers a wide variety of topography, climate, and vegetation, from the tidal flats and wetlands of San Pablo Bay and the rocky intertidal coastline of the Point Reyes Peninsula to the oak woodlands, coastal redwoods, and grasslands of Mt. Tamalpais. A wide range of soils create unique niches for different plant communities, and for the animals that depend upon them.

**Ecosystem Diversity** is a hallmark of Marin County, part of the California Floristic Province, an internationally recognized biodiversity hotspot. Marin is home to many endemic terrestrial, avian and aquatic species that are not found anywhere else in the world, and many of which are listed as threatened, endangered, or rare. There are numerous ecosystems present, and there are also a considerable number of protected plant and animal species present. Located on the Pacific Flyway, the area is an important resting and feeding spot for migratory birds as well as local residents such as Northern Spotted Owls and Ridgeway’s Rails.

**Water Resources** rely heavily on local rainfall. About 75% of MMWD’s drinking water comes from rainwater captured on 21,500 acres of protected watershed in seven reservoirs on Mt. Tamalpais and in west Marin. The rest is imported from the Russian River in Sonoma County.

Water from these sources is treated and tested at one of three drinking water treatment plants to ensure the highest quality. The water then travels through almost 900 miles of underground pipelines to homes and business throughout the service area.

## If you live in a wildland/urban interface, you have a special responsibility to:

- Select local native plants with specific habitat benefits whenever possible (*see pp. 26-27*)
- Avoid planting invasive species (*see p. 56*)
- Minimize pollution (trash/debris, animal waste, chemical runoff)
- Manage/minimize/protect against erosion (*see p. 20*)
- Irrigate carefully, do not under water or overwater and be sure to eliminate runoff (*see pp. 50-51*)
- Maintain your property with consideration for fire (*see p. 22*)

# You live within a Watershed

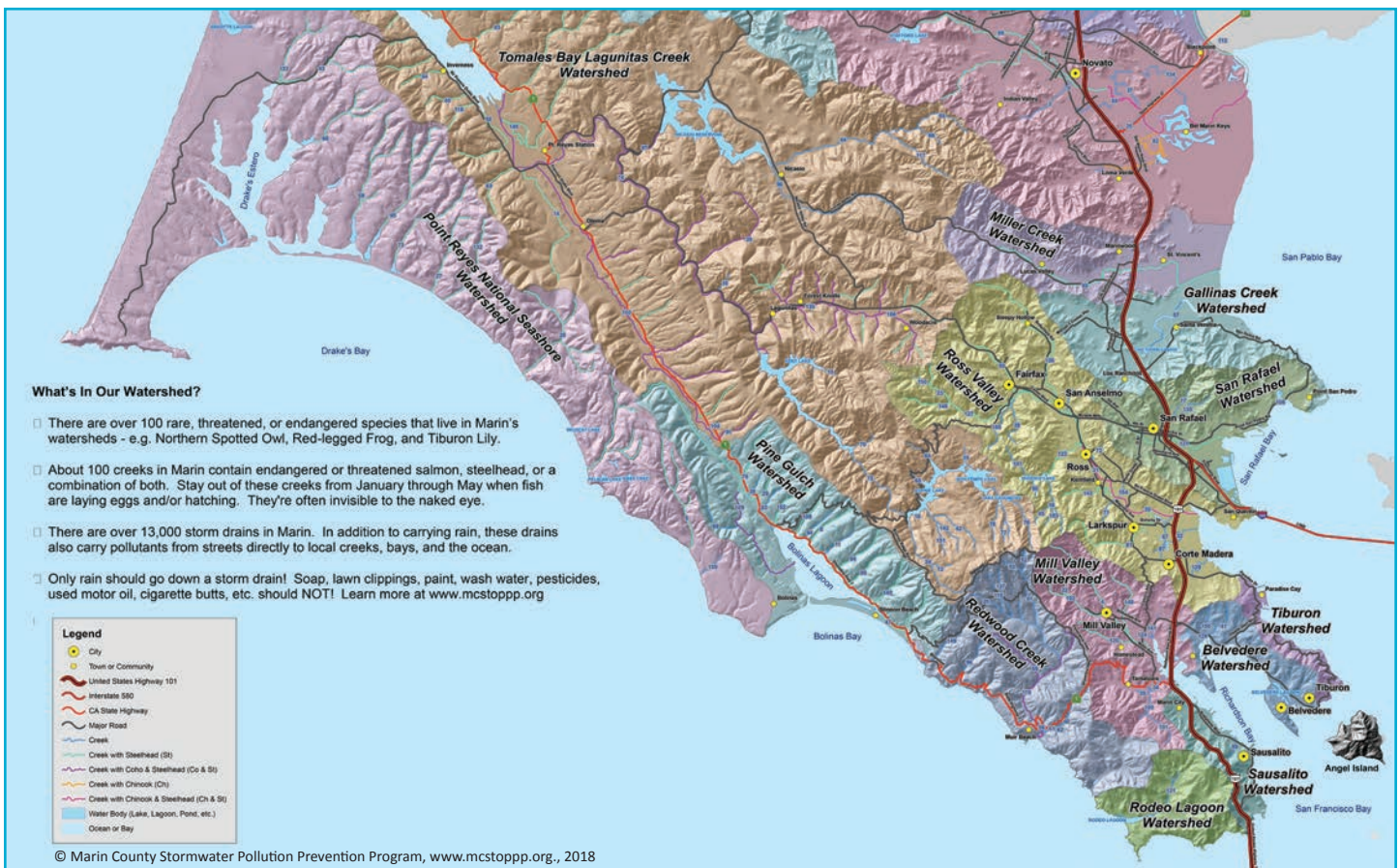
**Mt. Tamalpais Watershed**, one of California's most valuable natural resources, is the major source of water for the MMWD service area. Five of MMWD's seven reservoirs are situated within this watershed. The mountain itself drastically affects weather, as warm air is forced upward over its rising terrain and is cooled down, prompting precipitation on the mountain and in its shadow.

MMWD's service area contains seven watersheds (Miller Creek, Gallinas Creek, San Rafael, Ross Valley, Richardson Bay, Southern Coastal Creeks and Lagunitas Creek/Tomaes Bay). All the rain falling on landscapes within these watersheds makes its way to the Pacific Ocean via an interconnected web of creeks, through tidal flats and wetlands that are critical habitat for a myriad of terrestrial and avian species, some endemic to Marin County.

**Lagunitas Creek** makes up a great portion of the Tomales Bay Watershed at the northern most regions of MMWD's service area. This watershed begins on the north slope of Mt. Tamalpais and its

tributaries feed into MMWD's reservoirs. These waterways are prime coho salmon, steelhead trout, and California fresh water shrimp habitat; many of them are protected by the U.S. Fish and Wildlife Service. The land use in the watershed is primarily residential, parklands and grazing lands characterized by open, low rolling hills in the lower watershed and rugged canyons in the upper watershed.

The Southern end of MMWD service area is dominated by the various watersheds that discharge into **San Pablo Bay** and **Richardson Bay**. San Pablo Bay includes Miller Creek, Gallinas Creek, and San Rafael Creek, which flow eastward from semi-rural headwaters through urban areas and tidal wetlands. Corte Madera Creek and Corte Madera del Presidio flow southeastward from steep hillside headwaters through highly urbanized valleys and discharge into Richardson Bay. With nearly 70% of runoff from the developed portion of these watersheds generated from impervious areas, landscapes are poised to play an important role in the health of the creeks as well as the critical tidal areas.



**Water Quality** is maintained by keeping the Mt. Tamalpais watershed lands in a natural condition and limiting use by people to activities that have the least impact on the watershed. MMWD carefully stewards all of its reservoir land to limit the impact on downstream habitats.

The landscapes we create have a significant impact on the environment. Among the objectives for protecting and restoring the vitality of these watersheds are reducing the volume of water that comes into the creeks during wet weather, and eliminating the amount that comes in dry weather resulting from landscaped and hardscaped area runoff.

**Watershed Wise** landscapes become the first line of defense in treating water on site before it runs off the parcel and travels downstream. By creating healthy living soil (*see pp. 36-41*) and contouring landscapes to receive the water generated from roofs and other hard, impermeable surfaces (*see pp. 42-45*), the landscaped area becomes a sponge that reduces the effects of flooding during rain storms, cleans pollutants, and recharges the local ground water supply.

These landscapes are great for water conservation and water quality improvement, and contribute to the health and resilience of every watershed in the MMWD service area.



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# Envision your Landscape

## What are your Design Priorities?

A healthy landscape is one that offers both lasting beauty and practical functions . . . season after season. The homeowners whose garden we use in our examples in this handbook want to remove the lawn without using chemicals and replace it with a low maintenance and low water landscape that uses local California native plants to reflect the lush hillsides and woodlands of Marin County. They want to start spending more time in their garden with their family and dog, and attract birds, butterflies, and other beneficial insects. They also want to capture all the rainwater from the roof, even though one downspout puts the water right on the driveway, and keep it in their garden.

Think about the elements of your landscape that are most important to you. Jot down a few ideas that will help you determine your next steps.

**Consider how much maintenance you want to take on.** Do you want to use or lose the lawn? Would you like fruit trees or edible shrubs? Are you falling in love with California native and Mediterranean plants?

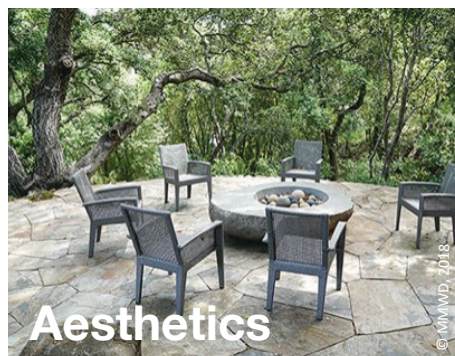
**Consider how you move through the garden.** Do you want a patio near the house, or out in the yard? Would a nice wide entry pathway make your home more welcoming? Does enclosing the front yard make the most of a small space and provide needed privacy?



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### Functionality

Plan your garden with long-term health and maintenance in mind. Look for opportunities to improve the soil with compost and mulch, shape and contour the land to make the most of rainfall, and select climate-appropriate plants that thrive in the local environment. Think about providing resources for local native insects and fauna, and keeping the streams healthy for salmon.



© MWWD, 2018

### Aesthetics

The art of garden-making draws on the principles of scale, color, texture, and placement of plants and features. Landscapes are living, dynamic performances, and the long-term health and viability of the garden requires knowledge of the science behind what we see with our eyes. A well-designed landscape will continue to grow, change, surprise, and delight for decades.



© Julie Parkinson-Morgan, 2018

### User Experience

A well-executed landscape design, whether you do it yourself or have professional help, not only makes your home more enjoyable, it adds to your useable space. Studies have shown that thoughtfully developed outdoor spaces can increase the value of a home by up to twenty percent. And a well-maintained landscape ensures that you retain that value.



# Use this guidebook

## Plan **Before** you dig.

Create a landscape plan for yourself by using the resources and templates contained within this guidebook. If you prefer, you can hire a professional to create a plan or to complete other specific tasks (see p. 60). **Before you dig, call USA NORTH 8-1-1.**

### Don't Be Overwhelmed

If your budget is limited, you can phase your project over time, but plan to tackle it all eventually. Pick one section of your garden that you can completely remodel, or start with small fixes. As you gain confidence, add new garden areas or tackle larger projects. Follow the Project Checklist (see pp. 65-67) to keep on track. For example, don't dig up your irrigation and then select new plants; irrigation design and installation always follow choices you've made in the planting design.

### Clean Up

A clean slate will make it easier to see what's going on and help you envision the renovations to come. Decide which healthy plants will remain in your new landscape, and remove everything else.

### Get A Natural Lawn

Keep your existing lawn, but make it more climate-appropriate using organic techniques and overseeding with clover (see p. 18). Alternatively, you can remove your grass without chemicals by sheet mulching and building healthy living soil for gorgeous new plants (see pp. 38-39).

### Contour For Rain Capture

Make all your choices about moving soil and capturing rainfall before you start planting (see pp. 42-45).

### Water Wisely

Much of your irrigation system is below ground, so some planning is required before installing plants and finishing your garden. If you are installing a surface drip system, put plants in the ground before completing the irrigation. If you are adjusting/updating your existing spray sprinkler system, do any trenching and moving of sprinklers before you plant, and fine tune after (see pp. 46-51).

### Select Your Plants

Use the Plant List for selecting climate-appropriate plants that will thrive in your Marin garden microclimates (see pp. 62-64). Once you've selected your plants, you'll want to group them by their water needs to save water (see pp. 53-55).

### Tend With Love

Water, weed, prune and most importantly, spend some time in the garden observing it. Your new watershed wise landscape should require less care than a lawn. So, give your garden some love, remember to continue monitoring your water use, and avoid using fertilizers and sprays (see pp. 58-59)!

## Garden like a pro.

Use these steps for success from gardening professionals in order to Design It Yourself.

### Lay Out Your Garden

Start with a landscape plan, then gather your plants and lay them out before you start digging. It's easier on you, and the plants, if you tweak the layout before anything is put in the ground (see pp. 54-55).

### Grow Living Soil

Add compost and mulch and eliminate compaction for a healthy and resilient garden (see pp. 36-41).

### Plant In The Cooler Season

Marin County climate-adapted plants, especially the natives, are much happier if you plant them in the cooler fall months. This gets them settled and watered by the rains, allowing them to establish strong roots before the summer heat convinces them to take a summer siesta. Pay attention to how and when you plant to get your garden off to a great start! (see p.57).

### Get Started!

Use the sample Design Inspirations, Marin Landscape Elements, and Plant Lists to select the plants for your garden and figure out how many you'll need. Bring your Shopping List to your local nursery or native plant society sales and ask them to order what they don't have in stock. Start a Garden Journal to keep track of what you are planting, where and when. Your investment will pay off (and your plants will thrive) if you follow the guidelines explored in this book.

Wherever we have provided plant selections, we identify them by their water requirements by placing their identification numbers on a colored background. You can use this color coding to help you group plants by their water requirements in your new landscape, making it easier to irrigate them properly.



**Blue** for **MODERATE** water use,



**Yellow** for **LOW** water use, and



**Red** for **VERY LOW** water use.



The **Butterfly** icon indicates plants that support the life cycle of pollinators, butterflies and other insects.

## Need help getting the job done?

Professionals are standing by, eager to help you. Landscape designers, landscape architects, landscape contractors and irrigation specialists can help redesign your garden, coach you through the process, or actually contract the installation. If you work with a gardener, make sure they understand what you're doing and why. Hire a certified landscaper familiar with watershed wise, regenerative landscapes (see p 60).

© Connie Lewin, 2018

# Wooded and Wildland-urban interface

## Plants That Thrive In Dry Shade



- 1 *Berberis aquifolium* var. *repens*  
*Creeping Oregon Grape*
- 2 *Polystichum munitum*  
*Western Sword Fern*
- 3 *Salvia spathacea*  
*Hummingbird Sage*
- 4 *Iris douglasiana*  
*Douglas Iris*
- 5 *Symphoricarpos mollis*  
*Creeping Snowberry*

© Calscape, 2010

**Wooded and Wildland-urban Interface Style** gardens should comprise the majority of the landscapes in Marin County, since so many people are living adjacent to natural lands and wooded hillsides.

Woodland Style gardens are dominated by large, stately trees which provide valuable shade, privacy and beauty. Trees are underplanted with lush, evergreen, shade-tolerant flower borders, formally clipped or natural hedges, and with Natural Lawns and groundcovers. Trees and plants should be selected from Marin's temperate woodland plant communities, primarily Oak Woodland, Mixed Evergreen Forest, and Inland Chaparral.



© MMWD, 2018

## Plants For The Wooded Edges



1

1 *Ribes sanguineum*  
var. *glutinosum*  
*Pink Flowering Currant*



2

2 *Festuca californica*  
*California Fescue*



3

3 *Morella californica*  
*California Wax Myrtle*

These plants help blend the interface between the garden setting and natural landscape; they will thrive in partially or fully shaded areas, under most trees and along North- or East-facing walls. Select plants from Mixed Evergreen Forest and Oak Woodland plant communities.



The wildland-urban interface is not a particular place, but rather a set of special conditions that can exist almost anywhere. Some of these key conditions include the amount, type, and distribution of vegetation, flammability of structures in proximity to fire-prone vegetation, general climate conditions, hydrology, and topography. The interface also describes the increased fragmentation of natural habitat as urban landscapes intrude into the local plant communities.

## Reliable Shade Brighteners



1

1 *Carpenteria californica*  
*Bush Anemone*



2

2 *Daphne odora variegata*  
*Variegated Winter Daphne*



3

3 *Helleborus foetidus*  
*Bear's Foot Hellebore*

Consider adding some plants for height and color that will brighten up otherwise gloomy corners of the garden. With their glossy green leaves, and seasonal flowers, these plants look good combined with bright green ferns, even in full shade under dense tree canopy.

## Tips For Wooded and Wildland-urban Interface Style Gardens

1. **Leave the Leaves** on the ground, under the trees from which they fell. Trees make their own mulch, which is the best possible organic matter for the soil and plants living beneath the trees.

2. **Add Living Mulch** if your trees are not producing enough, or if there is open garden area. Be sure to keep mulch a few inches away from the trunks and stems of plants to avoid rot and drawing insects into the succulent wood (see p. 40).

3. **Keep Your Communities** in mind when you are selecting plants; these are natural hydrozones and ensure a blending of the garden setting into the natural surroundings (see pp. 26-27).

4. **Shade-Loving Drought Adapted Plants** are acclimated to the conditions beneath tree cover, so do not over water them just because they appear lush and green (see p. 50).

5. **Consider Oaks Before Planting** underneath them. Use low water plants only or eliminate planting directly under the native oak trees. These trees require winter rains to sustain them during the summer months, and their life expectancy can be compromised by irrigating around them any time but in a dry winter.

6. **Avoid Fire-prone Plants** such as rosemary, juniper and tall grasses at the interface of wildlands to reduce the chances of adding fuel to a wildland fire (see p. 23).

7. **Permeable Patio Areas** encourage going outside for gathering and relaxation. The cool environment of a wooded and wildland area will be welcome on warm summer evenings (see p. 28).

8. **Create A Fairy Garden** for under trees. Use various native ferns and Riparian or Mixed Evergreen Forest plants with small flowers and finely articulated leaves; include a few unique lichen-covered boulders or hollowed tree limbs that will shelter insects, small mammals, amphibians and the occasional garden sprite.

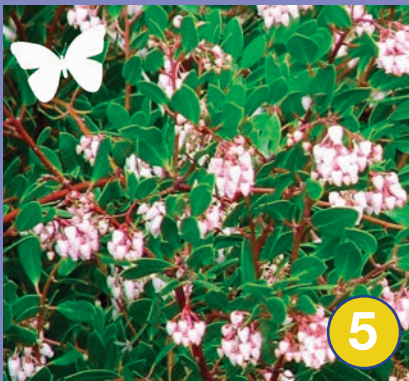
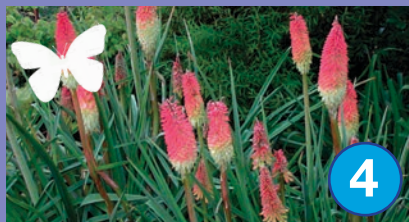
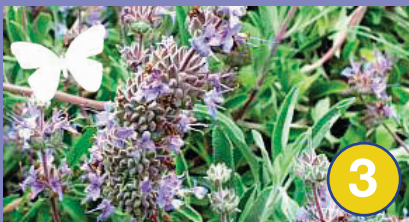
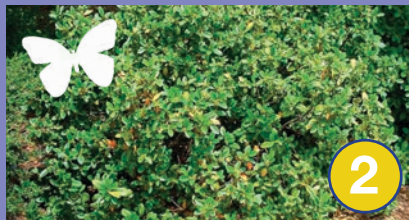




# Low and Easy Maintenance

© GardenSofia 2018

## Natural Form Winners



1 *Monardella villosa*  
Coyote Mint

2 *Frangula californica*  
Coffeeberry

3 *Salvia 'Bee's Bliss'*  
*Bee's Bliss Sage*

4 *Kniphofia* spp.  
Red Hot Poker

5 *Arctostaphylos densiflorus*  
'Howard McMinn'  
Howard McMinn Manzanita

**Low and Easy Style** landscapes are beautiful and functional, so active homeowners can concentrate on making weekend memories and don't have to worry about their garden when they are away from home. Instead of mixing lots of different plants in your palette, consider paring down the list to a few, easy-care plant groups surrounded by organic mulch or large swaths of groundcover.

Long-flowering plants, bold evergreen shrubs, and large trees pull the look together for a stress-free environment. Selecting plants for their natural forms, and choosing evergreen and variegated plants as the garden backbone helps to make maintenance an annual or semi-annual event rather than a weekly repetitive chore. Add in naturally long flowering perennial shrubs in large groupings for a more vibrant look.



© Chantelle Torgovitsky 2018

## Evergreen Options



1 *Berberis 'Skylark'*  
*Skylark Oregon Grape*



2 *Rhus ovata*  
*Sugar Bush*



3 *Pittosporum tobira*  
*'Wheeler's Dwarf'*  
*Wheeler's Dwarf Mock Orange*

Select evergreen shrubs (shrubs that don't lose their leaves) to provide year-round interest and create a neutral backdrop for flowering perennials. Be sure to correctly space these plants for fire safety, especially on hillsides (see p. 23).



Reduce your ongoing maintenance and keep your garden "under control" by leaving enough space between plants and selecting plants for their foliage color, leaf shape, or natural form. Planting smaller plants and giving them room to grow makes for healthier roots, so you don't need to add fertilizers and other inputs. Do not prune these plants into boxes or balls; poor pruning encourages weak growth and short life. Fill the space between plants with small composted woodchip mulch, and you are good to go!

## Long Flowering Plants



1 *Grevillea rosemarinifolia*  
*Rosemary Grevillea*



2 *Gaura lindheimeri*  
*Butterfly Flower*



3 *Agastache* spp.  
*Hummingbird Mint*

Choose long flowering plants and shrubs to reduce deadheading duty and keep the garden looking tidy with just one or two big clean ups a year.

## Tips For Low and Easy Maintenance Style Gardens

1. **Mulch** builds healthy living soil, which is the key to improving soil moisture retention and boosting the immune system of plants so they can make it through a long, dry period without additional attention (see p. 40).

2. **Plants With Natural Forms** do not require staking or clipping to maintain their shape. Maintenance is reduced because you don't have to spend time shaping them.

3. **Native Drought Adapted Plants** are acclimated to various Mediterranean climates and do not require special attention or maintenance (see p. 52).

4. **Big Beds and Drifts** of the same kind of plant are easier to maintain than a jumble of many different kinds of plants in small spaces. Remember to plant in odd numbered multiples for a more natural effect (see p. 55).

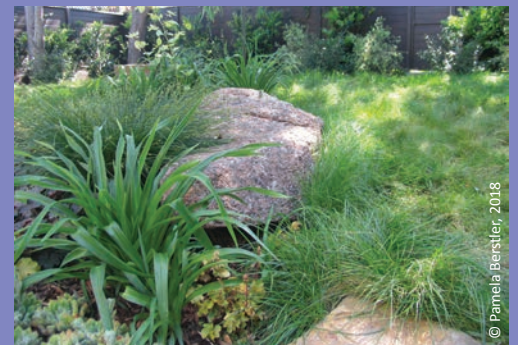
5. **Natural Meadow and Lawn** is significantly easier to maintain than a conventional turf lawn because it requires less water and no additional inputs if maintained organically. Natural Lawn is cut less frequently, and the grass clippings are best left on the lawn itself as organic matter to build the soil (see p. 18).

6. **Low Growing Groundcovers** fill gaps and keep weeds in check, thus reducing maintenance. Groundcovers also shade the surface of the soil, helping keep the moisture in.

7. **Wide Permeable Paths** rather than narrow winding walkways are easier for bringing wheelbarrows and trash bins for those infrequent maintenance days.

8. **Avoid Rambling Climbers** that grow fast and large and require constant attention to keep in bounds.

9. **Weather-Based Irrigation Control** is essential for managing irrigation efficiently even when you're only using the garden a few days a week (see p. 51).





# Family Fun Spot

© Garden Soft, 2018

## Tough and Beautiful Mediterraneans



1



2



3



4



5

- 1 *Lavandula* ssp.  
*Lavender (various)*
- 2 *Westringia fruticosa* 'Morning Light'  
*Coast Rosemary*
- 3 *Teucrium chamaedrys*  
*Wall Germander*
- 4 *Cistus x purpureus*  
*Purple Rockrose*
- 5 *Prunus ilicifolia* ssp. *lyonii*  
*Catalina Cherry*

© Peter A. Mansfield, 2018

**Family Fun Style** landscapes have family areas with living boundaries created by groups of plants or low evergreen hedges. Kids get safe special places where they can go for some creative playtime.

A small natural lawn or walkable groundcover area could create an open space that uses less water than a traditional cool season lawn (see p. 18). Generous tree canopies are preserved to provide shade and places to rest within the garden. Raised beds provide an opportunity to grow seasonal veggies.

Patios should be permeable wherever possible, to allow direct rainwater infiltration, or contoured to capture all runoff in adjacent swales (see p. 29). Add to the adventure with a dry creek bed or wide pathways for trikes and bikes.



© Laura Morton, 2018

## Edible Perennial Herbs



1

1 *Aloysia citrodora*  
Lemon Verbena



2

2 *Origanum vulgare*  
Oregano



3

3 *Allium schoenoprasum*  
Chives

Edibles and perennial herbs can be planted right in the garden to provide garnishes and additions to meals throughout the year, connecting everyone with the outdoors, even in the rainy season.



Secret areas and hideouts where kids or adults can gather and get away are essential for keeping people active in the garden. Consider growing a willow arbor, or installing a play fort; create a pole ti-pi planted with beans, sunflowers and squashes to create a summer shelter. Enclosing a hiding place, even if it is just with a low-growing hedge, is a good way to keep kids contained within the garden.

## Edible Fruit Trees



1

1 Citrus 'Improved Meyer Lemon'  
Improved Meyer Lemon



2

2 *Acca sellowiana*  
Pineapple Guava



3

3 *Prunus salicina*  
'Santa Rosa'  
Santa Rosa Plum

Many beautiful fruit trees thrive in Marin County, creating bountiful orchards and singular patio trees. Think about fruit-drop when you place your fruit trees in the landscape, so they do not create stained or slippery hardscape.

## Tips For Family Fun Style Gardens

1. **Explore the Senses** with plants that have great color contrast, strong fragrance or are soft to the touch.
2. **Raised Beds, Accessible From All Sides** make it easy to get around the entire planter without bending over. Raising a bed to 48" (waist height) allows for standing gardening, and 18" - 24" (knee height) allows you to sit on the edge of the bed.
3. **Wide Paths, No Steps** allow everyone to enjoy the garden without worrying about tripping and falling.
4. **Kids' Safe Play Area** should be visible from the cooking/dining area so adults are able to watch over kids without having to wander throughout the garden.
5. **Consider A Cutting Garden** with long-flowering plants that have long stems suitable for arrangements in vases. Bring the garden inside to appreciate your investment all day long.
6. **Trees or Shade Coverings** should be used throughout the garden to protect the family from weather extremes and to provide a sense of enclosure or protection. Consider a covered dining area or outdoor kitchen.
7. **Vertical Growing Surfaces** such as trellises or arches make gathering of fruit and flowers accessible to everyone; just make sure these are not placed against structures where they may become fire hazards (see p. 23).
8. **Birdbaths and Feeders** can be placed as focal points from seating areas or just outside windows. Providing a little extra to wildlife engages you in the garden throughout the seasons.
9. **Garden Resting Spots** provide vantage points for enjoying the garden while watching kids, and talking to neighbors. Spend some time looking for unusual chairs and benches to decorate the garden!

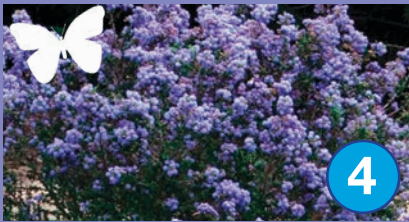


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# Habitat Corridor garden

## Five Habitat Heroes



- 1 *Verbena bonariensis*  
Purpletop Vervain
- 2 *Eriogonum fasciculatum*  
California Buckwheat
- 3 *Diplacus aurantiacus*  
Sticky Monkeyflower
- 4 *Ceanothus 'Julia Phelps'*  
Small Leaf Mountain Lilac
- 5 *Symphotrichum chilense*  
California Aster

© Charlotte Torgovitsky, 2018

**Habitat Corridor Style** landscapes demonstrate a new paradigm in gardening that views the landscape as a living ecosystem and recognizes the intricate relationships between native plants and the host of native creatures that evolved in associations with those plants. Habitat gardens are designed to provide food, cover, water, and nesting opportunities for wildlife; enhanced conditions that bring fascinating creatures closer to home.

These landscapes help to re-establish corridors between open spaces for wildlife, many already in decline and stressed by human encroachment into wilder lands. Habitat Corridor gardens are an oasis for creatures in areas otherwise dominated by 'green deserts.'



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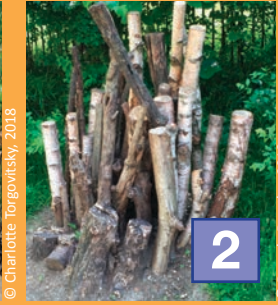


## Homes For Garden Visitors



1

1 Weeping Stone



2

2 Wood or Stone Pile



3

3 Bird Nesting Box

To attract more garden-helpers, native bees, small reptiles, and amphibians, create habitat niches just for them. Consider hanging nesting boxes for songbirds, using dry-stacked stone instead of mortared walls, and leaving a small rock pile. Put a log or large tree branch in the garden and let it decompose naturally.



These habitat gardens embrace biological diversity, ecological design, and environmentally friendly gardening methods that eliminate the need for additional inputs like fertilizers, herbicides, or pesticides. A good planting formula for habitat gardens is 1/3 California natives, 1/3 old fashioned ornamentals rich with nectar and pollen, and 1/3 edible plants (berries, fruits, and herbs).

## Plants For Riparian Habitats and Amphibians



1

1 *Cornus sericea*  
Creek Dogwood



2

2 *Deschampsia cespitosa*  
Tufted Hairgrass



3

3 *Mimulus cardinalis*  
Scarlet Monkeyflower

Riparian “creeks and wetlands” habitat is an essential wildlife corridor between habitat patches and otherwise fragmented landscapes. Boggy patches and low spots are best populated by riparian plants that will tolerate soggy conditions and rainy season inundation.

## Tips For Habitat Corridor Style Gardens

1. **Celebrate Sense of Place** by recognizing the native plant community that was present before urban development and preserving the native plant species already on site (*see pp. 26-27*).

2. **Promote Diversity** in the forms of plants (trees, shrubs, vines, perennials, grasses, and annuals) to create vertical layers which provide food, cover and nesting sites.

3. **Avoid Pesticides** and plant for the insects first with a diversity of plants in large drifts that bloom at different seasons.

4. **Leave the Leaves** in place and recycle any organic material on site with compost piles; these provide foraging opportunities for insects and larvae for birds and other small critters. Keep a little section unkempt (away from any structures or trees) and let flowers and grasses go to seed. Be sure to abide by fire safety rules.

5. **Try A Weeping Rock** of rough stone or other simple water source with tiny pools at varying depths. Include a “beach” or partially submerged log to encourage safe and easy access for birds and insects.

6. **Include A “Heat Sink”** and basking opportunity by placing stones and boulders as accents or including a gravel pathway that can heat up areas of the garden. Paired with heat-loving plants, these areas become microclimates that hold humidity and create much-needed cover.

7. **Include Dry-stack Walls** with recycled concrete or stone wherever possible to create nooks and crannies for hiding or over-wintering places for small creatures and insects in their various life stages.

8. **National Wildlife Federation** provides yard signs to people who meet the standards for Habitat Gardens. Get a sign to tell neighbors about the abundance in your landscape. [www.nwf.org](http://www.nwf.org)





© Marilee Kuhlmann, 2018

More  
**Trees**, please!

## Trees are **Priceless**.

While planting trees means improved water quality, resulting in less runoff and erosion, it's also good for the pocketbook. Because trees provide shade and actively cool the air beneath their canopy through evaporative cooling, properly placing trees around buildings can reduce air conditioning needs by 30%! Trees are living solar powered air conditioners. Healthy, mature trees can be individually worth tens of thousands of dollars each. Protect your investment by hiring licensed arborists to keep your trees healthy and beautiful with annual assessments and pruning only when necessary (see p. 60).

**Choose the Right Tree** for your space and your needs. Trees are both slow-growing and long lived, so planting a tree is a big investment in both time and money. Consider the mature size of the tree when you plant it. At the nursery it's short and cute, like a puppy, but a small tree can quickly grow into a 30 foot tall

tree with a 30 foot wide canopy of branches, or bigger. If you've selected a large tree species, it can top 70 feet tall and wide at maturity. Select a tree that will best fill the space you have, not one that will need annual pruning to keep it small.

Consider litter and allergen issues - some people are particularly allergic to specific tree species, and some fruit and nuts (olives, persimmons, black walnut, etc.) will stain patios and can make sidewalks slippery. And consider evergreen vs. deciduous species for different spaces. Hot summer patios are perfect places to add leafy deciduous shade trees. Deciduous trees will lose their leaves in winter, making them an even greater choice on cloudy, shorter winter days when the lighter tree canopy will allow more sunlight through. Evergreen trees and shrubs are better for privacy screening and year-round tidiness. When making your tree choices, also consider fruit, flowers and seasonal color.

### Majestic Landscape Trees



1 *Acer macrophyllum*  
Big Leaf Maple



2 *Quercus agrifolia*  
Coast Live Oak



3 *Cornus kousa*  
Korean Dogwood

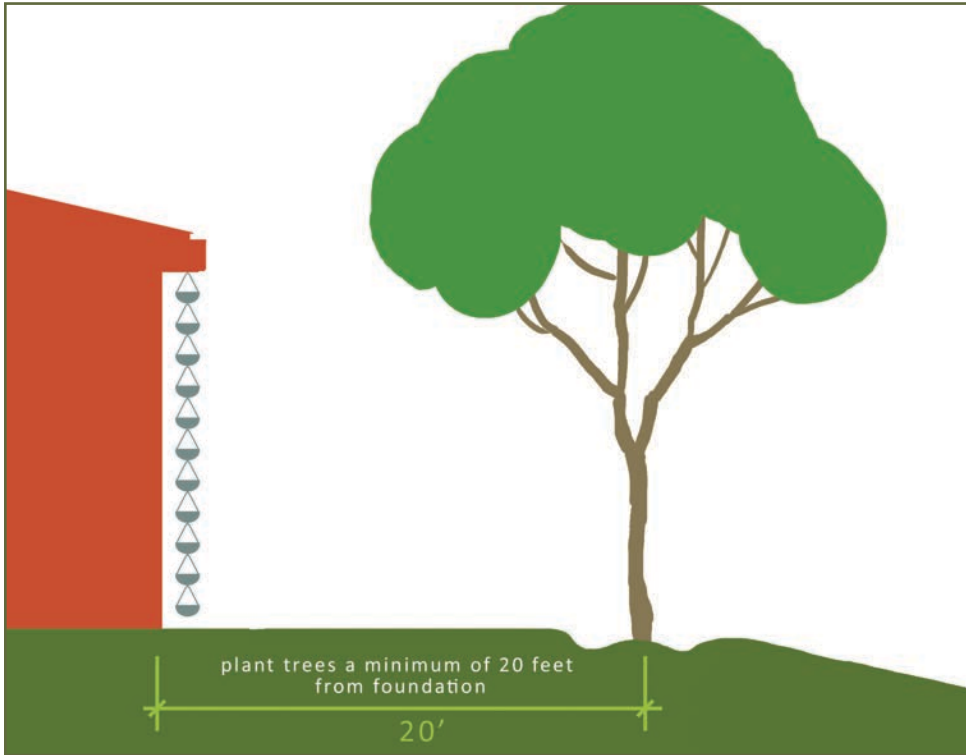


4 *Arbutus 'Marina'*  
Marina Strawberry Tree



5 *Lyonothamnus floribundus*  
Fernleafed Ironwood

# Keep trees **Happy**



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## Right Tree, Right Place

Place your trees carefully. Make sure the placement of the tree is sufficiently far away from the house. Small trees (30' wide or less) should be no closer than 20 feet. And large trees (70' wide or more) should be planted no closer than 40 feet from the house. Also consider nearby trees, other structures (like power and phone lines), views and where shade will fall at different times of the day, in different seasons.

On the ground, pay attention to water, sewer, septic and other utilities, as well as patios, sidewalks and driveways. If you will be planting near any of these, choose trees with low root-damage potential. If you are in a windy area, near the top of a bluff or hillside for example, select trees with strong branches and small leaves, so wind will easily pass through their canopy and gusts won't topple trees or shear branches off.

Small trees are like living umbrellas, adding dappled shade, habitat and color to smaller planting areas without taking over. Be mindful of water requirements; avoid planting water-fond California redwoods (*Sequoia sempervirens*) in dry oak woodlands. And, pay special attention to those oak trees. Native oak trees provide up to 50% of the year-round food needs for black-tailed deer. Please leave native oak trees accessible to deer whenever possible (see p. 25).

## Perfect Patio Trees



1

1 *Styrax japonicus*  
Japanese Snowbell



2

2 *Cercis canadensis*  
'Forest Pansy'  
Forest Pansy Redbud



3

3 X *Chitalpa tashkentensis*  
Chitalpa



## Protect Roots, Save Trees

Trees depend on their roots for survival. Roots anchor tree trunks and canopies against strong winds and earth movement. They absorb water and nutrients, and connect trees to the soil and plant communities that surround them. Landscape and construction projects can easily damage tree roots, killing trees, unless the roots are respected and protected.

**1. Avoid Heavy Construction Equipment** near trunks or under tree canopies. Equipment can break branches, compact the soil and damage tree roots.

**2. Avoid Poisons** like paints, solvents, cleaners, herbicides and other chemicals that can contaminate soil and kill roots, too.

**3. Minimize Root Shock** when removing existing plant material, especially grass, by keeping the trees well-watered. Many trees will go into shock when water is reduced, so water them regularly during construction and landscape renovation, especially for the first year after turf or other high-water plant material is removed, even if you remove surrounding irrigation.

**4. Slow and Deep Watering** under the tree canopy is best. Try using tree bags, soaker hoses, or in-line drip irrigation.

**5. Plan Ahead For Water Management** and put trees on their own irrigation hydrozone in renovated landscapes (see p. 53).



# Groundcovers and lawn alternatives

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## Consider a **Natural Lawn.**

Grass lawns that are maintained organically and efficiently can offer a cool surface for both active recreation or just hanging out, but most lawns are maintained inefficiently. It's time to rethink using lawn as all-purpose wall-to-wall groundcover carpet.

Your lawn can be turned into a water conserving **Natural Lawn** that needs up to 50% less water than contemporary fescue lawns. An eight minute shower every two weeks can be enough water to keep it lush, depending on the irrigation system and the specific landscape conditions. To make your lawn more natural, aerate and cast clover seed mixed with worm castings uniformly over the existing lawn area and water thoroughly. No fertilizers or herbicides are needed, as it will grow less vigorously if they are applied. Less frequent mowing every few weeks keeps the lawn at 3" - 4" height. Weeding is almost completely unnecessary; we're encouraging little flowers like English Daisies (*Bellis perennis*), Dutch Clover (*Trifolium repens*) and, in low damp spots, Plantain (*Plantago major*).

**Walkable Groundcovers** are a good alternative to lawn and can be introduced on the edges of lawn to transition to garden areas. If you don't need to walk on it, then groundcovers can be as high as 36" tall and still look like unified green open space.

### Maintain Your Natural Lawn

Apply ¼" deep layer of good compost or worm castings every fall (September through November). If the compost smells of manure do not use it! It will kill the lawn. Use only well-composted materials or worm castings. There should be no noticeable foul odor and good compost has a pleasant, earthy smell.

Keeping grasses longer (4" - 5") provides habitat for small butterflies whose larvae feeds on them. Resist cutting the lawn on a fixed schedule. Allowing the clover and other tiny flowers to grow, ripen and set seed will perpetuate the lawn without any additional over-seeding in the spring or fall. This is the way nature keeps the lawn evergreen and maintenance costs down – the lawn does all the work. If you are mowing frequently, an application of new seed may be required every spring or fall to keep the appearance more uniform.

Ask your lawn care professional about their equipment and insist on a mulching mower, or purchase one to store and use exclusively on your property, keeping other's chemicals, weeds and pests away from your fabulous smart, healthy, and beautiful Natural Lawn.

## Great Groundcovers



1 *Geranium sanguineum*  
*Bloody Cranesbill*



2 *Phyla nodiflora*  
*Common Lippia*



3 *Arctostaphylos uva ursi*  
*'Green Supreme'*  
*Creeping Manzanita*



© Garden Soft, 2018

## Walkable Groundcovers



1 *Thymus serpyllum*  
*Creeping Thyme*



2 *Cerastium tomentosum*  
*Snow In Summer*



3 *Veronica liwanensis*  
*Turkish Speedwell*

© Charlene Burgi, 2018



© Garden Soft, 2018

## Step Up Your Groundcover Game

1. **California Native Grasses** can be naturally drought-adapted and provide habitat (food and shelter) for important insect and bird species.

2. **Mow Less Frequently** or not at all to keep the grass from growing too quickly and using more water. Some ornamental grasses don't need to be mowed, and others like to be kept long so the old growth shades the new.

3. **Please Don't Pick The Daisies** nor apply any herbicide to them. English Daisies, Clover, Plantain, and even Dandelion reduce compaction, provide evergreen groundcover and have flowers that feed insects and birds. Whack them back only if they get too feisty.

## Plants For Tough Spots:



*Festuca glauca*  
*Common Blue Fescue*

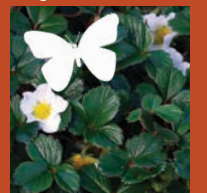


*Carex pansa*  
*California Meadow Sedge*

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*Agrostis pallens*  
*Bent Grass*

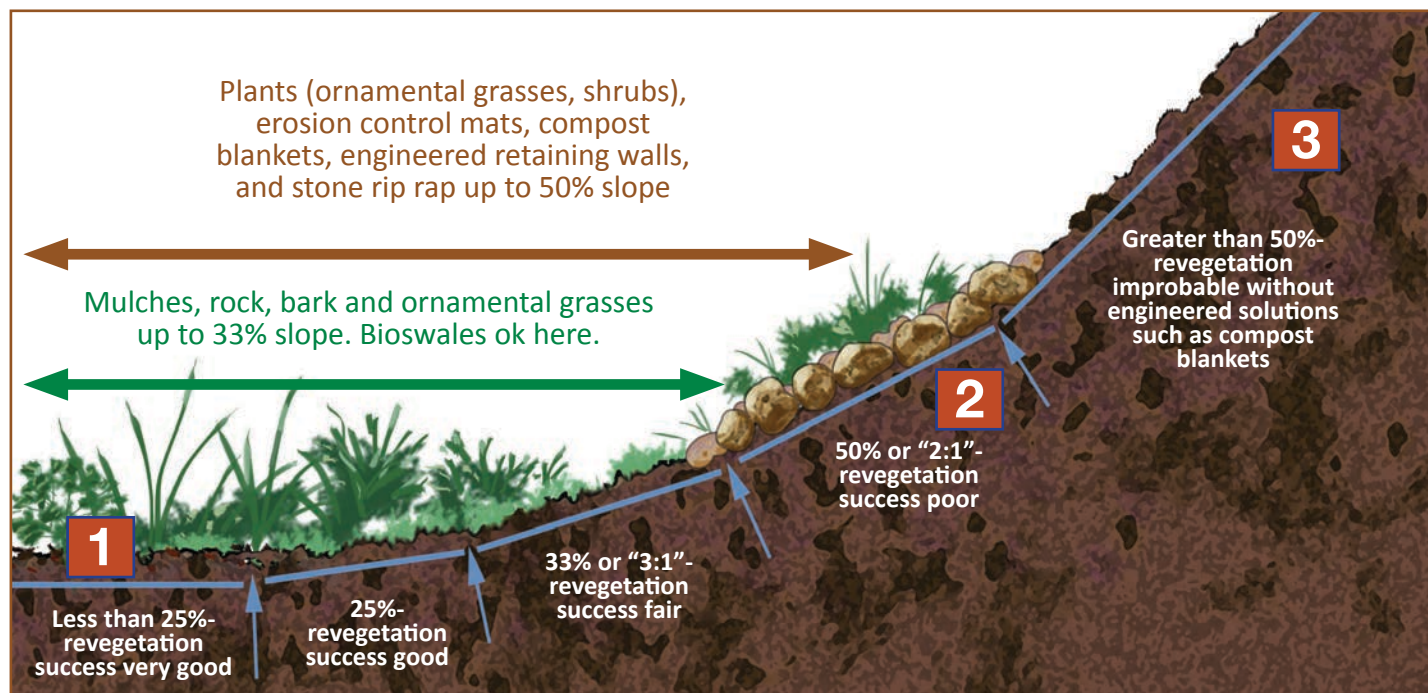


*Fragaria chiloensis*  
*Beach Strawberry*



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# Slopes and Hillside are special



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## Hardy Hillside Holders



- 1 *Salvia sonomensis*  
*Creeping Sage*
- 2 *Ceanothus 'Yankee Point'*  
*California Lilac*
- 3 *Cistus salviifolius*  
*'Prostratus'*  
*Sageleaf Rockrose*
- 4 *Artemisia californica*  
*'Montara'*  
*Montara Sagebrush*
- 5 *Epilobium canum 'Catalina'*  
*Catalina Fuchsia*

## Plan for Stabilization.

Working on a slope or hillside should be a collaborative process in which you should seek the advice of a licensed civil engineer, landscape architect, or other professional before grading and capturing rainwater on existing hillsides. Get to know your soil type (see p. 33) and slope percentage (see p.21) before moving forward with any disturbance.

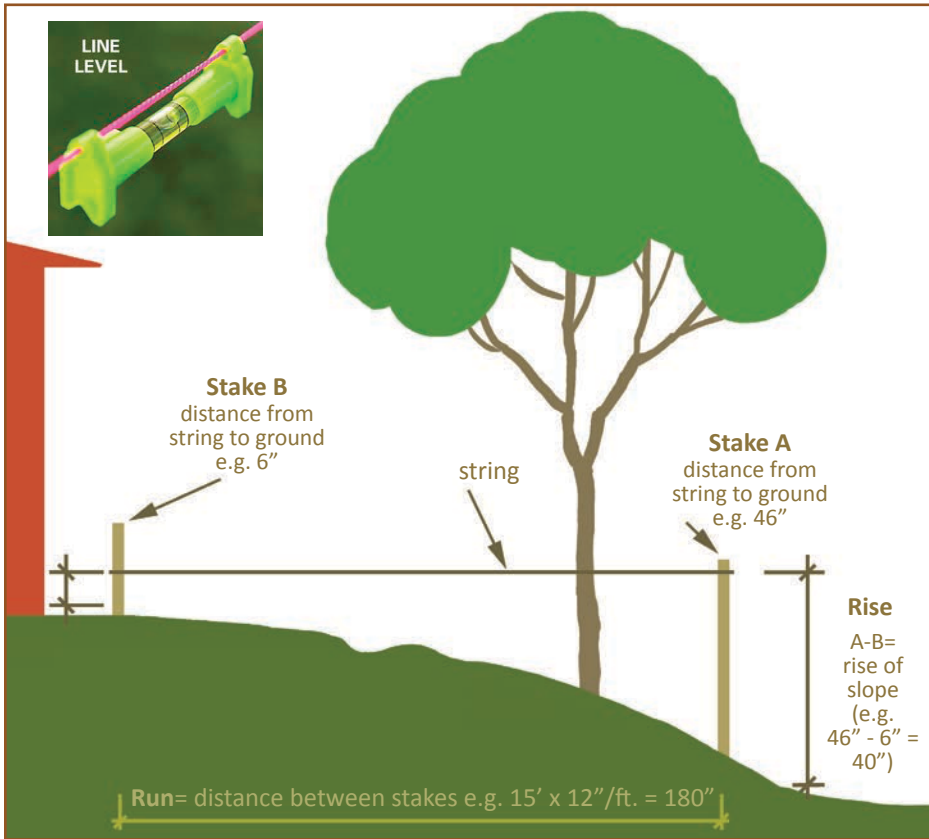
Whenever possible, do not disturb canyon hillsides. Select low water use plants, trees, deep-rooted native plant species, and climate-appropriate plants with strong root structures for disturbed or built slopes and hillsides, as these root systems can help hold soil together.

If your slope is gentle, 3:1 or less (33% grade) coarse compost and mulch can be applied directly to hillside and slope surfaces, providing surface protection from the force of falling rain and shading exposed soils. With occasional irrigation, mulch will "knit" together.

Compost blankets are a kind of erosion control mat applied to the soil surface to protect and preserve it, and can be used either alone or with other organic engineered material with biodegradable grids for stabilization that will degrade into soil within a year or two. Compost mats allow water to penetrate through to underlying soils while retaining loose soil and debris and preventing erosion. You can plant right through them or use pre-seeded products. Compost blankets can be found at specialized landscape products distributors.

Consider working with an irrigation design professional to design and install your irrigation system. Runoff, erosion and efficient deep watering are important issues to keep in mind always, but especially on hillsides. Contouring across the slope can help slow, spread and sink rainwater into the planted areas and goes a long way toward reducing or eliminating any potential runoff from irrigation during dry months (see p.42).

# Terrace with Caution



Rise of Slope = Stake A - Stake B = 46" - 6" = 40"

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Run of Slope = 180"

Slope Percentage is Rise Divided by Run Multiplied by 100 or  $40" \div 180" \times 100 = 22\%$



## Tips For Eliminating Erosion

1. **Calculate Your Slope** for terracing using stakes, string and a measuring tape.

- **Place** two stakes in the ground - one at the top of the slope and one at the bottom.
- **Take** a 5' to 20' long string and wrap it around both stakes, pulling it taut.
- **Attach** a line level to the middle of the string and allow it to hang down beneath the string.
- **Determine** the Rise of the Slope by measuring the distance between the ground and the string on **Stake A** on the lower part of the slope, and doing the same on **Stake B** on the upper part of the slope.
- **Subtract** the Stake B distance from Stake A distance. This is the Rise of the slope.
- **Determine** the Run of the Slope by measuring the length of the string between the stakes.
- **Divide** the Rise by the Run and multiply by 100 to determine the percent of slope.

2. **Think About Irrigation** before doing any hillside work. Low-volume rotating spray heads are ideal for sloped areas, if the space is large and the groundcover is uniform. Drip tubing also can be effective, especially for wider-spaced shrubs and trees. Pressure compensating emitters should be used for all irrigation (see p. 48).

3. **Apply Water In Short Durations** so that it can be fully absorbed into the soil between application times. This is called Cycling and Soaking (see p. 51).

4. **Separate Irrigation Valves For Top and Bottom** of the slope, and place irrigation emitters above the plant basins. Check Valves should be placed on the lower emitters of all spray systems to avoid low point runoff.

5. **Capture On Contour** using very shallow mulch-filled or planted basins to slow, spread and sink rainwater and any irrigation runoff to nourish the hillside root systems (see p. 42).

6. **Pathways for Maintenance** make it easier to walk around on the hillside after plants are established. Try to create at least 18" wide footpaths or stepping stones that can be incorporated into rainwater capture.

7. **Natural Form Plants**, correctly spaced when planted, keep maintenance to a minimum.

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# Keep Cool in a Fire Zone

## Five Fire Fighters



1 *Bergenia cordifolia*  
*Elephant Ears*

2 *Erigeron glaucus*  
*Seaside Daisy*

3 *Escallonia* spp.  
*Escallonia*

4 *Hesperaloe parvifolia*  
*Red Yucca*

5 *Sedum*  
*nussbaumerianum*  
*Orange Stonecrop*

## Plants can Resist Ignition.

Plants with a high water, high salt, or low volatile oil or sap content in their leaves, like succulents, are less likely to produce airborne burning embers if ignited. Agaves, aloes, crassulas and other succulents store extra water in their fleshy leaves.

Messy, oily trees and shrubs, like eucalyptus, and junipers, do the opposite – igniting quickly, burning hot and long, and releasing copious embers into the air, which may further spread the fire.

Preventative maintenance includes regularly removing dry grass, thatch, brush, weeds, litter, waste, and dead or dying vegetation. Trees should be properly pruned and limbed up 10 ft. Shrubs and perennials should be kept thinned and cleared of dead and dying branches and leaves. Unwanted vegetation must be regularly mown, cut or grazed, while root structures must be left intact to avoid erosion. Dead leaves and branches are particularly flammable, especially on evergreen shrubs or vines like bougainvillea, and these must not be planted close to structures. Plants should be kept spaced apart to avoid continued ignition.

Wildfire can be reduced by the placement and spacing of trees and shrubs. The larger the vegetation, the greater the spread should be between individual plants (see p. 23). Slope makes a difference too; if your property is relatively flat, the spacing between plants can be closer than if your property is situated on a slope, where the distance between trees and shrubs needs to be greater (see p. 21).

Many of the Marin County's native plant communities, like chaparral, can survive and recover from infrequent fire. Some plants use fire to signal available space to grow or need heat to start the germination process, such as Bishop pines (*Pinus muricata*). When fires are too frequent, even the most well adapted plants' ability to survive is disrupted. Invasive species have made fires more frequent, with longer duration and hotter intensity, so it is even more important to avoid invasive plants in fire-prone zones (see p. 56).



# Fire is a **Real** and constant **Threat**



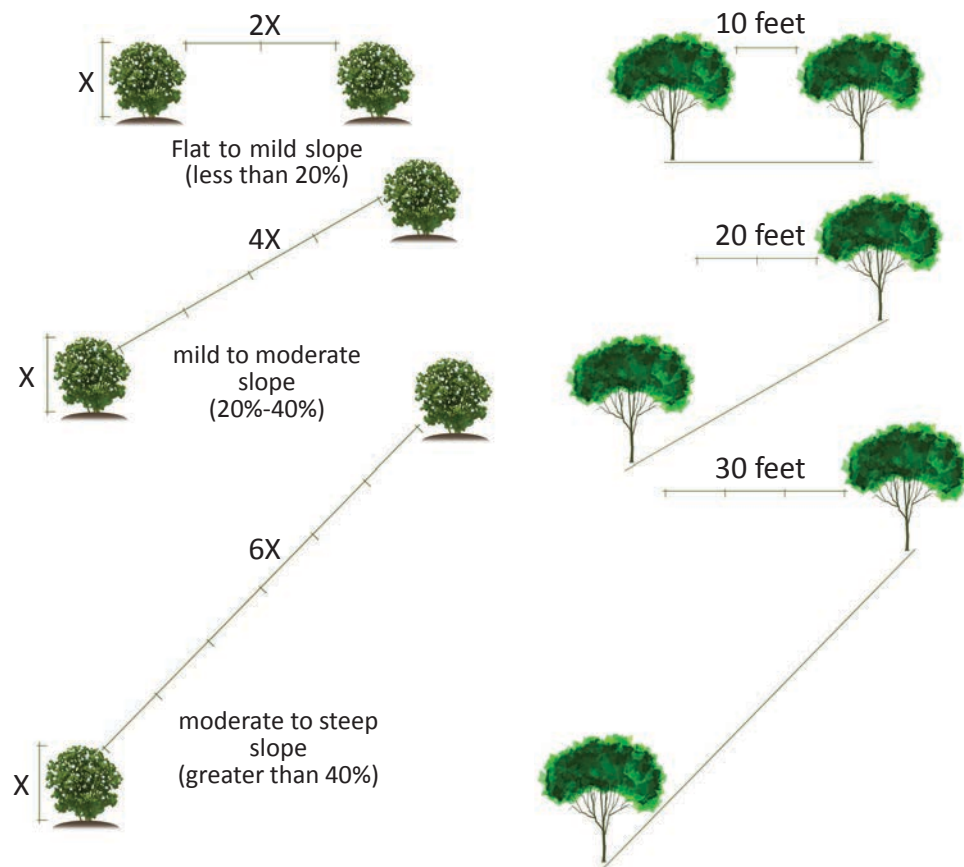
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**Your Plan Can Save Lives.** This is especially true in wildland-urban interface areas commonly found in Marin. Plant selection, design and consistent maintenance all must be in accordance with fire safety guidelines.

Landscapes should resist ignition and provide 35 ft. of actively maintained defensible space around structures and access zones (**Zone 1**), maximizing fire prevention and also allowing for access by fire crews, if necessary. Cut or remove grasses and weeds to less than 3 ft. in height, remove dead and dying vegetation, and maintain proper vertical and horizontal spacing on large shrubs and trees.

Beyond Zone 1, the landscape should reduce the chance of potential airborne embers through careful thinning of native vegetation for another 65 ft., or greater if located on an uphill slope (**Zone 2**).

## Spacing Landscaping Plants for Fire Resistance



## Six Fire-Safe Practices From FireSafeMarin.org

**Fire Safe Zones** should be created with stone, masonry walls, and gravel and other permeable pathways and patios. Think about placement of fire-resistant hedges or screens to catch embers. Retaining walls on terraced areas disrupt airflow, creating wind “eddies” that may keep embers away from structures.

**1. Keep Wood Mulch Away From Structures** and replace with gravel, broken concrete, or other permeable, non-flammable surface, that doesn’t jeopardize wood siding or foundation sills.

**2. Keep Roofs and Gutters Debris Free** and keep vegetation away from vents or eaves or from under or near decks and siding.

**3. Choose “Living” Wood Mulch** that is either well composted or has a good mix of green leaf and small brown woodchip material. Avoid large wood chips, pine needles, rubber, and shredded “gorilla hair” type mulches, which smoulder and produce huge flames (*see pp. 40-41*).

**4. Create Vertical Spacing** between shrubs and the lowest branches of trees, limbing up trees at least 10’ from the ground or 3x the height of the nearest shrubs.

**5. Avoid Invasive Plants**, especially grasses and groundcovers, which contribute to fire risk by spreading the fire from woody plant to woody plant. **Remove these plants from your garden** (*see p. 56*)!

### Remove The Fire Prone Four:



*Pennisetum setaceum*  
African Fountain Grass



*Juniperus ssp.*  
Juniper (various)



*Cytisus scoparius*  
Scotch Broom



*Eucalyptus ssp.*  
Eucalyptus (various)

# Plant for Pollinators



© Bob Watkins, 2018

## Plant A Pollinator Garden

Look for the Butterfly icon on pictures of certain plants throughout this book. These are plants that attract beneficial insects and support the life cycle of butterflies. Try to get several in your garden that bloom during each season so you host the larvae and caterpillars as well as the full-grown nectar-seeking showstoppers.



## Gotta Get Bees

Not every bit of ground needs to be covered in mulch. Try designating a 5 - 10 square foot patch of open ground for solitary ground nesting bees and insects, especially if you have planted California native plants. Bees will show up if you install some nesting boxes, or build an insect hotel (see p. 14).

## Pollinator Attractors



- 1 *Asclepias fascicularis*  
Narrow Leaf Milkweed
- 2 *Heuchera maxima*  
Island Alum Root
- 3 *Achillea millefolium*  
Common Yarrow
- 4 *Verbena lilacina* 'De la Mina'  
Cedros Island Verbena
- 5 *Ceanothus* ssp.  
California Lilac

© A. Barra, 2018

## Plants and Bugs need each other to survive.

Nature provides checks and balances in a garden, and you can attract insects and creatures that will help you maintain your garden without pesticides. Flowering plants rely on insects for pollination and thus reproduction. In turn, they provide for different insect species which feed on various plant parts and prey on other insects. Some bugs eat too much, destroy plants and spread diseases. Other bugs, beneficial insects, fight off the bad guys, keeping them in check by eating them or disrupting their reproductive process.

Use only organic methods, avoid chemical inputs, and actively cultivate a diversity of plants that provide resources at different times of the year, and you will be rewarded with a healthy and balanced mini-ecosystem.



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# Gardening in **Deer Country**

## Tips For Detering The Deer

### Deer Resistant Selections For Sun



1 *Penstemon heterophyllus*  
*Foothill Penstemon*



2 *Solidago velutina* ssp.  
*californica*  
*California Goldenrod*



3 *Romneya coulteri*  
*Coulter's Matilija Poppy*

Many California native plants have developed characteristics that protect them from excessive deer browsing. These include plants with sap such as Milkweed (*Asclepias*), highly aromatic leaves like Sages (*Salvia*), thorny or spiny leaves like Barberries (*Berberis*), silvery dry or hairy leaves like California Phacelia (*Phacelia californica*) and sticky leaves like Hummingbird sage (*Salvia spathacea*).



Deer live in small family groups, usually comprised of does with their fawns and older female offspring and relatives. There are indeed "neighborhood deer," as family units don't generally stray far from their territories. They like browsing at garden restaurants they know well!

Walk your neighborhood to see which plants are doing well in gardens close by, and which plants the deer seem to avoid throughout the year.

### Deer Resistant Selections For Part Shade/Shade



1 *Lepechina fragrans*  
*Fragrant Pitcher Sage*



2 *Holodiscus discolor*  
*Cream Bush*



3 *Elymus glaucus*  
*Blue Wild Rye*

1. **Black-tailed Deer Are Browsers** that eat only broad-leaved plants. Acorns, young leaves and twigs of California oak trees are their main food source, and they rely on this forage throughout the year. Deer also browse on tender twigs and shoots of shrubs, flowers and seed capsules, fungus, lichens, and mistletoe, with the occasionally foray into growing tips of grasses in early spring.

2. **Climate-appropriate Plants** that are dry in the summer are not as enticing to deer, so go native whenever possible (see p. 56)!

3. **Limb-up Trees** once they are established, so tender shoots are out of reach. This helps with fire safety too (see p. 23).

4. **Make and Use Deer Spray** on the foliage of smaller plants until they are rooted.

5. **Select Aromatic and Sticky Foliage**, including some Mediterranean culinary herbs, Sticky Monkey Flower (*Diplacus aurantiacus*), Sages (*Salvias*), and Coyote Mint (*Monardella villosa*) to repel the deer.

6. **Try Thorny, Fibrous, Spiny Foliage** like some small-leaved California lilac (*Ceanothus*), Barberries (*Berberis*), and Douglas Iris (*Iris douglasiana*), as these plants have adapted to protect from excessive browsing. Tiny, tough leaves hold little interest for deer.

7. **Silvery, Rough and Hairy Leaves** such as California Phacelia, Seaside Woolly Sunflower (*Eriophyllum staechadifolium*), or Cobweb Thistle (*Cirsium occidentale*) also deter.

8. **Small Plant Cages** protect plants during the establishment period until they are large enough to withstand some browsing. Many California native shrubs and trees can withstand some deer browsing once established, and some more tender natives provide only seasonal interest.





# Strengthen your communities

© Garden Soft, 2018

## Plants live with their **Best Friends.**

Left on their own, plants arrange themselves into communities of their friends based on common microclimates, and interactions with each other, with insects, birds, and other animals, and with the physical environment. Most communities tend to occur repeatedly in the landscape under similar environmental conditions.

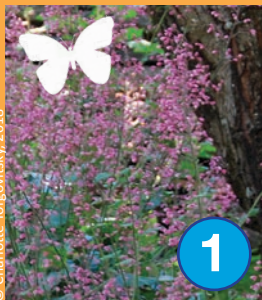
While non-native plants may be equally adapted as native plants to the climate conditions of a particular area, local native plant communities have evolved together and will grow so well together that they will reject “outsiders” and work together to out compete them. So, we recommend learning something about the Marin County plant communities and selecting plants that like to live together from those lists.

Many of the plants in Marin are adapted to the seasonally dry Mediterranean climate. But there are plants which prefer to

gather near the shoreline or creekbed and tolerate significantly wetter conditions. Some plants prefer dry shade, and others are happier out in the sunshine of open space.

The most iconic plant community lives within the shade of California native oaks. The oak trees themselves are extremely drought-adapted and will not tolerate watering of plants beneath them. Coast Live Oaks (*Quercus agrifolia*) grow an extensive system of feeder roots under a litter of leaves, and Blue Oaks (*Quercus douglasii*) lose their leaves during extremely dry summers, so the plants that live with them must be able to tolerate the highly fungal environment. These trees survive in clay soils that hold moisture in the rainy season, but become completely dry during much of the year. The fungal network connects many root systems underground, which enables all the plants in the community to share resources to weather all seasons.

### California Oak Woodland



1 *Heuchera 'Old La Rochette'*  
Coral Bells



2 *Aesculus californica*  
California Buckeye



3 *Sambucus nigra* ssp. *caerulea*  
Blue Elderberry



4 *Melica harfordii*  
Harford's Oniongrass



5 *Lonicera hispidula* var. *vacillans*  
Hairy Honeysuckle

© Charlotte Torgovitsky, 2018

© Dave Baron, 2018

© Lyniko, 2018

# Keep **Friends** in community

## California Mixed Evergreen Forest



1 *Sisyrinchium californicum*  
*Yellow-eyed Grass*



2 *Rhododendron occidentale*  
*Western Azalea*



3 *Alnus rhombifolia*  
*White Alder*



4 *Carex tumulicola*  
*Foothill Sedge*



5 *Aquilegia formosa*  
*Western Columbine*

Mixed Evergreen Forest plants thrive along watercourses and lakes, and on moist shady hillsides. The atmosphere in these places is often cool, and the native plants here are moderate water use plants. Many of these plants will tolerate winter inundation and heavy, soggy soil conditions. In the garden, these plants do best next to organically maintained lawn areas that receive some limited summer watering.

## California Grassland / Meadow



1 *Eschscholzia californica*  
*California Poppy*



2 *Calamagrostis foliosa*  
*Leafy Reedgrass*



3 *Pacific Coast iris*  
*Pacific Coast Iris Hybrids*



4 *Festuca idahoensis*  
*Idaho Fescue*



5 *Oenothera elata* ssp. *hookeri*  
*Yellow Evening Primrose*

Grasslands feature shrubless vegetative groundcover; these can appear either in moist, shady exposures, or in hot dry conditions. Grasses blend easily with a mixture of annual wildflowers, broad-leaved perennial plants, and bulbs. This community is essential for insects, birds, and other wildlife, and is largely deer resistant. In landscapes, these plants require some patience, as they take two or three years to fully establish and become self-sufficient. The meadow plants featured here grow best in open, sunny conditions and on slopes.

## California Inland Chaparral



1 *Berberis aquifolium*  
*Oregon Grape*



2 *Garrya elliptica*  
*Silk Tassel Bush*



3 *Cercocarpus betuloides*  
*Mountain Mahogany*



4 *Stipa pulchra*  
*Purple Needlegrass*



5 *Salvia apiana* var. *apiana*  
*White Sage*

Chaparral plants have adapted to poor, gravelly soils that do not retain moisture, and often are found on hot dry slopes. Very little leaf litter collects around these plants, and several of these species have small or resinous leaves that help reduce evapotranspiration. Many beautiful flowering natives, which are very drought tolerant and deer resistant, grow in these conditions. In landscapes, these plants need a hot sunny location and good drainage.

© Tom Nay, 2018

# Slow, Spread, Sink and Store

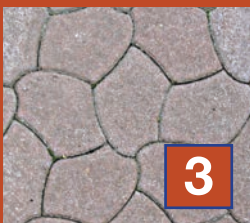
## Five Great Permeable Hardscapes



1



2



3



4



5

- 1 Sand set pavers
- 2 Porous concrete paving
- 3 Interlocking pavers
- 4 Gravel
- 5 Cut 4"-6" gaps into brick path

photos 1,3,5: © Pamela Berstler, 2018

**Slow It!** Replace downspouts with rainchains to slow down the water, so it is more easily absorbed when it reaches landscaped areas. Add a rain barrel or cistern at the bottom of the downspout or rainchain and direct it to overflow into the garden.

**Don't Have Gutters?** Cover areas under eaves with permeable groundcover such as pea gravel, mulch, or rock to reduce the compacting force of water falling on bare soil. Spreading fresh leaf and wood chip mulch throughout the garden will slow down water. Healthy soil, bound together by the structures its life creates, can withstand even the strongest rains.

**Spread It!** Water needs to be spread around to spend some time in your landscape. For new construction, always specify permeable hardscape. Consider breaking or cutting up impervious surfaces like patios and walkways and rearranging the concrete with gaps between the concrete or puncturing it to create planting areas. Paved area drains also can be redirected from storm drains into the garden.

**Sink It!** Trust the soil sponge to do its job. Existing impermeable surfaces that cannot be transformed should be treated as water capture areas, where water is collected before it is guided to the garden. If you are not able to capture and hold the water on site, then concentrate on making sure that it passes through as much of the natural landscape as possible before it moves off your yard and becomes runoff.

**Store It!** Rainwater also can be directly harvested and stored. Storage vessels include rain barrels and cisterns directly connected to downspouts. Stored water gradually can be released into the landscape between winter rains. Properly sited trees are an excellent landscape feature for holding rain temporarily and allowing it to be released slowly over time.

# Contours capture rain

## Contour Your Garden In Six Easy Steps

### Native Plants OK With Wet Feet (Basin Swale Plants)



1

1 *Anemopsis californica*  
*Yerba Mansa*



2

2 *Juncus patens*  
*California Wiregrass*



3

3 *Clinopodium douglasii*  
*Yerba Buena*

**Swale Plants Are Special.** These basin plants like wet feet and can be completely submerged in rain water and still survive Marin's hot dry summers without extra water. They're sort of plant Super Heroes that way! Look to the Riparian and Mixed Evergreen Forest plant communities for these selections (see p. 27).

### Native Plants That Prefer Dry Feet (Berm Plants)



1

1 *Epilobium canum*  
*'Everett's Choice'*  
*Everett's California Fuchsia*



2

2 *Salvia leucophylla*  
*'Point Sal Spreader'*  
*Point Sal Purple Sage*



3

3 *Bouteloua gracilis*  
*'Blonde Ambition'*  
*Blonde Ambition Blue Grama*

**Berm Plants Like It Dry.** On the mounded side berms, choose plants that like their feet drier. Plants from the Inland Chaparral community are great choices here (see p. 27). Throughout the entire landscape, make sure to mulch at least 2-4" deep around all the plants (though not right up against the trunks), including those in the bottom of the swale.

© G3, Alex Stevens, 2018



**1. Make Your Site Plan** and note where rain falls and flows. Look for an open, mostly flat low spot to direct water towards in the front yard, or anywhere with the center at least 10' away from the house foundation and 3' away from the sidewalk and neighbors (see p. 43).

**2. Lay Out Your Low Spots.** Spread out a garden hose to outline the shape. The area must be basically flat or slightly bowl-like, and not sloping back toward the house. Be careful around trees. Don't put your contours under a mature tree or disturb any big roots. Remove all plants (including grass) from the area and start digging.

**Do not dig without calling USA NORTH 8-1-1!**

**3. Do A Percolation Test.** If you have compaction, try to break through it with a shovel or a pitchfork (see p. 33).

**4. Dig A Basin** that is between 6" and 12" deep at the center. Slope the sides gently to make a sloping bowl, not a cylinder. Mound extra soil around the bowl to increase capacity. At the bottom of the basin, put down at least an inch of high quality compost or worm castings to activate your soil.

**5. Direct Downspouts Into The Basin** area, moving the rainwater through gravel lined ditches or above-ground drainage pipes. Also, make an overflow path so extra water has a direct channel away from your house.

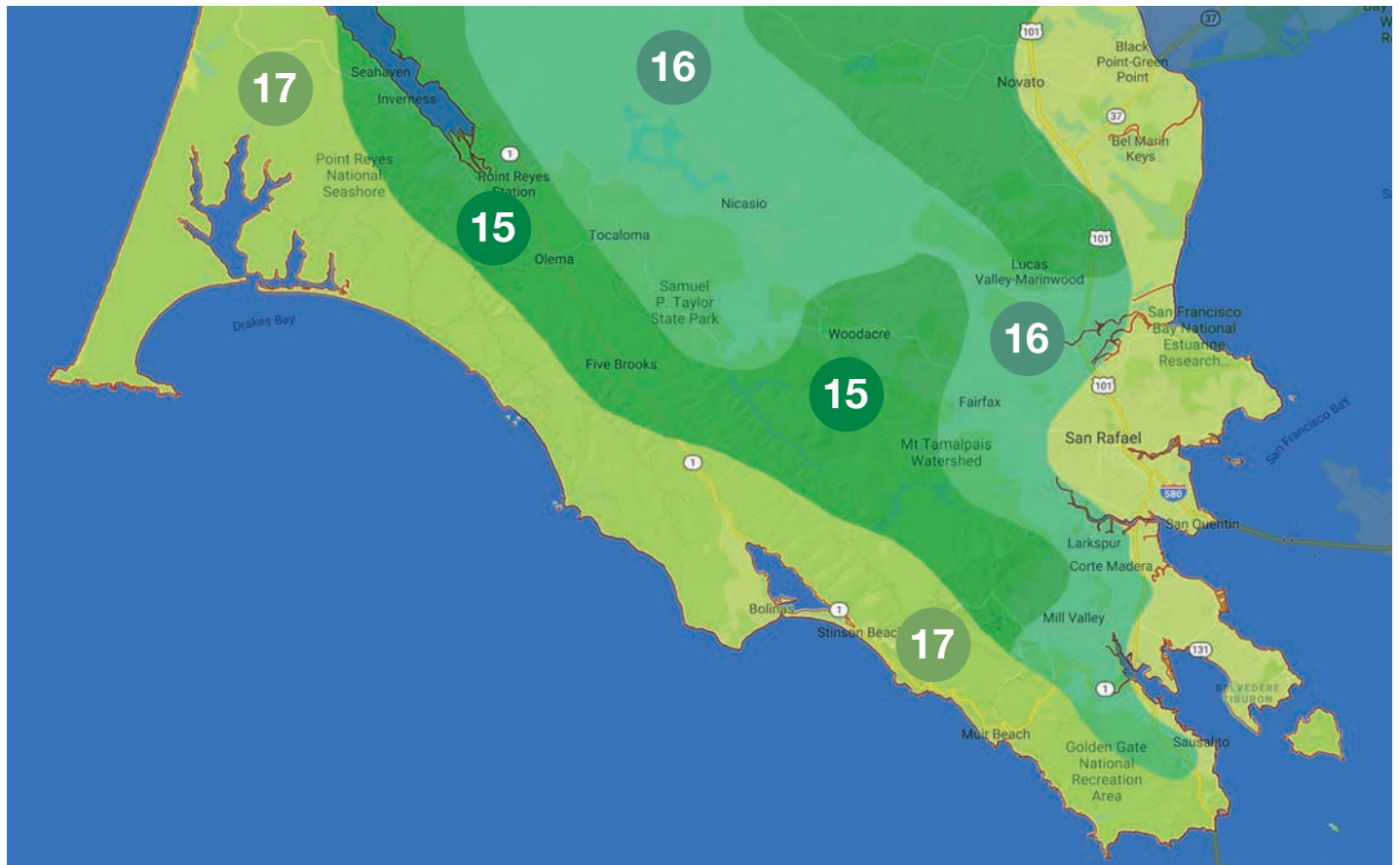
**6. Plan For Overflow** that isn't directed onto your neighbor's property; overflow always should be directed from your property into the street.

**7. The Basin Will Fill Up** when it rains, creating a temporary pond until the water soaks into your soil. All the water should be gone in 24 hours.

**TAKE ACTION if your basin is slow draining!**

If water in your basin is not gone within 48 to 72 hours maximum, then auger the basin to eliminate compaction (see p. 37). Add worm castings when it has drained. Whenever you disturb the soil, be sure to reapply compost.

# Marin County's Climate zones



## Sunset Zone 15: Coast Range

Characterized by warmer breezy summer temperatures and colder winters with more frost, the varying climate is influenced by cold air basins and hilltops.

Average temperatures range from 22-106° F.

## Sunset Zone 16: North Coast Thermal Belt

Gentle afternoon summer breezes, plus heavier winter rainfalls with some frost. The climate is influenced by thermal belts from slopes resulting in drains of cold air.

Average temperatures range from 25-104° F

## Sunset Zone 17: Marine Effects

This region is often foggy and cooler in summer, with mild, cool and windier winters, and the climate is heavily influenced by marine layers.

Average temperatures range from 30-97° F

## Need help finding your climate zone?

California Irrigation Management Information System [www.cimis.water.ca.gov](http://www.cimis.water.ca.gov)

This state-wide network of over 145 automated weather stations provides daily information about landscape water needs. The information may be used to help in water management, water budgeting, designing, planning and scheduling irrigation systems.



# Garden with your Local climate

Marin County is characterized by hundreds of microclimates. The most significant climate factor is from maritime and coast range influences.



## Coast

The mainly urbanized coastal communities in the Southeastern portion of the MMWD service area are highly influenced by marine effects, and represent Zone 17. Little California native vegetation remains on deep soils and grazed areas found in this zone. A few native bunchgrasses, such as purple needlegrass, festucas, and melic grasses hold onto territory threatened by non-native annual grasses and weeds such as oat grass, ripgut brome, rattlesnake grass, Italian, bull and star thistles, and filaree. CA poppies, phacelias, clarkias, ground iris, blue-eyed grass, mariposa lilies, and blue dicks also abound. Rainfall here is approximately 30"- 36" per year and ETo is approximately 33" per year.



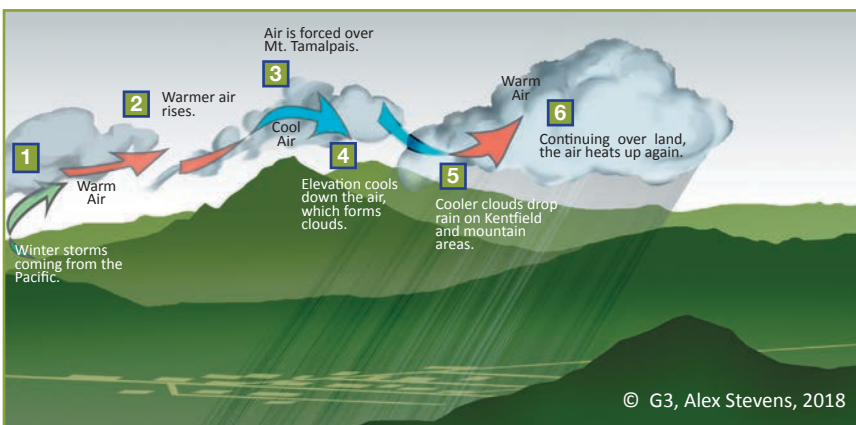
## Upland

Zone 15 gardens are most influenced by the coast range, and rainfall around Mt. Tamalpais. Wetter areas have much Douglas' fir, drier areas have more oaks. The Marin reservoir-lakes area is drier, while the peak of Mt. Tamalpais is wetter. Soils are mostly clay and rocky, and very dry in summer months. Drought-tolerant shrubs and perennials thrive here. Small and resinous leaves are often typical on live and scrub oaks, manzanitas, chamise, coyote brush, California sagebrush, sticky monkeyflower and pitcher sage. Spring flowering annuals, perennials, and bulbs include jewelflowers, lupines, buckwheats, coyote mint, mule's ears, and soap lilies. Rainfall here is as much as 50" per year and ETo is approximately 47" per year.



## Inland

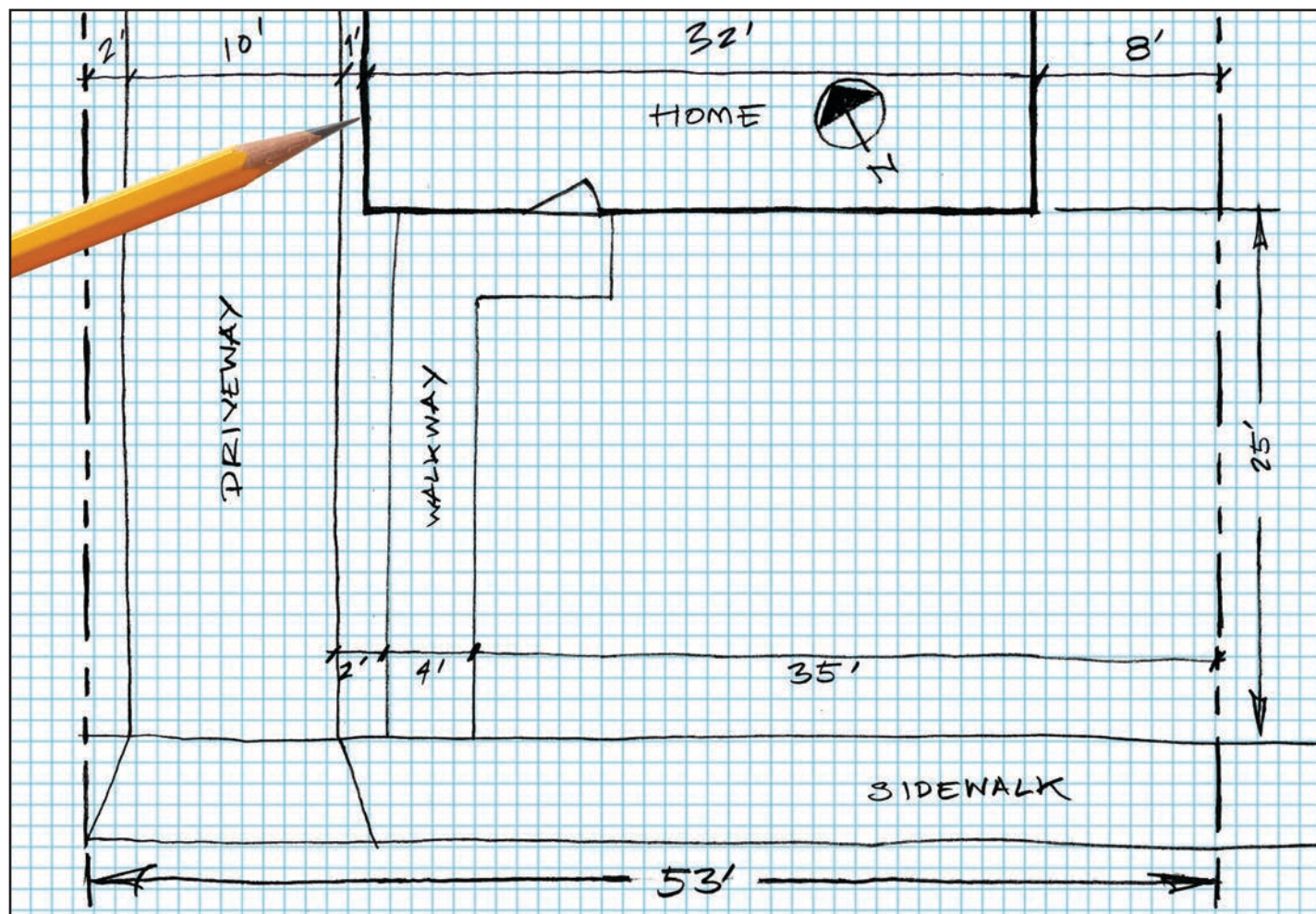
Zone 16 gardens have the best of all worlds. Along the coast and following stream courses inland the climate is often cool and foggy in the summer months. Canyon slopes cut by streams offer good drainage, though soils are thinner and rockier than at streamside. Small trees such as hazels and vine maples thrive here; larger shrubs such as flowering currant, huckleberry, creambush, ceanothus, and ninebark also are seen here. Understory plants include snowberry, sword ferns, Douglas iris, columbine, bleeding heart, oxalis, violets, vanilla grass and sedges. Rainfall here is approximately 20" per year and ETo is approximately 44" per year.



## Orographic Uplift

The ridge of Mt. Tamalpais is a singular ridge that lines up against incoming winter storms, producing a phenomenon that leaves the coast relatively dry and the inland area wetter called orographic uplift. Winter storms, rotating in a southwesterly counterclockwise motion, arrive on the Marin coast from their trip across the Pacific Ocean. As it flows over the land, the wind is warmed up. Warm wind rises and is forced over the elevation of Mt. Tamalpais. As the air crests the ridge, the wind cools down, condenses into clouds, and sinks into the Kentfield area, dropping rain. As the wind proceeds eastward across the land, it warms up again.

# Start with a Site Plan



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## Measure to Make Your Site Plan

Measure your site. Once you've got the dimensions, trace the lines cleanly on a sheet of grid paper. Make at least 10 copies that are dark enough to still see the grid. You will use each of these sheets to evaluate and plan the changes for each aspect of your landscape.

Depending upon the size of your property, most projects can use a  $1/4'' = 1'$  scale. Try using 1 box = 1 foot.

Mark the locations of trees and large shrubs you are unlikely to remove. Always use three reference points to triangulate the location of trees. Label any hard surfaces like driveways and walkways.

Take some photos and mark where they are located on your site plan. Use your smartphone or a compass to find North and also mark it on the plan.

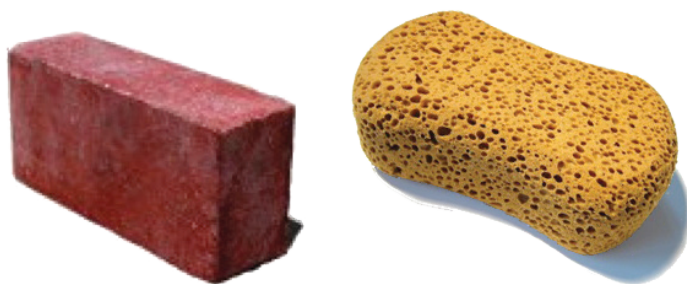
## Mind The Foundation

Be sure to mark your doors, windows and footprint of your building on your plans. You will be grading the soil away from foundations and locating your mounded up berms and swales 5' - 10' away from the foundation of the buildings and 3' from edges of the walkways or neighbors.

Need help finding dimensions? [maps.google.com](https://maps.google.com)

Look at Google Maps for help placing buildings or trees on your property. Just type in your address, zoom in, and use the Satellite view.

# Test your soil



## Is your soil a Brick or a Sponge?

If you have a brick you will need to take this into consideration when planning your contours. You will need to spend some time and effort to turn the soil back into a sponge. If the soil does not drain well, you will need to take special care when you plant that you do not drown your new plants.

We want to have soil in our landscape that can capture water and allow it to soak into the plant root zone within 24 - 48 hours. Building **Living Soil** therefore becomes important in our plan to capture rainwater and save it for a dry day, so you will need to follow the Soil Lasagna Recipe (see pp. 38-39).

Before we figure out how to grow better soil, we need to figure out what kind of soil we have. Sand, Silt and Clay, are the basic soil types. The smallest particles create clay soil and the largest make sandy soil, with loam (an even blend of sand, silt and clay) considered the "just right" medium. Professional designers will take soil samples and send them off to a lab for soil analysis and recommendations.

### You Will Need:



### Percolation Test

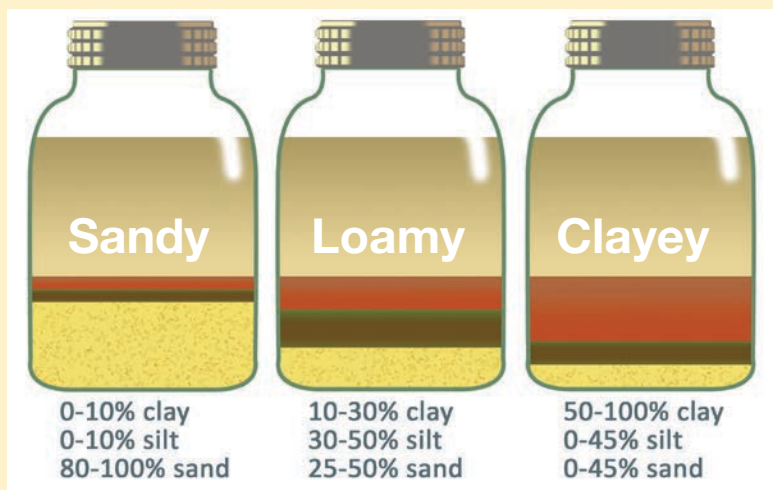
1. Dig a hole about 12" deep and 12" wide (that's a little larger than a 1 gal. plant container).
2. Fill the hole with water and wait. Note how long it takes to drain completely. This is necessary to completely saturate the soil.
3. Fill the hole all the way when all the water has drained out from first filling, and see how long it takes to drain out again.
4. Lay a stick or shovel handle across the hole and measure the distance from the top of the water to the stick each hour until it has drained completely.

### Results:

>4" per hour - You have sand and need to add more organic matter to improve the soil (see pp. 40-41).

<1" per hour - **You have a brick!** Your soil needs some extra help so try sheet mulching to build the sponge (see pp. 38-39).

1" - 4" per hour - Congratulations! Your soil drains well! **You have a sponge!**



### Determine Soil Type Using A Jar Test

(This is fun to do with kids!)

#### You Will Need:

- 1 Qt. size glass container with lid
  - 1 Cup of soil from the garden (Select one area per container, or take samples from several holes and blend them together.)
  - 1 Teaspoon of alum (Find in baking section of grocery.)
  - 3 Cups of distilled water
1. **Add soil and water together** in the glass container and shake until all solids are suspended in water.
  2. **Place container on a shelf** and wait 24 hours.
  3. **Wait another 24 hours**, if the container is still cloudy. After 48 hours, the layers should be settled: **Sand** on the bottom, **Silt** in the middle, and **Clay** on top.
  4. **Measure the layers** in proportion to each other.
  5. **Use the graphic** to determine the Soil Type based on the proportions of Sand, Silt or Clay.

Which jar does your sample most look like?

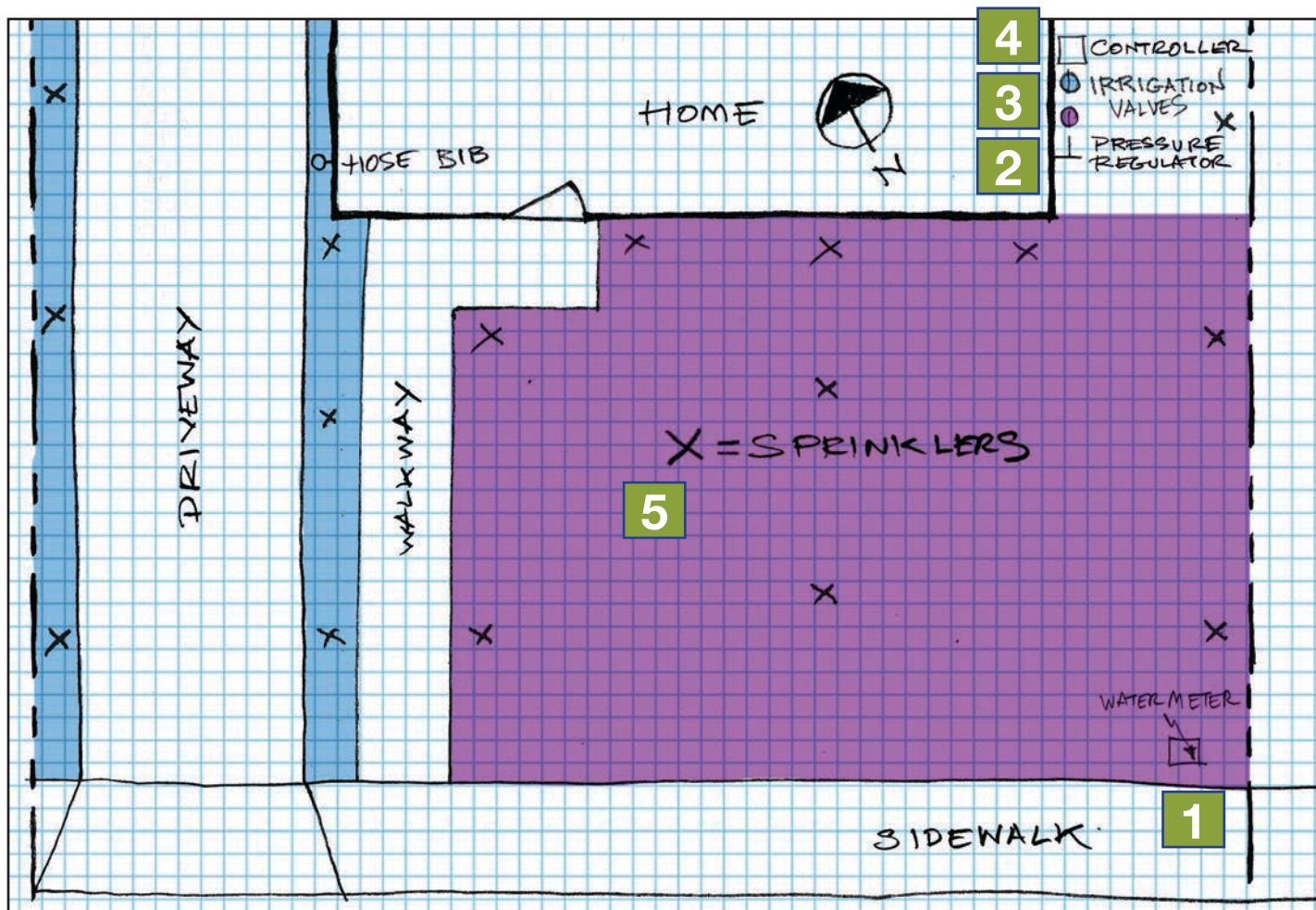
**For Example:** If there are equal proportions of Sand and Silt, and very little Clay, then the proportions are something like 40% Sand and 40% Silt and 20% Clay.

Loam best describes the jar with 40% Sand, 40% Silt, and 20% Clay.

**Your soil is Loam.**

Determine your Soil Type so that you can better program your "smart" irrigation controller and so you can select plants best adapted to your site.

# Evaluate your Existing Irrigation layout



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## Make A Plan of your irrigation system.

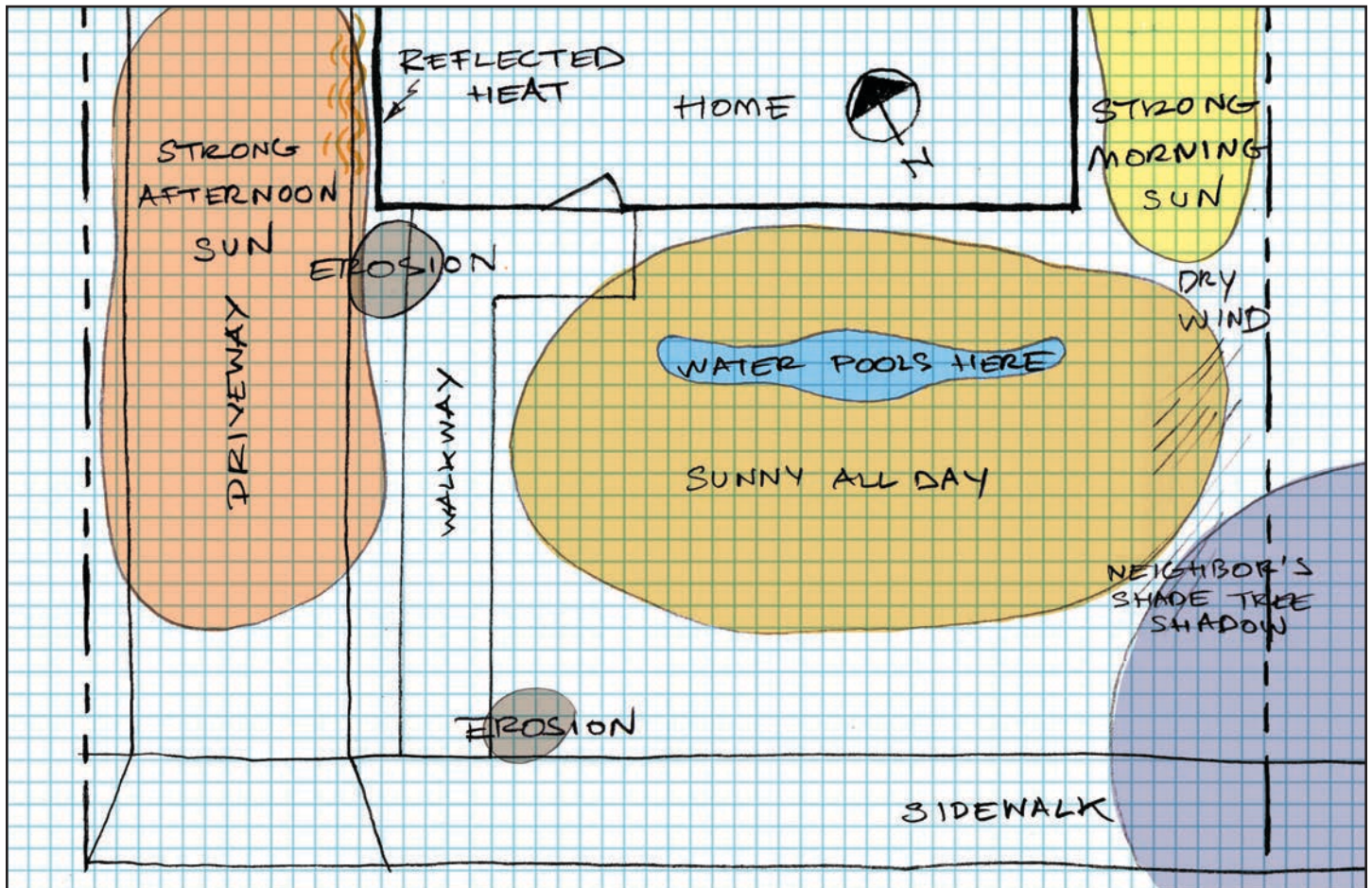
Start the discussion about whether or not to abandon your existing irrigation by mapping out the components of the system. If you have lawn, chances are that your existing irrigation is a spray sprinkler system with an automatic irrigation controller. If you are renovating most of your landscape, be prepared to start from scratch rather than try to significantly alter the existing irrigation system. This way you have an opportunity to use the latest technologies and proper design for your new garden. It is especially difficult to match existing irrigation to new plants grouped by water needs (see p. 53) or new permeable hardscape that replaced previously planted areas (see p. 28).

Locate all the sprinkler heads on your property and mark their locations on a copy of your Site Plan. Note where the water comes on to your property from the street (the water meter/main line), the location of your irrigation controller, and the location of the valves that control the various irrigation zones. Also, mark the location of hose bibs, shut off valves, and pressure regulators or backflow prevention devices.

Now color code the areas that spray with each valve so you easily can see the various zones you are dealing with for replacing plants and irrigation. Our front yard example (above) has two separate zones marked by two different colors.



# Consider your Microclimates



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## Microclimates are **Climate** factors **Particular** to your garden.

Every garden has areas where some plants will grow well and others will die. Structures, walls, fences, and other plants all can affect the amount of sun and shade in a garden. And every garden is completely different, even if it is located in the same general climate zone. There will be hills and hollows in your front yard that may collect cold air or, because your property is sloped, you don't get frost when your neighbors do.

Microclimates may differ significantly from the general climate of an area. You need to map these microclimates, and the first step is to walk around your property during the day and observe it more closely. Grab a chair, sit down outside, and start thinking about your design priorities.

### Note Sun and Shade

Mark the areas that receive sun all day and areas that are shaded all or part of the day. Also note which areas receive only partial sun, maybe just a few hours of direct morning sun, mid-day or in late afternoon.

When you start choosing your plants, make sure to select those that are appropriate to your garden's sunlight patterns. Plants marked as "full sun" will not be happy in full shade or vice versa.

Are there other things you observe in your garden? Mark it on your Site Map!

### Which Plants Will You Keep?

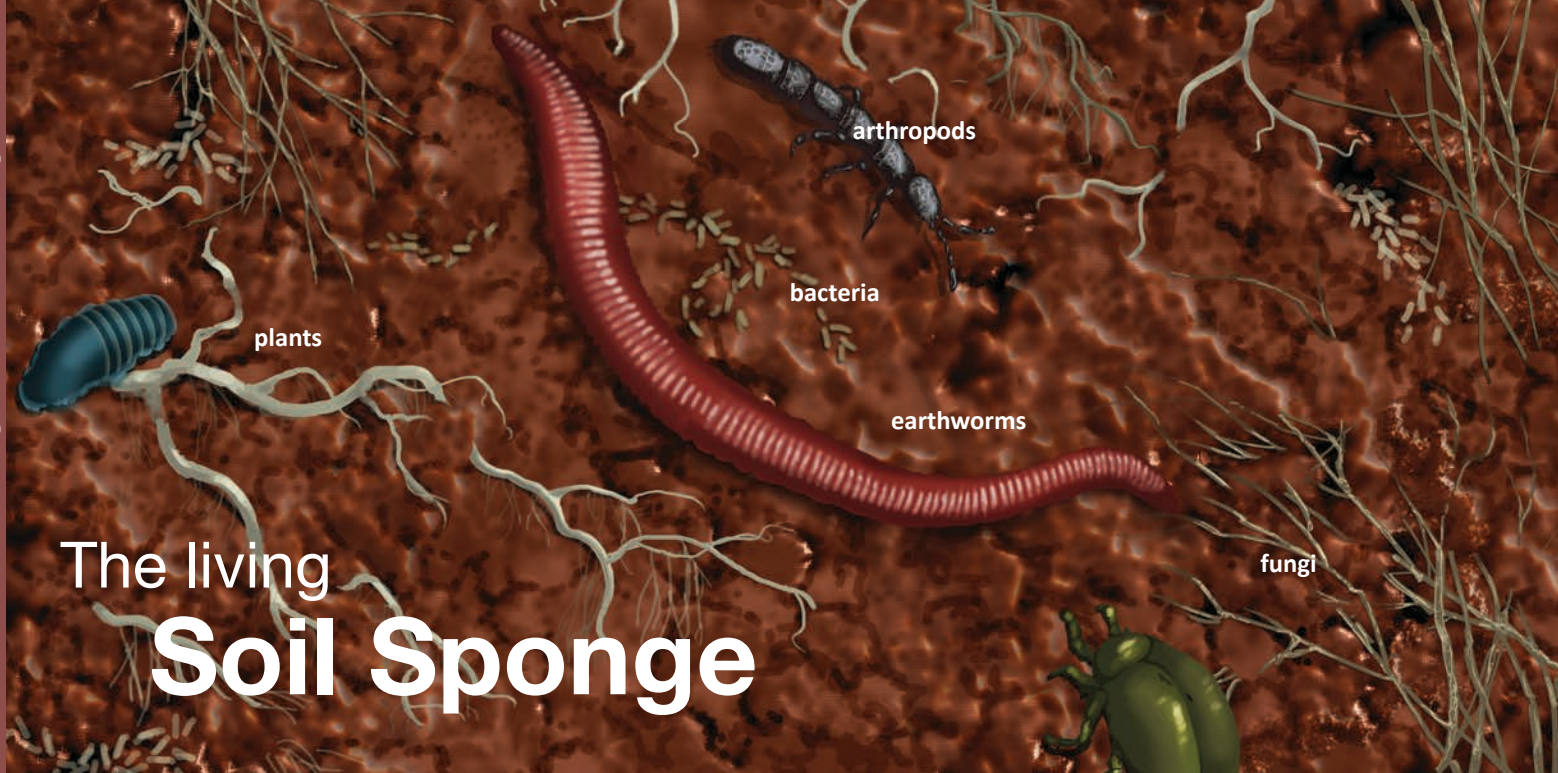
Now is the time to decide which plants will work well in your new garden and which should be removed. Outline the canopy area of each plant you are keeping and note with the name, general size and health of the plant. If you don't know the name of the plant, take a photo and leaf/flower with a bit of stem attached to a local nursery to get some assistance.

Which of these plants seem thirsty and which are not? Many plants can be unthirsty if they are well established, with deep healthy roots (old rose bushes, mature camellias or very large shade trees, for example).

### Plants Speak Latin

Did you know that many plants have the same common names? If you ask for a plant by their common name, you might end up with something completely different than what you want. The best way to order plants is to use the Latin botanical name; that way there is no miscommunication.

When you go to the nursery asking for plant identification, be sure to walk away with both the Latin name and the common name, so that you can conduct your research and be assured of selecting the right plant for the right place.



# The living Soil Sponge

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## OWL (Oxygen, Water and Life) makes **Living Soil**.

Living Soil is alive, and it is essential to a healthy garden. A teaspoon of good garden soil contains annelids, insects and other invertebrates, billions of invisible bacteria, several yards of equally invisible fungal hyphae, several thousand protozoa, and few dozen beneficial nematodes. Microbes bind soil together and, when OWL is balanced, billions of microbes work in concert with the roots of plants to be the change agents that transform brick-like dirt into a healthy, living soil sponge.

**Oxygen** is needed by healthy plant roots and soil organisms. Healthy soil has lots of little pockets filled with air. When soils are eroded, graded, or disturbed, their structure becomes compacted. Compaction is caused when the tiny air and water bubbles are squeezed out of the soil and the microbes are killed or demobilized. Microbes can be killed by fertilizer and pesticide use or even heavy traffic (foot or vehicular).

**Water** is needed by both plants and microbes. But too much water in the soil displaces the oxygen, saturating the soil and creating an anaerobic (no oxygen) condition. Pathogenic microbes prefer anaerobic soil, and if this condition persists, diseases may develop, thus endangering the health of your garden.

Water is constantly moving through the soil. Any water in the soil needs to be replenished as the plants use it, as it evaporates from the soil surface, and as gravity pulls it down past the root zone.

**Life** in the soil includes all the visible creatures, bacteria, protozoa, nematodes, and fungi, the food they eat, the excretions they make, and the root systems they sustain. Adding good quality compost into the soil is the fastest method of incorporating living microbes.

Plants act like microbe farmers, attracting microbes to their roots by feeding them carbon. Plants know what they need to grow strong and stay healthy, and they can target members of the microbial community with specific compounds in order to get what they need at the exact time when they need it. These billions of microbes all need water and oxygen, so there is a lot of jostling around, creating miniscule air pockets. Bacteria and fungi hold the soil together with microscopic superglues and binders. Carbon and other nutrients are cycled through these many life forms, creating healthy, living, well-structured soil, no matter what the base soil type.



## Use a Soil Probe

A soil probe allows you to determine a lot of information about your soil. It will come in handy when you are trying to figure out whether water is reaching the plant roots or even going too deep beyond the roots' reach.

Press the probe into the ground, twist and pull out to take a sample. Take multiple samples from around your garden. How deep are your plants' roots?

Use this kind of probe on a regular basis if you are maintaining your landscape. It is a quick tool for determining whether or not your irrigation schedule is providing enough water.

Purchase a soil probe online or at your local irrigation warehouse; or ask your designer to purchase one for you.

# Grow a great soil **Sponge**

Try to avoid excessive disturbance of the soil. But, if it happens, make sure you add **Oxygen, Water** and **Life** in the form of really good compost as soon as possible to get the soil critters working again. Good organisms turn dirt into a great living soil **Sponge**.



## Eliminate **Compaction** by loosening soil.

If you can press a pitchfork into the soil, then that is all you need to do to create air holes.

If the soil is heavy clay, then augering or tilling may be necessary. Immediately after augering heavily compacted areas, fill the holes with good compost or earthworm

castings. Then water the whole thing thoroughly to get the biological processes kickstarted. Remember that augering and tilling damage the biological network already existing in the soil, so they should be employed only when absolutely necessary. **If you have a lawn, aerating twice a year will help eliminate compaction.**

After decompacting, three essential practices for maintaining soil oxygen are:

- 1) Feed the soil good organic matter from the top down only.
- 2) Plant annuals like sunflowers with jack-hammer root structures to open clay soil.
- 3) Manage water so things don't get too saturated or too dry.



## Water Wisely, first with rainwater.

Rainwater lacks chloramines and is slightly acidic, providing the perfect chemistry for both plants and microbes. Rainwater should be directed into landscapes at every opportunity.

**Irrigate** only to maintain the water balance in soil (*see p. 50*). Too much water saturates soil and results in the anaerobic conditions that promote diseases. Too little might result in microbes drying up or going to sleep. When microbes are no longer cycling nutrients for the plants, the roots will die and the plant might too.



## Feed your soil.

Organic matter improves the water holding capacity of soil. You can get organic matter from a wide variety of sources, including compost and living mulch. Once you get things started, plants manufacture their own soil-building organic matter by dropping leaves, blossoms, and other debris.

Mulch, compost and compost tea can be applied to the surface of the soil and used as amendments during planting and soil preparation (*see pp. 40-41*).

Ornamental plants do not need to be fed with fertilizers (even organic ones) if you maintain OWL. Fertilizers make the plants lazy about attracting microbes to cycle nutrients; this diminishes the plants' immune response and may compromise their resilience, particularly if they are put under stress from drought or pests.

## No Weed Cloth!



© Jodie Cook, 2018

It looks like weeds grow right through weed cloth. Weeds are actually encouraged because OWL is kept from happening when the organic matter from fallen leaves doesn't touch the soil.

## Leaf It in Place



Keep leaf litter and grass clippings on the soil surface, under the plants from which they fall, instead of removing them during maintenance. Be careful not to pile up leaves or mulch against the trunk of the plant.

## Go "No Blow"



The last thing plants need is hot, dry air noisily blowing dust around. Stop drying out your garden and use a rake for everything but the largest hardscape areas where an electric blower might be used judiciously.

## Tea for Two



Compost tea and worm castings offer a microbe jump start, providing many benefits of compost in an easily-digestible aerated liquid (compost tea) or dry form (worm castings), already teeming with life.



Lose your lawn  
and **Build Healthy Soil**

Sheet Mulching makes **Soil Lasagna**.

We call this lawn removal process Sheet Mulching, or Soil Lasagna, because we layer materials that living soil organisms eat up and convert to soil. Once you've made the Soil Lasagna, all you need to do is keep the system moist so the microbes can stay awake and cooking. How long this will take depends on the kind of grass you have. If you have warm season grass, you will have to cut it out, but you can plant right away. If you have cool season grass, you can leave it in place, but it will be a while before it's ready for you to plant into the yummy soil you are creating.



**You Will Need:**

- Shovels and Rakes
- Bins for removed grass and soil
- Landscape flags
- Compost, Worm Castings, or Compost Tea

- Wheelbarrow(s)
- Mulch
- Painters' Paper or big sheets or rolls of Recycled Cardboard
- Hose with shut off nozzle at end
- Water (LOTS!)

**Secure Your Permits**

Call USA NORTH (8-1-1) two days in advance, and check with your local water agency for any water use restrictions.

**Rent a Dumpster**

For every 1,000 sq. ft. of turf removed you will need 1 low-boy (10 yard capacity) dumpster.



**1** After you have checked for permits and any local water use restrictions, and called **USA North (8-1-1)** to mark underground utilities, deal with the lawn you have. If it's cool season, mow it to about 1/2" height, say goodbye and soak it thoroughly with water. Then go to #3. If you want to cut out cool season grass, go to #2.

**2** If you have warm season grass, rent a sod cutter and remove the grass and 2"- 3" of roots beneath. The result is that you will be removing about 6" of grass and soil. Unfortunately, this must be hauled away, so you will need to rent a dumpster.



**3**



**4**



**5**



**6**

**3** Dig a trench 8"-12" deep (about 1 shovel depth) and at least 12"-24" wide around all hard surfaces and 6" deep along building foundations. **Before moving on, complete your contouring for rainwater absorption and retention and any landscape alterations such as paths, patios, or other features (see pp. 42-43).**

**4** Flag your sprinkler heads so you can find and adjust them later. Or, be prepared to abandon and replace the irrigation system.

**5** Add a (1/2" to 1" deep) layer of compost on top of the graded soil. Alternatively, use humates, a sort of freeze-dried compost available at some landscape supply stores, or spray with compost or worm tea. You are adding good instant microbe food and some living microbes to the soil!



**7**



**8**



**9**



**10**

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**6** Water everything well. Wake up microbes! Let's get the soil party started!

**7** Roll out painters' paper, cardboard or other paper. Overlap at the seams by at least 6". No naked soil!

**8** On the hardscape edges, make a "burrito" of rolled paper and mulch to keep grass from resprouting immediately.

**9** Water the paper again and add another layer of compost here, if you'd like. Rake a thick blanket 4"-6" deep of finely chopped, mixed leaf and wood mulch over the paper or compost.

**10** Water the mulch thoroughly. This mulch layer will absorb more water than you ever thought possible to become soaked through. Don't despair; just keep slowly watering!

**11** Plant right through the layers (see p. 57). The longer you wait to plant, the tastier the lasagna will be for the new plants, but you can plant right away if you removed the grass. **If you kept your cool season grass in place, count on waiting 3-4 months before planting. Make sure your HOA is ok with the time frame.**

**12** Step back and admire your work! Have a glass of lemonade too; you earned it!

# Keep adding **Compost** and **Mulch**



## **Compost** is a soil amendment.

Compost looks like soil. You cannot 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 mostly consumed and completely decomposed by micro-organisms. Good compost brings oxygen, water and life in one package.

**How to Use Compost.** Compost can be store-bought or homemade. 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 microbes to start the formation of healthy soil aggregates. These resulting aggregates are composed of existing soil particles and decomposed organic matter, which combine to create a more stable and better functioning soil structure like a sponge.

## **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 (not-quite-completely-decomposed compost, grass clippings, leaf litter, and shredded wood trimmings) or inorganic materials such as gravel or decomposed granite.

Mulch 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.

**How to Use 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. Don't bother with inorganic mulches like rubber, gravel, or decomposed granite in planted areas. These are only applicable in pathways or gathering areas; they don't help grow good soil.

Need help buying amendment? [www.buy-compost.com](http://www.buy-compost.com)

### **MAKE IT**

Less than 5 Cubic Feet



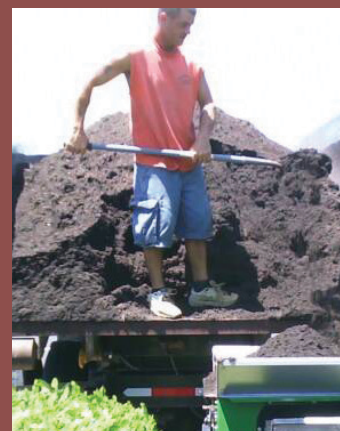
### **BUY IT IN BAGS**

Between 5 and 25  
Cubic Feet

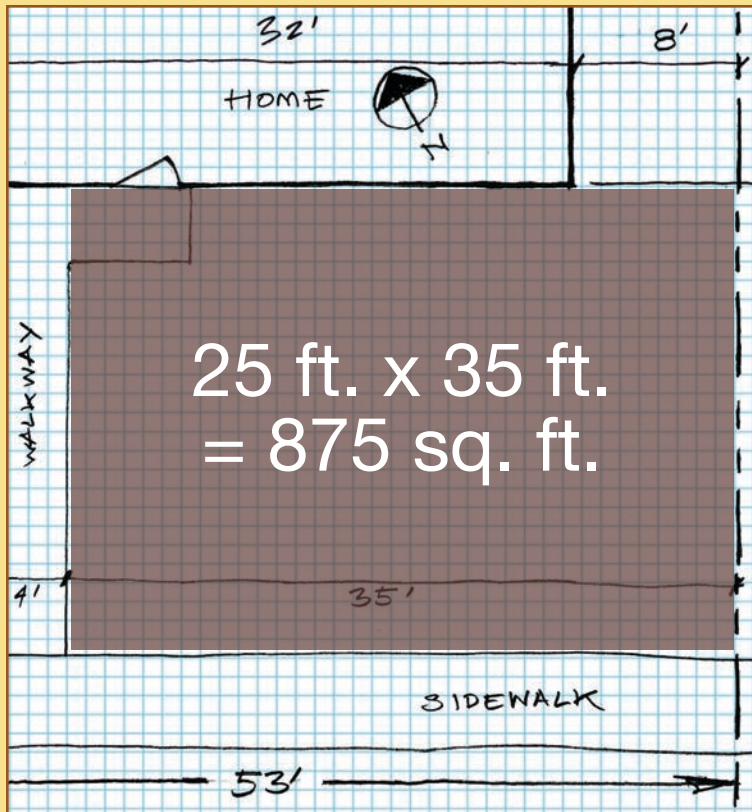


### **BUY IT IN BULK**

More than 25 Cubic Feet or  
1 Cubic Yard



# How **Mulch** does your garden **Need?**



## Add Organic Matter

Add 1-3" of compost to improve the water holding capacity of soil by 30%.

Place 4-6" of mulch on top of the soil to hold in moisture and keep down weeds when planting, and maintain 2-4" of mulch on beds at all times thereafter.

**Keep mulch at least 1-6" away from the stems of plants.**

## Calculate the Material Requirement

Start with the **Square Footage (SF)** of space to be covered and figure out how much you will need for **1 inch of material**.

$SF \times 1 \text{ inch} \div 12" = \text{Cubic Feet (CF)}$  of material needed. (Dividing by 12" turns your inch of amendment into feet of amendment.)

If you need less than 20 CF of material, you can probably make it in a compost pile or purchase it in bags.

If you need more than 25 CF of material, you must convert your materials to Cubic Yards, because you are going to have to have it all delivered in bulk.

$CF \div 27 = \text{Cubic Yards (CY)}$ .

So,  $25 \text{ CF} \div 27 = \text{about } 1 \text{ CY}$  of material needed.

## Applied to Our Site Front Yard:

$875 \text{ SF} \times 1" \div 12" = 73 \text{ CF}$  for each 1" of mulch.

If you need 2", you multiply the amount needed for one inch by 2 and if you need 6", you multiply the one inch total by 6.

**We need 3" of mulch =  $73 \text{ CF} \times 3" = 219 \text{ CF}$**

**For our front yard, that is  $219 \text{ CF} \div 27 = \text{about } 8 \text{ CY}$  of mulch.** That sounds like a lot of material! It looks like we will have to buy it in bulk (see p. 40).

## Avoid These Mulches Around Plants!

While these mulches are commercially available, and some are organic materials, they are not recommended. For example, dyed mulches are composed primarily of recycled wood materials such as treated or painted furniture or wood pallets. Also try to avoid mulches filled with plastic or other debris. Shredded redwood or cedar and rubber present significant fire hazards. Gravel does not decompose to feed the soil microbes and can raise the temperature of the entire landscape.



"gorilla hair"  
shredded wood



dyed wood



dyed wood



gravel



rubber



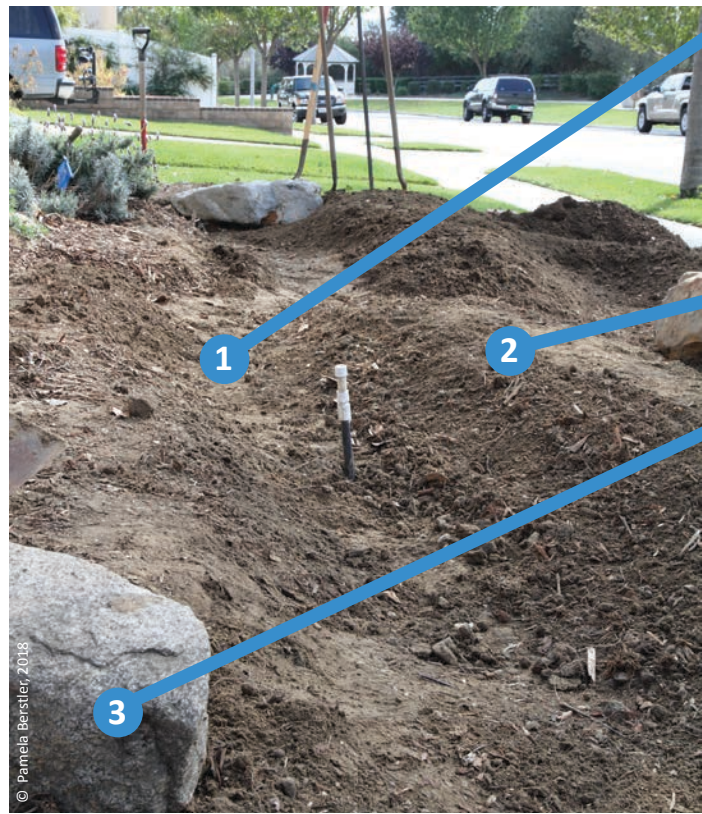
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# Contours for Rain Capture

## Every garden can become a **Sponge**.

Many front yards are just flat lawn, but this space could be a last chance to capture and filter your seasonal rain before it runs into the storm drain and right into creeks, rivers and eventually, the ocean! By contouring the land to hold on to at least the first inch of rain after a dry period (known as First Flush), we create landscapes that are far more interesting than flat expanses of lawn, and provide an opportunity to create conditions for some of California's most interesting native plants.

Meet your **Contour** (aka Swale!) Sounds fancy, but really, it's very simple. Your Contour is just a little soil basin to slow, spread, and sink the first inch of rain water from your roof into the plants in your front yard (see pp. 28-29). Direct your downspouts into the depression. Your soil and plants will thank you! There are two main components of this watershed wise landscape: **Basins & Berms**. **Boulders** are optional, and a lot of people like the look of them. If you don't like the rock, skip them and just add mulch.



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**Basins and Swales** are shallow depressions, or channels no more than 6"-24" deep, on gently sloped or nearly flat landscapes that move water around over short distances. The plants in and around the depressions capture and sink small volumes of surface water. Small, shallow depressions (6" - 12") are best used in clay soil areas, while sandy soils may accommodate the deeper (up to 24") depressions. Channels can be filled with mulch, planted (vegetated swales), and/or lined with rocks and small boulders to resemble natural water features.

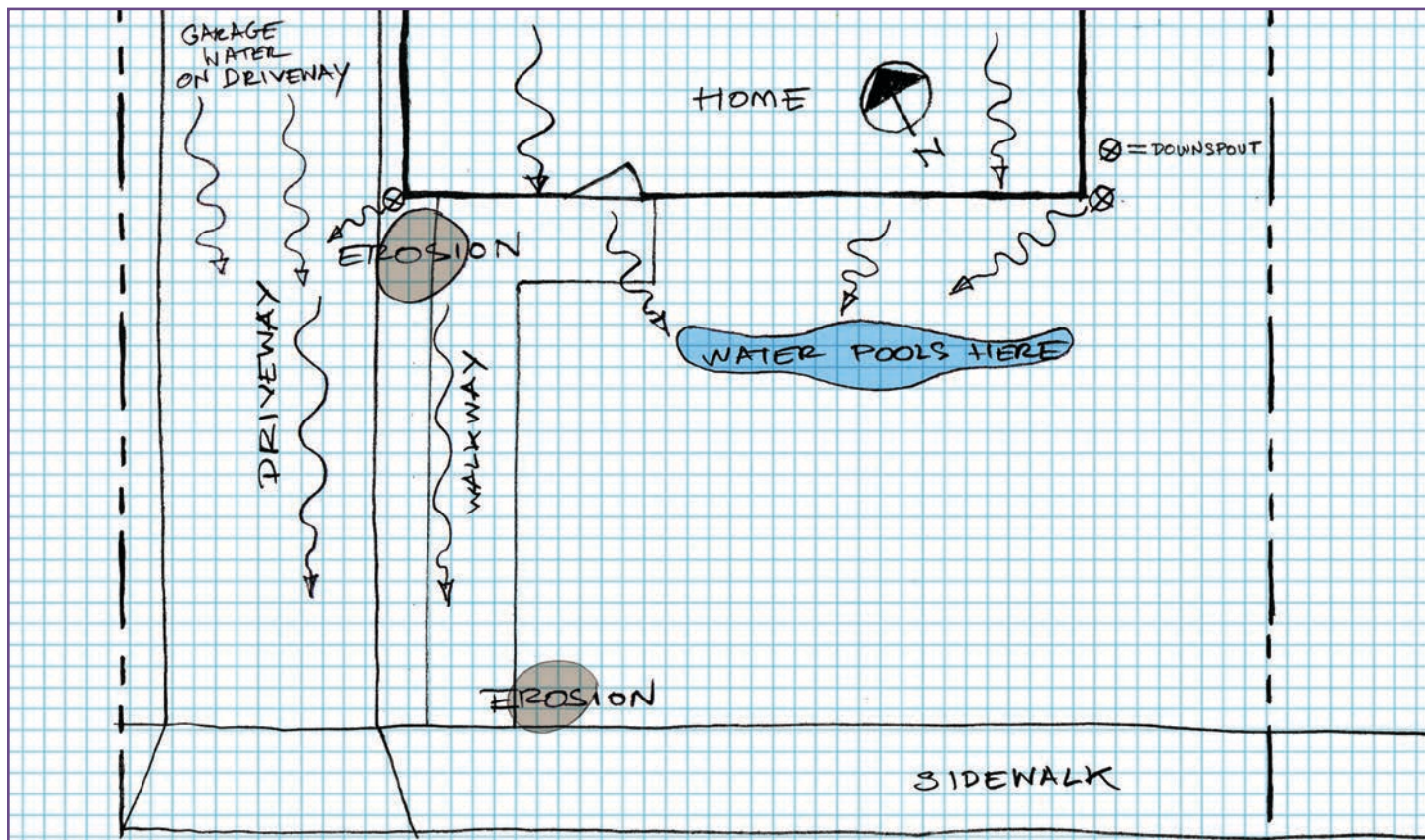
**Berms** are mounds of raised soil, usually planted, that can border basins and swales or be used alone. Berms help contain and move water around, increasing the holding capacity of basins and swales, and providing good drainage for certain plants.

**Boulders** may be used to retain small berms or edges of swales and to create "dry creekbed" interest in the landscape.



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# Imagine your yard is a **Mini-Watershed**



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## Your **Roof** is the **TOP** of the Watershed.

### Make a Copy of Your Site Plan and Label It "Water Plan"

Watch what happens to water as it comes off the roof of your home and moves across your property. Your roof is the **Top** of your mini-watershed and where the water finally runs off your property is the **Bottom**. Think about how you can capture water in between the top and bottom of your landscape.

Begin to separate out each area that deposits water into a downspout. Mark the location of each of your roof gutters and downspouts.

Once you know the total area of the roof, you can figure out the amount of rainfall that it generates (*see p. 44*).

- Do you have low spots in which water pools?
- Does water run off the property anywhere?
- Does water run onto the property from a neighbor or street?
- Do any buildings or any hard surfaces appear to be water damaged or eroded? If so, does it appear to be a result of rain, irrigation, or both?
- Note the direction of water as it moves around the property.
- Turn on the irrigation for no more than 5 minutes and note whether there is pooling or runoff (*see p.51*).
- What parts of the roof divert water into downspouts, and is the water being diverted into your landscape? Indicate the direction of the water with arrows as seen above.



# Capture **First Flush**

First Flush is the **First Inch of Rain** after a dry spell.

This is the most important water to capture in your landscape. The first rainfall washes away pollution that has gathered on hard surfaces during the dry spell, and it needs to be filtered by the living soil and root zones of plants before it goes anywhere else.

## Calculate How Much Water Comes Off Your Roof

The shape of your roof doesn't matter in the calculation of water it produces. A pitched roof and a flat roof have the same footprint and the same amount of rain falls on the total roof area. Just measure the outside edges (the footprint) and calculate the square footage as you would any landscape area.

**Area of a Rectangle = length of side A x length of side B**

Some roofs are flat, and therefore easy to calculate. For complicated roofs, divide the area into squares and add up the area of each square.

Once you know the total area of the roof, you can figure out the amount of rainfall that it generates in gallons. 0.62 is a constant that converts square foot inches into gallons.

**Rainfall (in Inches) x Roof Area Square Feet x 0.62 = Gallons of Rain Water From Your Roof**

You can use these calculations to determine how much water comes off any hard surface (patio, driveway, sidewalk, etc.).



## How Much water per downspout?

First figure out how much water is coming from the whole roof, and then divide the roof into sections and calculate the particular amounts falling from each downspout:

**Rainfall (in Inches) x Roof Area Square Feet x 0.62 = Gallons of Rain Water From Your Roof**

If your roof is 1,000 square feet (SF), here's how much water runs off it:

- 1" (rainfall) x 1,000 SF x 0.62 = 620 gallons
- 19" (typical coastal total rainfall) x 1,000 SF x 0.62 = 11,780 gallons
- 50" (typical foothills total rainfall) x 1,000 SF x 0.62 = 31,000 gallons

**It adds up quickly, even in dry areas. Try to save as much as you can in your landscape sponge!**

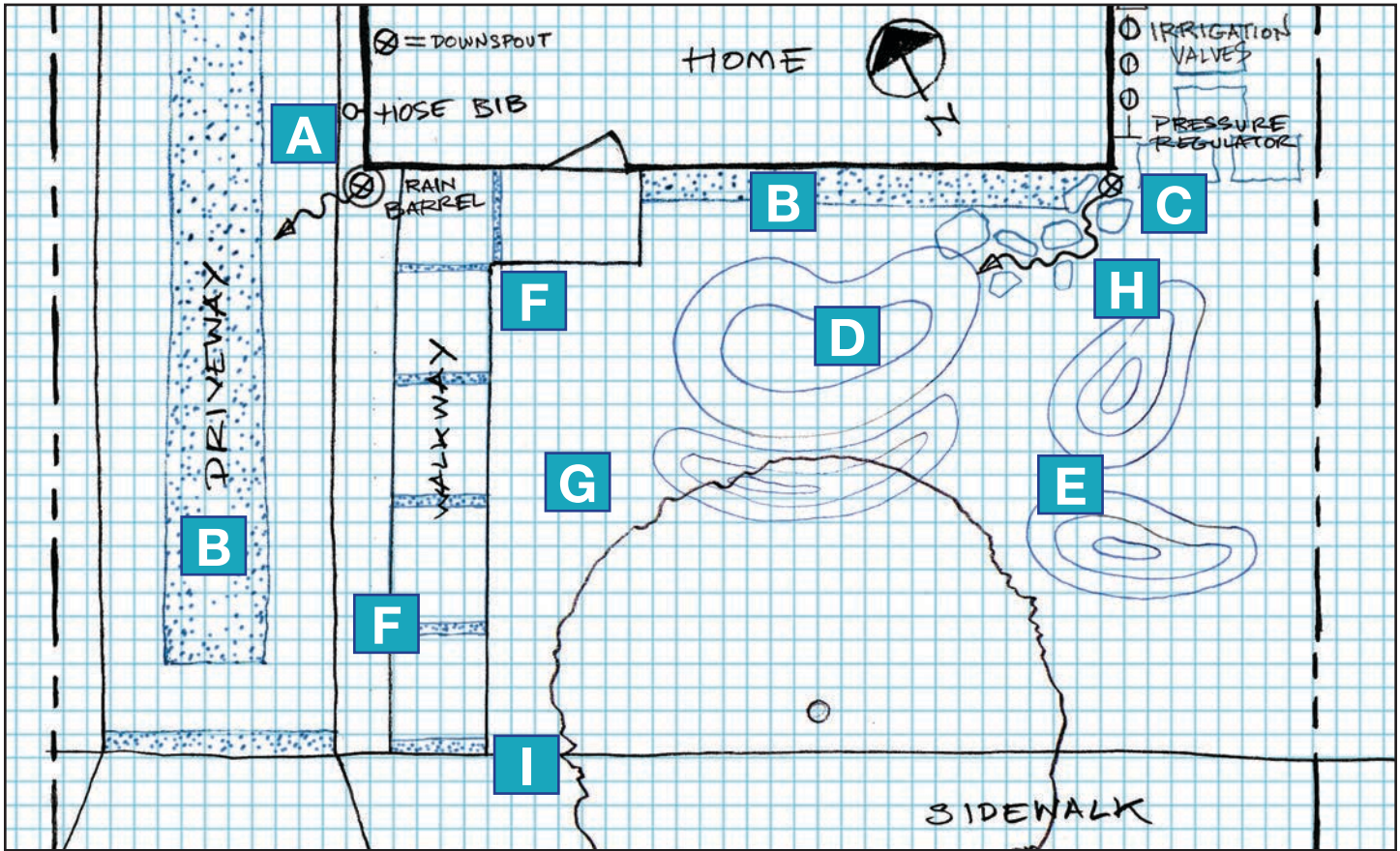
Imagine the water from your garage roof splits into two downspouts and Your Total Roof Area is 20' x 50' = 1,000 SF

If half of the water goes into each downspout, then the roof size for one downspout is: 1,000 SF ÷ 2 = 500 SF

**Now calculate how much water that is in gallons from each inch of rain coming from one downspout:**

1" x 500 SF x 0.62 = 310 gallons of water per inch of rain per downspout.

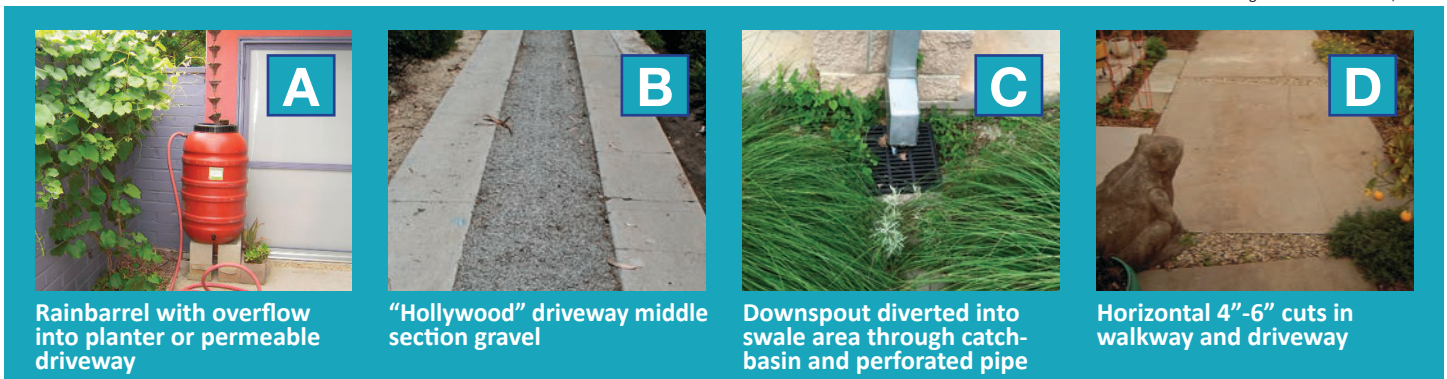
# Swales are Swell



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- A Downspout Redirected Into Rainbarrel** and away from the foundation of the residence. Overflow from rainbarrel slows down into gravel in the middle of driveway.
- B Concrete Removed and Gravel Installed** in middle of driveway and across the front of the residence. The 18" wide gravel area reduces erosion under roofline.
- C Downspout Diverted Into A Catchbasin** which is connected by perforated pipe into the swale area of the landscape. This should eliminate the pooling and erosion caused by the downspout.
- D A Slight Depression**, or swale, has been dug out in the middle of the yard in the area where water always pooled. This swale is only 12" deep in the middle (see p. 29).
- E Relocate Soil As Berms** when digging out the swale and the driveway area. Relocated soil becomes raised or mounded areas (berms) on either side of the depressed area. The berms become places for plants that like fast drainage (see p. 42).
- F Horizontal 4" - 6" Cuts** have been made in the walkway and across the end of the driveway and filled with 1/4" - 1/2" crushed gravel.
- G Living Soil** is being created with Sheet Mulching using 4" - 6" of mixed leaf and bark tree trimmings covering the whole yard (see p. 38).
- H Stones And Boulders**, most typically no more than 12" - 18" in diameter, are used to retain the edges of the swale and provide visual interest in the landscape (see p. 42).
- I Overflow** of excessive rain should be directed through the garden and out to the street, not on to neighboring properties.

Images © Pamela Berstler, 2018



**A** Rainbarrel with overflow into planter or permeable driveway

**B** "Hollywood" driveway middle section gravel

**C** Downspout diverted into swale area through catchbasin and perforated pipe

**D** Horizontal 4"-6" cuts in walkway and driveway

# How much **Water** does your garden **Need?**

## Evapotranspiration (ET) is the key to watering plants.

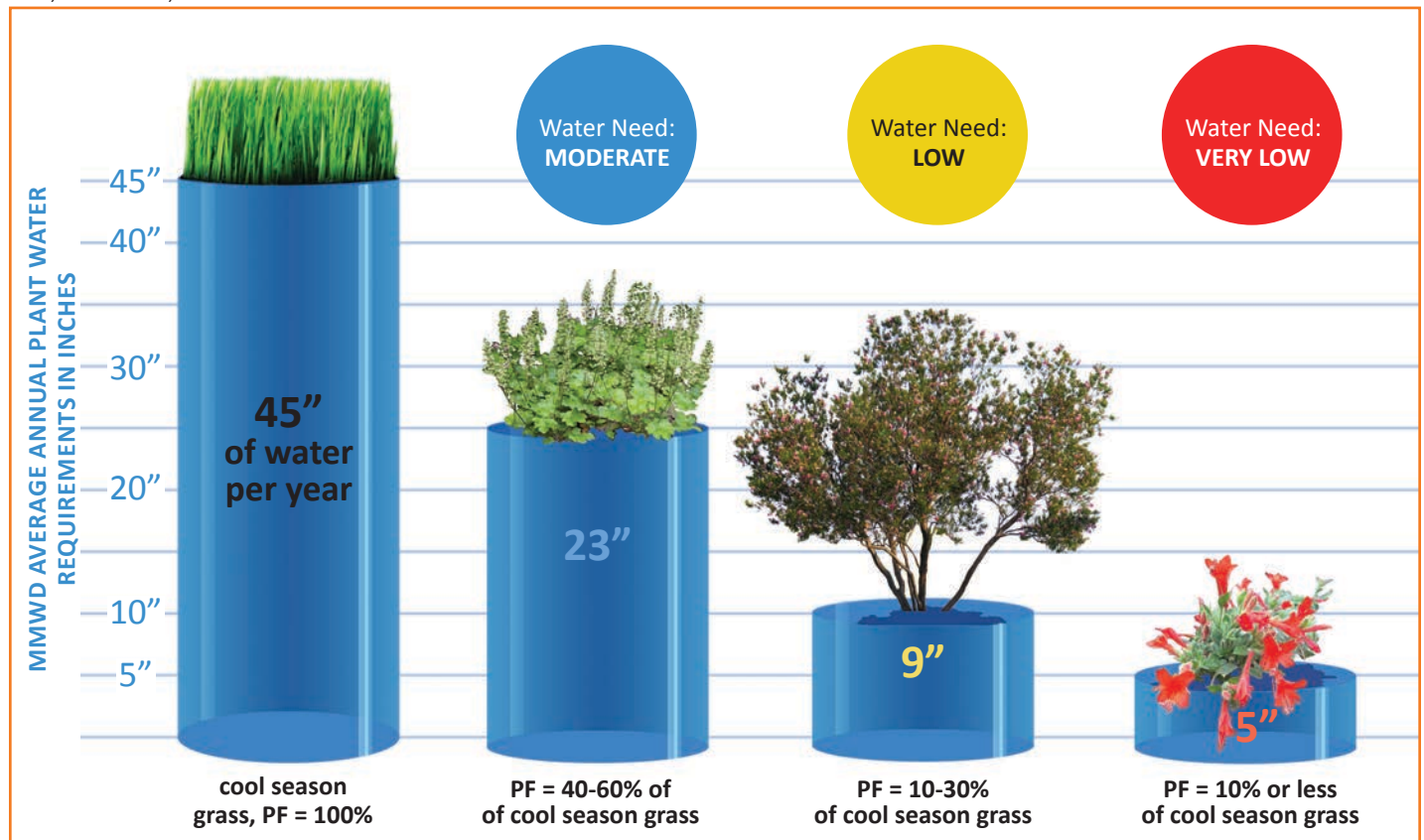
Evapotranspiration (ET) can be thought of as “reverse rain.” ET measures the inches of water being transferred over some period of time from the land to the atmosphere by evaporation from the soil and other surfaces and by transpiration (sweat) from plants. ET is a quick way to explain environmental and climate conditions, especially solar radiation (sunshine or cloud cover). Many plants need more water in the summer, when the sun is high and days are long; winter days are shorter and often rainy or overcast, so many plants need less water.

ET therefore, explains how much water plants really need and when they need it; critical information for planning irrigation and managing the **Soil Moisture Account** (see p. 50).

**Plant Factor (PF)** describes the specific water need of each plant in your landscape. PF can be determined by gathering information about a plant and then comparing it to the amount of water needed by cool season grass growing in your climate zone. PF is expressed as a percentage of the water needed by cool season grass. Plant watering needs, include: **VERY LOW at 10%**, **LOW at 20%**, **MODERATE at 50%** and **HIGH at 100%** (cool season grass).

**Landscape Water Need** takes into consideration the effects of irrigation efficiency (IE Percentage) and square feet of landscaped area (SF) to figure out how many gallons of water a particular landscape would require, given its climate zone (ET Inches) and plant selection (PF Percentage).

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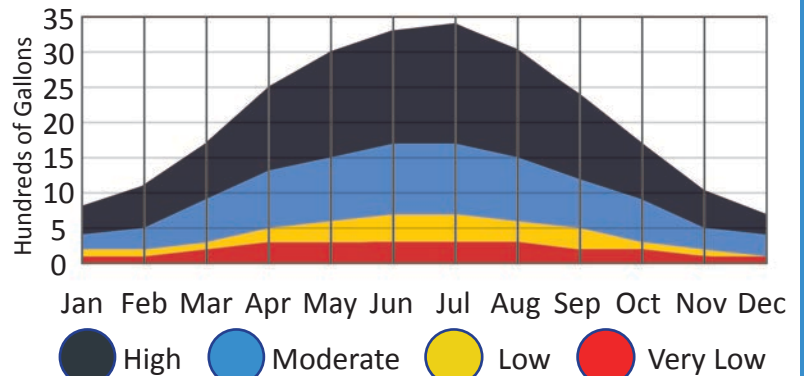
### Reduce Landscape Water Need: Understand ET, PF and IE

Every plant choice gives us the opportunity to reduce the Landscape Water Need.

In our 875 SF Front Yard, replacing **HIGH Plant Factor** cool season grass with **VERY LOW Plant Factor**, climate-appropriate plants saves about 32,000 gallons of water annually, without changing irrigation efficiency (see p. 51).

Converting to drip irrigation with a higher IE saves even more (up to 20%)!

### 875 SF Landscape Water Need By Plant Factor





# How much **Water** can your new garden **Save?**

## Calculate your landscape watering need in Gallons.

### Our Front Yard Landscape Water Need:

Our front yard is 875 Square Feet (Landscape SF). In order to calculate the Landscape Water Need, we will keep climate zone (ET Inches) and irrigation efficiency (IE Percentage) constant, but change the plant selections (PF Percentage). See how much water could be saved every year by switching from cool season grass and replacing the area with climate-appropriate **MODERATE**, **LOW**, or **VERY LOW** water requirement plants.

**Landscape SF = 875    Annual ET Inches = 45"    Irrigation Efficiency % = 70%**  
**Landscape SF x ET Inches x Plant Factor % ÷ Irrigation Efficiency % x 0.62 = Landscape Water Need in Gallons**

Grass  
Water Need:  
**HIGH**

**HIGH Water Need**  
Plant Factor = 100% = 1.0

875 SF x 45" x 1.0 ÷ 0.70 x 0.62 =  
**34,875 Gallons Annually**

New Front Yard  
Water Need:  
**MODERATE**

**MODERATE Water Need**  
Plant Factor = 50% = 0.50

875 SF x 45" x 0.50 ÷ 0.70 x 0.62 =  
**17,438 Gallons Annually**

In our 875 SF Front Yard, replacing cool season grass with **MODERATE** climate-appropriate plants saves 17,437 gallons of water annually, without changing irrigation efficiency.



**LOW Water Need Plant Factor = 20% = 0.20**

875 SF x 45" x 0.20 ÷ 0.70 x 0.62 =  
**6,975 Gallons Annually**

Replacing cool season grass with **LOW** Water Need plants saves 27,900 gallons of water annually, without changing irrigation. Change irrigation to drip with IE= 90% and save 29,450 gallons annually.

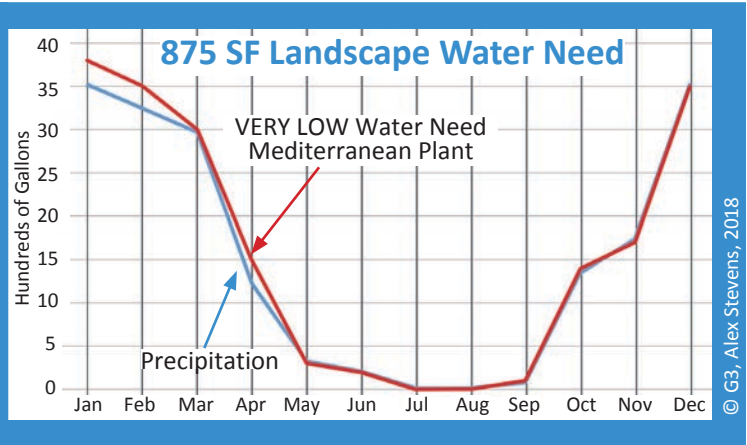
**VERY LOW Water Need Plant Factor = 10% = 0.10**

875 SF x 45" x 0.10 ÷ 0.70 x 0.62 =  
**3,488 Gallons Annually**

Replacing cool season grass with **VERY LOW** Water Need plants saves 31,387 gallons of water annually, without changing irrigation. Change irrigation to drip with IE= 90% and save 32,162 gallons annually.

**Sleep in summer, Grow in winter: Mediterranean climate-appropriate plants**

Since many climate-appropriate plants from Mediterranean climates have **MODERATE**, **LOW** or **VERY LOW** water needs, planting them saves water when compared to cool season grass. However, most of these plants don't want water in the summertime when they are dormant; they want water in the winter, when they can grow their roots in cool soil using rainwater. Irrigation needs can be reduced by directing rainwater to the garden from the roof and other surfaces in the winter months. But beware the dry winter -- these plants will need supplemental irrigation in winter if they are to survive the following summer.



# Go with the **Low Flow**: Spray or Drip?



Image courtesy of Rain Bird Corporation

**Spray Irrigation** emits water in an overlapping (head-to-head) pattern.

This can be an efficient way to irrigate large landscapes with groundcover or uniform plant material like lawns or meadows.

When properly installed, low volume spray heads apply water at about 1/3 the rate of conventional spray heads. The newer spray irrigation heads are improved so that they spray heavier water droplets that are more resistant to wind. Landscapes with grade changes using spray heads should have check valves installed to prevent water from flowing out of the heads at the lowest point in your landscape.

**Gallons Per Minute (GPM)** Spray systems apply water in GPM. If you know the application rate of each spray head, the distance between heads, and the pressure of your system, it is relatively easy to figure out how much water is applied every time you run your irrigation.

**Challenges** include irrigating very narrow areas surrounded by hardscape, or irregular patterns. Irregular patterns are particularly challenging because spray irrigation requires head-to-head coverage to be efficient and odd-shaped areas may be under- or overwatered. Replace high-volume spray heads that emit water at a much higher rate than the soil can absorb with low-flow heads, and remember to cycle and soak if you experience runoff (*see p. 51*).



Image courtesy of Rain Bird Corporation

**Drip Irrigation** delivers water directly to roots.

Since drip irrigation is covered with soil or mulch, water does not evaporate as quickly as it might if it were applied at the surface by spray.

Installations of subsurface (or under at least 2 inches of mulch) systems may be the most efficient way to irrigate nearly every type of garden area. Since the tubing is flexible, it can be made to accommodate a wide variety of irregularly shaped areas or rectangular areas when laid in a grid pattern.

**Gallons Per Hour (GPH)** Drip systems apply water in GPH. They need to run for longer periods of time than spray systems. However, the actual run time must always account for how fast water is applied (precipitation rate) and eliminating runoff.

**Challenges** include the possibility that drip systems could apply water too quickly for the soil to absorb, so careful consideration is required especially when dripline grids are installed (*see p. 49*). Drip irrigation operates most efficiently at low pressure (between 15 and 30 psi). Optimal performance requires the use of pressure regulation and a filtering system to keep the emitters from becoming clogged. Most low flow valves have pressure reduction and filtration included, so replace all valves that are not specified for low flow systems.



## What is a Tattle-Tale?

Screw a white cap (replacing the nozzle) on to the pop-up riser of one sprinkler head on each line when converting to drip.

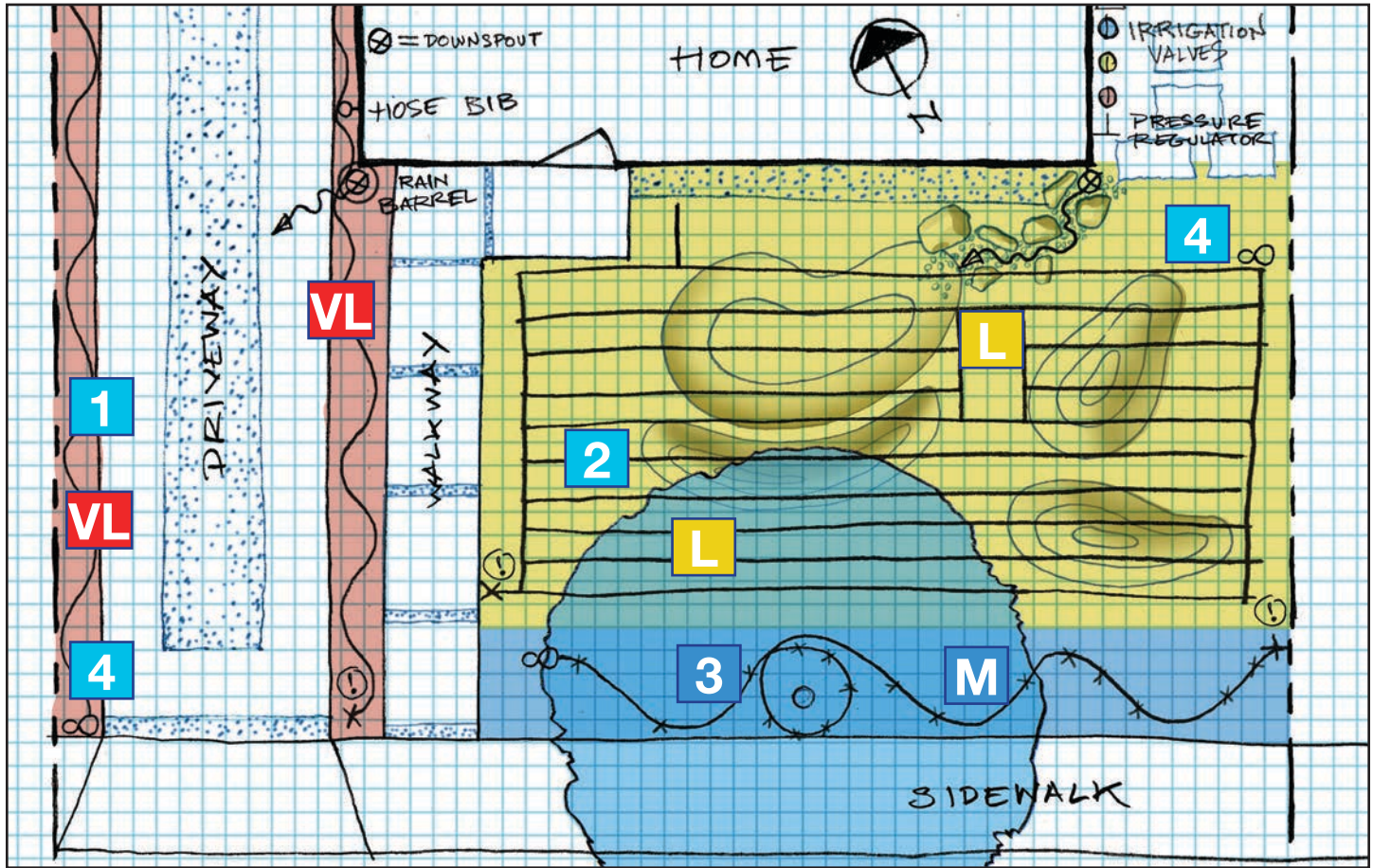
When the drip irrigation is running below the mulch, the tattle-tale will pop up and let you know that the irrigation is on.

## What is a Low Flow Valve?



Irrigation valves are designed to work within a certain pressure range (pounds per square inch or psi) and flow range (gallons per minute or GPM). If you redesign your system and use low flow irrigation, the flow through the valve may be so low that your existing valve will not operate effectively and may get stuck in the "open" position, wasting water. If you have flow lower than 5 GPM per valve, check your valve specifications for flow range to determine whether or not to replace your valves.

# Match Irrigation to new Hydrozones



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## Adjust Valve Zones to Hydrozones.






Which sprinkler heads go on at the same time and what kind of plant material are they irrigating? Get ready to make changes to your irrigation system in order to accommodate both the new grading and the new plants you are introducing into your garden. In our example garden, we have three different hydrozones.

**VL** **VERY LOW** water use plants in the strips along the driveway will have **in-line drip irrigation in a random pattern** around each plant.

**L** **LOW** water use plants in front yard dry creek and berm areas will have an **in-line drip irrigation line in a grid pattern**; the grid pattern is better for situations where you want to achieve a more uniform wetting pattern that works especially well with groundcovers and high-density mixed planting.

**M** **MODERATE** water use plants in the parkway will have an **on-line or "point source" drip irrigation line in a random**

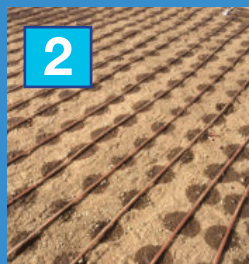
**pattern** around each plant; note that the tree gets special attention with an extra ring to accommodate its expected growth.

-  **END FIGURE "8" FLUSH VALVE**
-  **TATTLE TALE**
-  **ONLINE DRIP LINE**
-  **IN-LINE DRIP LINE**
-  **MULCH OR GRAVEL**

Images courtesy of Rain Bird Corporation



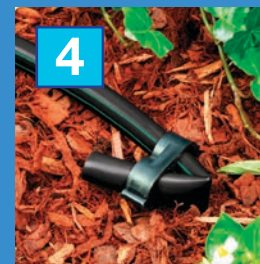
On-line drip emitter inserted into blank tubing



In-line drip grid emitters are built into tubing



Tree drip ring needs to expand as tree grows



Dripline end figure 8 can double as a flush-out valve



# Manage water for OWL

© Mike Watkins, 2018

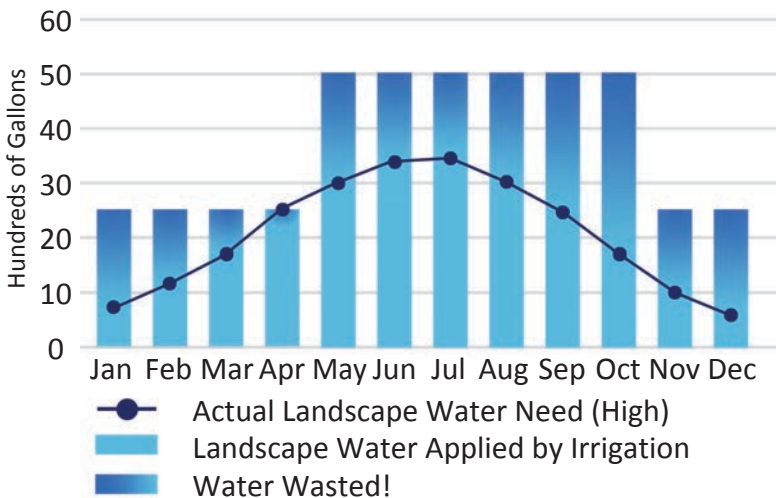
## Balance your soil Moisture account.

The objective of managing water wisely in the landscape is to keep just the right balance of oxygen and water so that plants look great, stay healthy, and the soil microbes are kept awake cycling nutrients. When oxygen and water are in balance within the soil, the amount of water that is lost through evapotranspiration (ET) is just like writing a check for water out of the soil bank account (*see p. 46*).

Rain and irrigation deposit water into the soil checking account. The trick is to make sure not to apply more water than is needed in dry months, and to hold on to rainwater in the wet months. Most people apply more irrigation water than their landscape really needs. The amount of wasted water can be greatly reduced by closely managing/adjusting the landscape water applied through irrigation.

How do we tell when the account is depleted? Smart irrigation controllers and landscape professionals are able to calculate this OR you can rely on using a soil moisture probe or even probing with your fingers.

### 875 SF Landscape Water Not Well Managed



### Wet or Dry?

Use “digital” technology! Soil may appear dry on the surface, stick your finger into the soil and make sure it’s wet below. If it’s wet up to your second knuckle, it doesn’t need any more water, so wait

another day or two. Alternatively, if you use a soil probe, you can feel the moisture in the soil and make a determination yourself (*see p. 36*). You can look at plant health to determine water need, but sometimes overwatering and underwatering will produce similar symptoms in plants.

### Underwatering Symptoms

- Soil is bone dry
- Older leaves turn yellow or brown or drop
- Leaves are wilted
- Leaves curl and become brittle
- Stunted growth
- Plant is dead!

### Overwatering Symptoms

- Soil is constantly saturated
- Leaves turn a lighter shade of green or turn yellow
- Young shoots are wilted
- Leaves are green yet brittle
- Algae and mushrooms are present
- Growth is excessive or stunted
- Plant is dead!

## Keep Water in the root zone.

Observe the irrigation while running and check to make sure that no water is spraying or flowing onto sidewalks, patios or structures. If the water is being applied too fast for the soil to absorb, runoff will occur. Puddling and pooling also may be an indication that water is applied too fast or too often. Repairs to broken pipes and heads should be made immediately, or the system should be turned off until repairs can be made. The optimal time to water is in the late evening and very early morning. Check with MMWD for any watering restrictions.



**Install a “Smart” Irrigation Controller** that automatically adjusts irrigation schedules in response to changing site and/or weather conditions; most of these interface with mobile devices and computers, so you can change the programs in your pajamas. ET (Evapotranspiration) controllers monitor weather conditions and Soil Moisture Sensors directly sample moisture in the soil profile. When selecting a controller, look for brands with the EPA WaterSense® label.

**Cycle and Soak Programming** eliminates water runoff. Observe how quickly runoff occurs when you are running your irrigation. This is the MAXIMUM run time for your irrigation controller in this hydrozone. So, to cycle and soak your irrigation, you divide up the total minutes required by the hydrozone into blocks of time no longer than the observed runoff time and allow a 30 minute rest period in between the irrigation cycles. **For example, if we need 12 minutes of water in a certain hydrozone, but we observe runoff after 4 minutes, break down the 12 minute total into three 4 minute cycles with 30 minutes between each cycle.**

**Hand Watering** is especially good for getting a garden established when you are going to want to spend more time looking at the plants to make sure nothing is amiss. During establishment you may need to water more frequently because roots are only 4”-10” deep on a newly-planted one gallon plant. (That’s why it’s great to try to plant during the rainy season!) Be sure to use a hose shutoff so that you are not inadvertently wasting and spraying water into the street. Ask your designer or landscaper to get you a hose shutoff, if you don’t yet have one.

Really look at your plants. Are they appearing droopy or sad? Is the soil very dry? If so, then give the plants a good drink and watch. Don’t water more than two days in a row, and let the soil partially dry out before watering again. Remember the symptoms of overwatering and underwatering are very similar (*see p. 50*).

**After the first year or two, once your plants are settled, your watershed wise garden should not need water more than once or twice a month, if at all. If you are at the coast, you may be able to eliminate regular irrigation all together after establishment.**

**Pressure Regulation** either for the whole house, or at each irrigation valve for each zone, eliminates excess pressure, and allows the irrigation system to run more efficiently. If you are keeping a spray system, pressure regulation will reduce misting and evaporative loss. With drip systems, pressure regulation is essential, because drip lines operate best at very low pressure.



Hose Shutoff Nozzle

### What Is Irrigation Efficiency (IE)?

Irrigation Efficiency describes how well your irrigation system is delivering water to the plants you are intending to irrigate. Since no mechanical system could be 100% efficient, the IE of any particular irrigation system will always be less than 100%. A well maintained spray system may achieve 70% IE, while a drip system could be as high as 90% IE.

Since there are many inter-connected mechanical parts of a system, there are lots of ways your irrigation can become inefficient and begin applying water in places that are not beneficial to your landscape. IE depends upon four key elements:

- 1 Design of your system reflects the best components for the specific conditions of your site.
- 2 Installation of the system uniformly distributes the water to the plants in the landscape.
- 3 Management of the system correctly balances the soil moisture account.
- 4 Maintenance adjustments and repairs are made frequently.

### Tips for Eliminating Runoff

Several things can be done to minimize runoff due to irrigation. These include:

- 1 Convert planter area spray systems to drip irrigation with the lower precipitation rates, pressure regulation and a filter.
- 2 Tune up spray irrigation systems so there is no overspray on to hard surfaces.
- 3 Do not install spray irrigation in areas that are too narrow for spray (10’ wide or narrower).
- 4 Move spray heads 24 inches from any buildings or hard and impermeable surfaces.
- 5 Cycle and Soak irrigation run times.
- 6 In lawn areas, be sure to follow the organic maintenance practices to keep your soil spongy (*see p. 58*).



# Select Climate-appropriate plants

© Pamela Berster, 2018



leathery



tiny

California native plants have evolved over time to thrive in our unique and varied climate conditions. By learning to recognize their adaptation tricks, you can identify climate-appropriate plants wherever you are. These four characteristics will allow you to find climate-appropriate plants in a crowded nursery.

### Stiff or Leathery

These leaves hold on to water and stay evergreen for most of the year.

### Silver or Hairy

Light colored leaves reflect sunlight, cooling the plant. Hairy back sides of leaves hold moisture longer, cooling them off.

### Tiny or Little

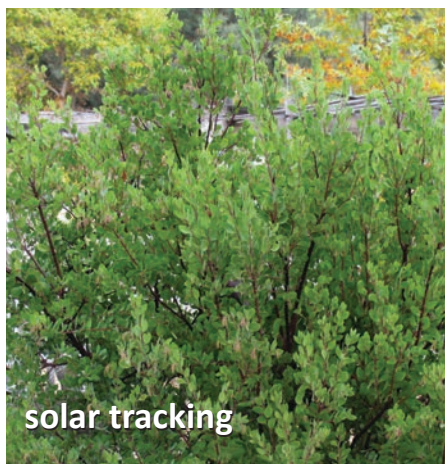
Small leaves are like tiny solar panels that are easier to keep cool than one large hot surface.

### Solar Tracking

Leaves that appear to be standing at attention, straight up and down in the middle of the day, are solar tracking. As the day progresses, or if you see the same plant in the early morning, you will find that the leaves are more horizontally oriented. This plant is moving its solar panels to minimize the hottest sun exposure. California native manzanitas (*Arctostaphylos*) are notorious for this adaptation.



silvery



solar tracking

# Group plants by **Hydrozones**



## Hydrozone Rules

- Plants with similar cultural and water requirements should be planted together in order to irrigate them efficiently.
- Consider the soil, water needs, sun/shade and temperature requirements for each hydrozone.
- Each hydrozone should be watered by a separate irrigation valve.
- Do not mix plants with different water requirements in the same hydrozone.
- Do not mix different irrigation types in the same hydrozone.
- The irrigation of each hydrozone should have matched precipitation (every nozzle needs to emit the same gallons per minute or in drip systems, gallons per hour).

### Five Sun Lovers With Moderate Water Needs



1 *Lonicera involucrata*  
*Twinberry*



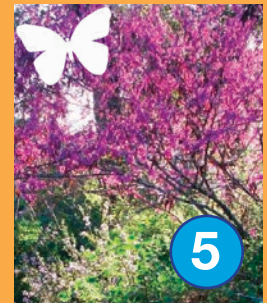
2 *Abelia x grandiflora*  
*Glossy Abelia*



3 *Calycanthus occidentalis*  
*Western Spicebush*



4 *Muhlenbergia capillaris* 'Regal Mist'  
*Pink Muhly Grass*



5 *Cercis occidentalis*  
*Western Redbud*

### Five Sun Lovers With Low Water Needs



1 *Sphaeralcea ambigua*  
*Desert Globemallow*



2 *Salvia mellifera*  
*Black Sage*



3 *Eriogonum giganteum*  
*St. Catherine's Lace*

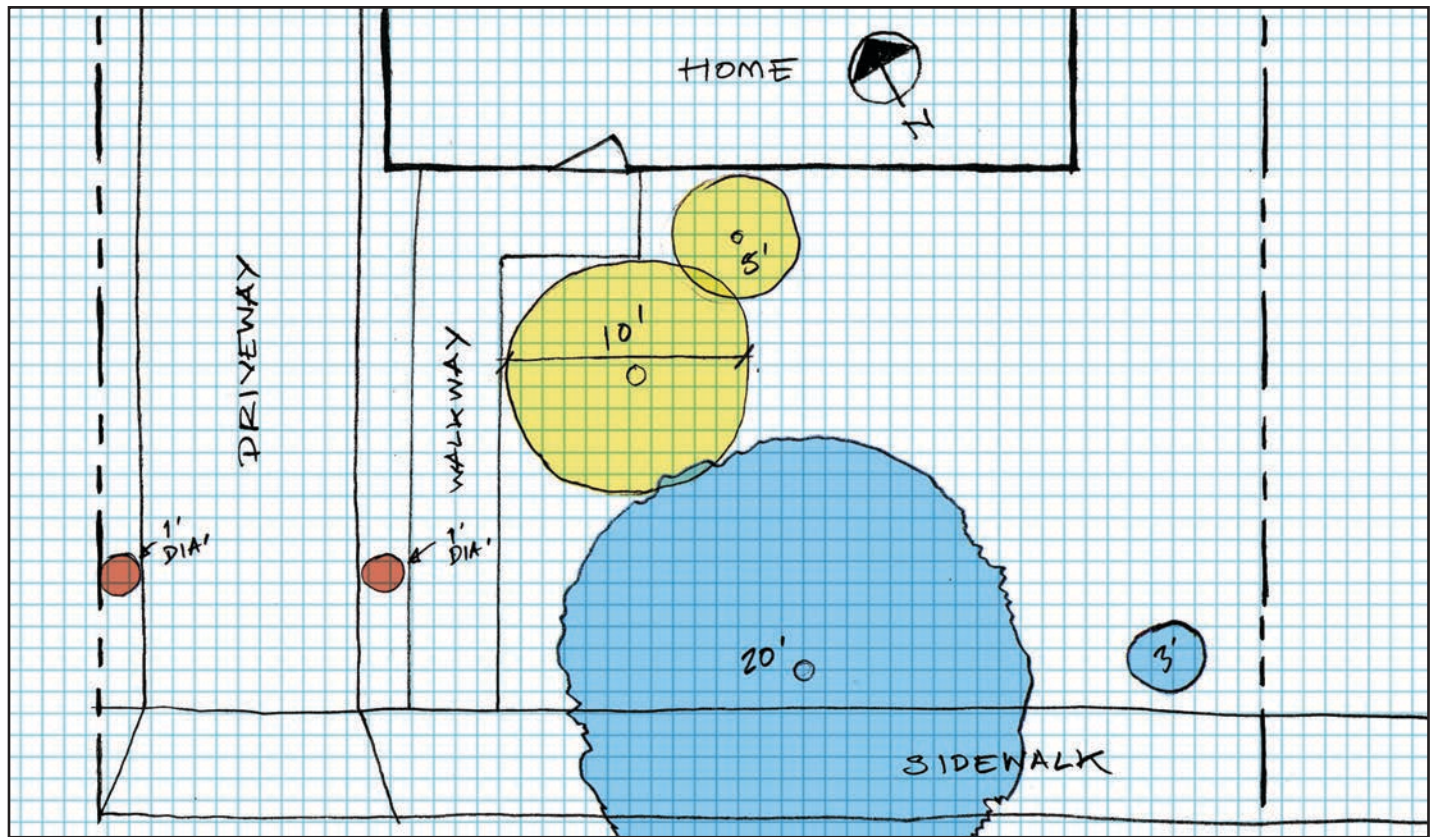


4 *Muhlenbergia rigens*  
*Deer Grass*



5 *Ribes menziesii*  
*Canyon Gooseberry*

# Plant in the Hydrozone



**A Guide to Plant Water Needs**  
(see p. 46):



**Moderate**



**Low**



**Very Low**

## Group Plants by **Water Needs** (Hydrozone) and plan ahead for **Maturity**.

Proper plant placement, considering mature plant size, should limit the need for future pruning and reduce the amount of maintenance required in the long run. Natural forms are encouraged for habitat value, but fire prevention does require pruning and removal of dead, diseased, damaged and deranged plant material.

### Scale Your Plants for Maturity

Make circles on your plan the size of the plant at maturity using a 1/4" = 1' scale (each box = 1').

Practice using colored paper to indicate the water needs of the plants. It will make it easier to lay out the planting plan in irrigation zones if you easily can move around the paper circles.

See on the plan how big the (VERY LOW water use) 20' wide canopy trees will be at maturity. Will this change the microclimates in the future? Think ahead if your new trees will cover a whole yard that's now sunny.

### Play By The Hydrozone Rules

- Plants with similar cultural and water requirements should be planted together in order to irrigate them efficiently.
- Consider the soil, water needs, sun/shade and temperature requirements for each hydrozone.
- Each hydrozone should be watered by a separate irrigation valve.
- Do not mix plants with different water requirements in the same hydrozone (see p. 53).
- Do not mix different irrigation types in the same hydrozone (see p. 48).
- The irrigation of each hydrozone should have matched precipitation (every nozzle needs to emit the same gallons per minute for spray or gallons per hour for drip).

### Root depth matters

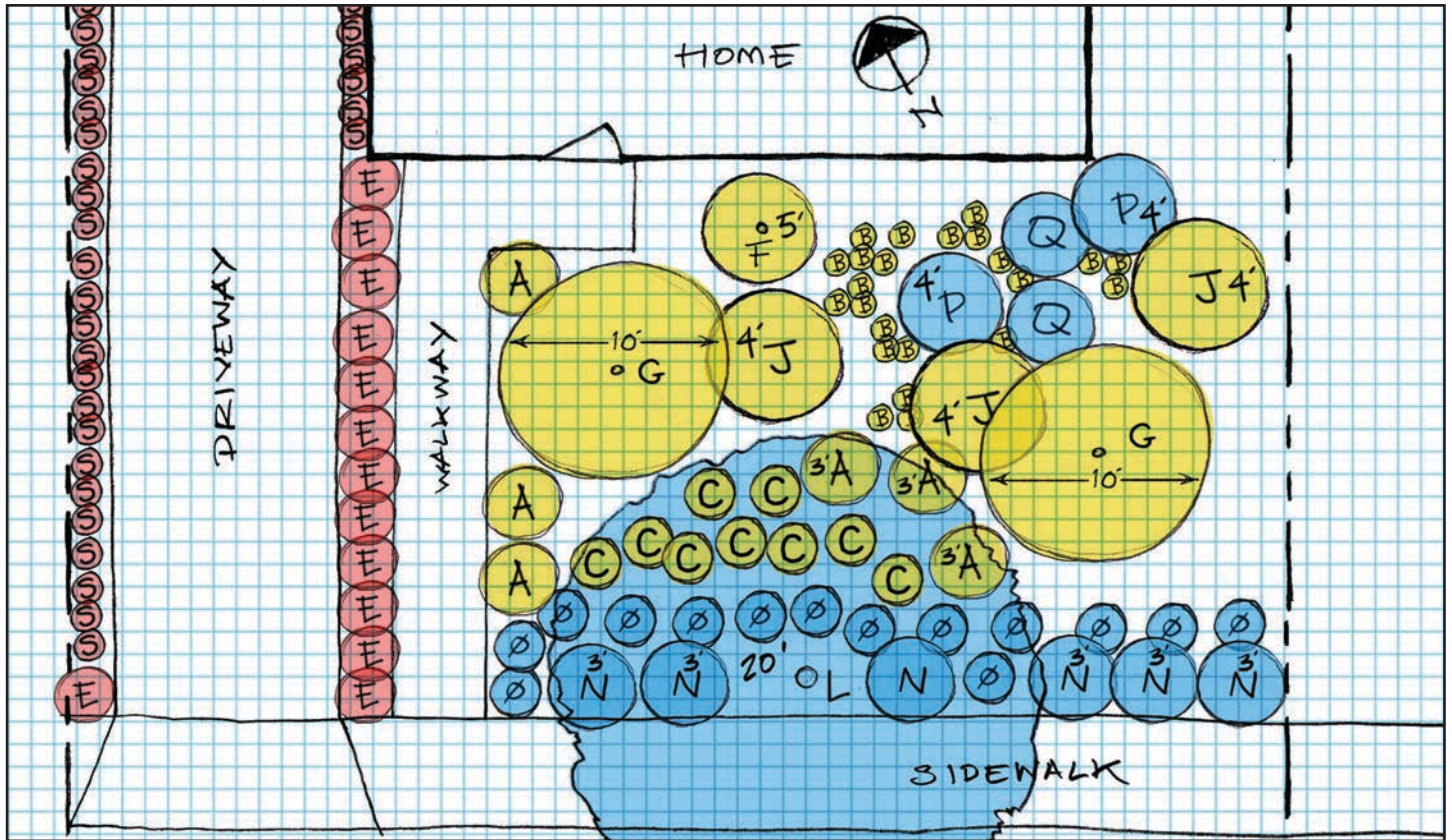
Make notes about the root depth of the plants when you are placing them on your plan. Trees, with their deep roots, will be irrigated less frequently, but for a longer time. Groundcovers with shallower roots will require more frequent watering.  
**Keep trees and groundcovers on separate hydrozones.**

### Small plants are mighty

Once planted in a properly prepared bed, and watered wisely, small plants establish themselves more vigorously than plants raised in larger containers. But just because you've selected small plants, doesn't mean you need to buy more than the space allows when those plants reach maturity!



# Make your Planting Plan



© G3, Alex Stevens, 2018

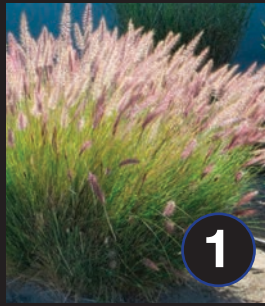
Qty.	Symbol	Form	P	Botanical (Latin) Name	Common Name	Plant Factor	Sun	Dimension H' x W'	D/E/S	Flower Color	Page
6	A	Groundcover	x	Achillea millefolium	Common yarrow	L	F	2' x 3'	S	various	24
23	B	Grass		Carex pansa	California meadow sedge	M/L	F	1' x 1'	E	wheat	19
9	C	Grass		Carex tumulicola	Foothill sedge	L	F/PS	1' x 2'	E	cream, rust	27
13	E	Perennial	x	Erigeron glaucus	Seaside daisy	L/VL	F/PS	1' x 2'	E	lavender, yellow	22
1	F	Groundcover	x	Salvia 'Bee's Bliss'	Bee's Bliss sage	L	F/PS	2' x 5'	S	pink, lavender	10
2	G	Perennial	x	Solidago velutina ssp. californica	California goldenrod	L	F/S	5' x 10'+	E	yellow	25
3	J	Perennial	x	Verbena bonariensis	Purpletop vervain	L	F	4' x 3'	E	purple	14
1	L	Tree/Shrub	x	Cercis canadensis 'Forest Pansy'	Forest Pansy redbud	M	F	20' x 25'	D	purple	17
6	N	Perennial	x	Iris douglasiana	Douglas iris	M/L	F/S	2' x 3'	E	various	8
14	O	Perennial	x	Geranium sanguineum	Bloody cranesbill	M	F/S	2' x 3'	S	fuchsia pink	19
2	P	Perennial	x	Pacific Coast iris	Pacific Coast iris hybrids	M/L	PS	2' x 1'	E	various	27
2	Q	Perennial		Juncus patens / Juncus effusus	California wiregrass	M	F/PS	3' x 3'	E	brown	29
31	S	Grass		Festuca idahoensis	Idaho fescue	VL	F	1.5' x 1'	E	wheat	27

**Plan for Planting.** Start with a copy of your **Microclimates Maps** (see p. 35). Begin the plant design process by selecting the right plant for the right place in your garden. Use the Plant List above to practice matching plants with the conditions, and represent the plants with circles the appropriate size and color reflecting water requirements. This is the foundation of your Plant Shopping List (see p. 69). It's just a paper plan, so move things around! Experiment!

- 1 Take into consideration microclimates and select plants that need Full Sun, Part Shade or Shade as appropriate.
- 2 Consider Plant Factors - Low or Very Low plants on berms and Moderate plants in the swales.
- 3 Consider the height, width and root depth of each plant.
- 4 What form of plant do you desire - Grass or Groundcover, Vine, Shrub, Perennial, or Tree?
- 5 Once you've drawn your plan, count the number of plants you will need to order and mark them in the Quantity box.

# Don't plant a Pest

## Remove These Invasive Plant Pests



**1** *Pennisetum setaceum*  
African Fountain Grass



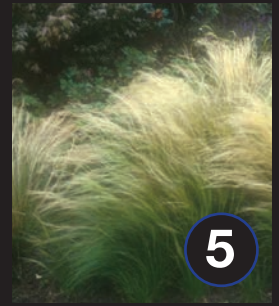
**2** *Vinca major*  
Periwinkle



**3** *Cotoneaster*  
Cotoneaster



**4** *Cytisus scoparius*  
Scotch Broom



**5** *Nassella tenuissima*  
Mexican Feather Grass

Some exotic plants such as these and species of *Pyracantha*, Algerian ivy (*Hedera Algeriensis*), privet (*Ligustrum*) and panic veldtgrass (*Ehrharta erecta*) can be innocently planted without realizing they end up beyond the far reaches of our gardens when birds, wind or water carry them to areas where they are difficult to control.

Their spreading and greedy behavior can take over native habitats, inhibiting areas for all to enjoy. Few of these species offer any benefits to the local animals and insects. Invasive species and species that act like invasives should be removed from your gardens, removed from nursery stock and should not be planted in the first place.

## Plant These Well Behaved Alternatives Instead



**1** *Melica imperfecta*  
Small Flowered Melica



**2** *Campanula poscharskyana*  
Serbian bellflower



**3** *Heteromeles arbutifolia*  
Toyon / Christmas Berry



**4** *Peritoma arborea*  
Bladderpod



**5** *Stipa cernua*  
Nodding Needlegrass



**PlantRight** [www.plantright.org](http://www.plantright.org)

Since 2005, PlantRight has been working with California's nursery industry to stop the sale of horticultural invasive plants in ways that are good for business and the environment. PlantRight unites leaders from California's nursery and landscape industries, conservation groups, academia, and government agencies in a voluntary, science-based, and collaborative way. PlantRight's Plant List, identifying the highest priority invasive garden plants, is the cornerstone of the program. For each plant on the invasive plant list, PlantRight suggests several non-invasive alternatives. Retailer partners pledge not to sell any plants on the Plant List, and any plants added to the list in the future. To track its progress and inform the plant list, PlantRight conducts a survey of retail nurseries throughout the state. PlantRight also has a Continuing Education program available for free to anyone who wants to learn about horticultural invasive plants.



**California Native Plant Society (CNPS)** [www.cnpsmarin.org](http://www.cnpsmarin.org) [www.calscape.org](http://www.calscape.org)

Our gardens play an important role in local ecosystems. The plants we choose for our gardens have the power to support pollinators, build wildlife corridors, and restore our natural landscapes. **Calscape.org**, is a tool CNPS has developed that makes it easier for gardeners to create thriving, natural gardens and avoid invasive plants. Use it to discover which plants are native to your location and to search by water requirements, blooming season, pollinator habitat and more. You also can build custom plant lists and find nearby nurseries who carry the plants you want. In addition to online resources, CNPS has 35 local chapters statewide that host native plant sales, garden tours, field trips, and expert talks.

# Do Plant with Confidence

## Get ready to **Install** plants!

Follow these simple steps to achieve healthier roots and stronger overall plant growth. It will take a contractor longer to plant this way, so expect a higher installation cost. However, the outcome is less plant shock and better, faster establishment of vigorous plants.

### You Will Need:

- Tools: shovel, hand trowel, buckets, hose with shut-off nozzle
- Plants
- Compost
- Mulch

### Add These For More Advanced Planting:

- Mycorrhizae (not for grasses)
- Fish Emulsion or Water Soluble Humates

All photos this page: © Paul Herzog, 2018



## What's with all the **Water**?

**Drainage.** If the water does not drain within an hour or so, it's probably not a good place to plant a climate-appropriate plant until you fix the soil compaction (see p. 37). Squared holes in heavy clay soil drain faster, and the corners facilitate root establishment.

**Kickstart OWL.** By watering so thoroughly, you are getting soil organisms that might be in the surrounding soil ready to "wake up" and start cycling nutrients for the plant.

**Plant Shock.** The major reason plants suffer from planting shock is that the dry soil around the new plants wicks water away from their rootball, sending plants into shock from which they never recover. By watering the surrounding soil, you reduce the probability of plant shock. Also, planting on overcast days, late in the afternoon on hot days, and in the rainy season help with overcoming plant shock.

## Successful Planting In Ten Easy Steps

1. **Dig A Hole!** Don't dig it any deeper than the rootball of the plant. Do dig at least a little bit wider than the plant to loosen the surrounding soil. If you accidentally dig too deep, be sure to put the soil back in and tamp it down firmly before moving on, to give your plant a solid base.

2. **Throw In Some Compost** or worm castings no more than 1" deep - along the bottom of the hole. Never put mulch in a hole! **And don't bother with fertilizers either.**

3. **Fill The Hole With Water TWICE**, and allow it to drain completely each time. This will take a long time, unless your soil is really sandy. Start digging the next hole, or take a break.

4. **Submerge The Rootball** in a bucket of water until air bubbles stop bubbling up. Keep the plant in its container, or you can take it out - just be careful with the delicate roots.

5. **Add Fish Emulsion** or soluble humate to the water (follow label directions). Dust the rootball with a mycorrhizae inoculant (only if the plants are woody, so don't bother with the grasses).

6. **Place Plant In Hole**, make sure the root collar (that's where the roots join the stem or trunk) is a bit (1/2" - 1") higher than the surrounding soil/ existing grade. This is super important because we don't want the plant to get choked by the surrounding soil.

7. **Backfill The Hole With Water** one more time (this time with the plant in it) and let it drain completely.

8. **Now Fill The Hole With The Soil** you dug out (not with fancy potting soil!), making sure the soil slopes away from the root collar. Tamp the soil down (use your feet, but be gentle) so the plant doesn't move around.

9. **Don't Create A Bowl** around the plant. Really! Your plant doesn't need it and it might make a moat that would drown your climate-appropriate plant.

10. **Water The Soil All Around The Plant** one more time, and deeply. And have a drink of water yourself!

# Steward your land

© Marisa Torres, 2018



Congratulations! Your beautiful new garden is now installed. Your garden is alive (more alive now than ever) and it will need some tending to thrive. A newly planted garden requires some extra time and special attention to bring it to its full potential. Consider keeping your designer involved while the garden is establishing to keep things on track.

**Add Organics.** As mulch breaks down, add more! The easiest way to do this is to use falling leaves from your trees. A leaf-covered garden is a healthy garden! You can brush them off patios, walkways and stairs right onto the existing mulch. No falling leaves? You can get more mulch from your local composting facility, or order it from a local nursery or building supply yard. Remember to “chop it and drop it” when pruning.

**Weed.** You are going to have to weed, especially after the winter rains, and especially in the first year or two. Even with a thick layer of mulch, you may still have some weeds popping up. Be sure to eliminate them regularly, and then feed your soil some compost to improve the root systems of the plants. Consider cutting weeds down to the soil level rather than pulling out roots and disturbing the soil.

**Water.** Especially during the winters of the first two years after planting, you need to give your plants a little extra water. Not too much! Remember, these plants (and your soil) will be healthier, live longer, and grow stronger if you give them just enough water.

**Prune.** Get a good pair of hand clippers, gently prune trees, perennials, and grasses as needed. Mow your natural lawn annually after it has self-seeded to keep it clean and walkable. Don't mow it too short - look up the grasses and/or sedges that you used and follow growers' directions.

**Maintain For Rain.** Check downspout connections and overflows annually to make sure they're working properly. If you don't have gutters and downspouts, make sure there are no areas of erosion around your house. Consider adding a rain chain and small bit of gutter if you need to direct water away from a highly eroded area. Loosen your soil if it's become compacted. Remove and relocate extra soil or silt that's built up, and add mulch if needed.

**Harvest.** Fruits, vegetables, seeds and flowers - it's up to you to pick them when they're ready, before the birds and other creatures get them. If you have stiff competition in your neighborhood, invest in some bird netting or lightweight mesh bags and wrap your trees, vines, shrubs or the fruit itself a week or two before it's ready to harvest. Be sure to clean up and compost fallen fruit to limit pests.

**Integrated Pest Management (IPM).** A few aphids or caterpillars will feed the birds, but a massive infestation requires immediate action on your part. Remove diseased plant material and don't put it in your compost pile. Wash off unwanted insects with your hose. If they come back try spraying them with a mixture of mild dish soap and water, or with compost tea. Spread worm castings and mulch.

**Go Out and Have Fun!** By spending time relaxing and playing in your garden you will be more aware of how it's growing, how it changes, and what it needs.



## Maintain Lawn Organically

If you decide to keep your grass, follow these guidelines to maintain it organically so that it will play nicely with the rest of your watershed wise landscape.

- Aerate and de-thatch annually
- Topdress annually with 1/8" - 1/4" good well-decomposed compost or worm castings
- Manage your irrigation
- Mow less frequently
- Maintain 3" - 4" height on cool season grass and 1-1/2" to 2" height on warm season grass
- Grass-cycle every time you mow or use a mulching mower
- Do not allow seed heads to form on the grass (remove if they do)
- Consider over-seeding with clover to turn it into a “Natural Lawn”
- Eliminate chemical inputs

# Use this Maintenance Checklist

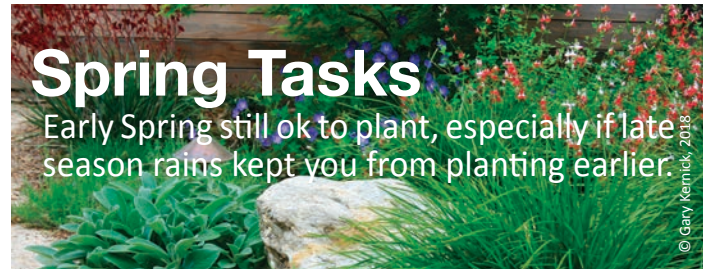


- General Landscape Management**
  - Review plant health and investigate reasons for observed decline
  - Weed and deadhead flowers as needed
  - Stake trees: add new or make adjustments
- Maintain Rainwater Capture Systems**
  - Make sure gutters and downspouts are not clogged
  - Clean rainbarrels/cisterns and clean out catch basins
  - Drill holes in bottoms of catch basins, if standing water
  - Make sure mosquito screens are not ripped or loose
  - Flush pipes
  - Remove debris from swales, especially at inlets/outlets
  - Refurbish berms and basins as needed
- Add Compost or Worm Castings**
  - De-compact or aerate lawns and areas around trees/ large shrubs and add worm castings/compost
- Replenish Mulch**
  - Maintain 2" if established garden, 4" - 6" if still getting established
- Late Fall Pruning (Chop and Drop)**
  - Cut back grasses (once a year for deciduous, less often for evergreen)
  - Cut back native salvias (sages) by 1/3
  - Cut back spring-blooming herbaceous perennials and pinch back non-woody shrubs
- Irrigation Checkup**
  - Turn on each valve to check for problems and make repairs
  - Open manual flush valves and flush
  - Clean irrigation filters
  - Adjust controller - reduce time



- General Landscape Management**
  - Review plant health and investigate reasons for observed decline
  - Weed and deadhead flowers as needed
  - Stake trees: add new or make adjustments

- Pruning (Chop and Drop)**
  - Prune dead, diseased, damaged, and deranged branches of trees and large shrubs
  - Cut back summer and fall-blooming herbaceous perennials and pinch back non-woody shrubs
- Still Time to Plant (but not in saturated soil!)**
- Irrigation Checkup**
  - Turn on each valve to check for problems and make repairs
  - Manually run irrigation if the weather has been very dry



- General Landscape Management**
  - Review plant health and investigate reasons for observed decline
  - Weed and deadhead flowers as needed
- Replenish Mulch**
  - Maintain 2" if established garden, 4" - 6" if still getting established
- Irrigation Checkup**
  - Turn on each valve to check for problems and make repairs
  - Open flush valves and flush
  - Clean irrigation filters
  - Seasonally adjust automatic irrigation schedule
  - Move drip irrigation and add emitters as the tree grows in order to maintain the wetting zone at the outside edge of the tree's canopy (dripline)



- General Landscape Management**
  - Review plant health and investigate reasons for observed decline
  - Weed and deadhead flowers as needed
- Irrigation Checkup**
  - Turn on each valve to check for problems and make repairs
  - Return irrigation controller to summer program

# Landscape with a Professional



**Assessment Organizations** including site assessment and testing, various measuring services, surveyors, soil testing services and even Google Maps are available to help. Property measuring and surveying companies can develop more detailed plans with elevations, sighting of trees and landscape amenities, irrigation, etc. If you get out into the yard with a measuring tape and the guidelines we've put into this book, you should be able to make a serviceable site plan to scale.

**Planning and Design** professionals can help you develop a working plan and budget for your landscape. The plan should include drawings, a list of resources, and an outline of the techniques to be used to implement the plan. Licensed landscape architects and licensed landscape contractors can assist you in developing a plan and budget. Landscape designers also can help you create a conceptual design. Working with a licensed professional (architect, landscape architect, landscape contractor or civil engineer) is recommended if you have hillsides and slopes or complicated structures. [www.apldca.org](http://www.apldca.org); [www.asla.org](http://www.asla.org); [www.asce.org](http://www.asce.org)

## Landscape Installation and Construction

professionals are licensed landscape contractors who specialize in building landscapes, and are able to work on all aspects of the sustainable landscape plan. If you are handy, and feel comfortable with the techniques outlined in this book, there is no reason why you cannot install your own garden, especially knowing that if you get stuck you can call upon the expertise of a landscape professional. Find licensed contractors at the California Landscape Contractors Association (CLCA). [www.clcanorthcoastchapter.org](http://www.clcanorthcoastchapter.org)

**Certified Arborists** are specialists trained in the art and science of planting, caring for, and maintaining individual trees. Arborists are knowledgeable about the needs of trees and are trained and equipped to provide proper care. Find tree consultants at the American Society of Consulting Arborists (ASCA). [www.asca-consultants.org](http://www.asca-consultants.org)

**Rainwater Catchment** specialists include people certified by the American Rainwater Catchment Systems Association (ARCSA) to design and install rainwater capture systems. These professionals can bring a lot of specific expertise to your project, particularly if it involves the installation of an active capture system such as a cistern. [www.arcsa.org](http://www.arcsa.org)

**Greywater Action** can assist you on an as-needed basis if you are attempting a DIY renovation. Their expertise is in the design and installation of laundry-to-landscape greywater systems. [www.greywateraction.org](http://www.greywateraction.org)

**Irrigation Systems Consultants** include people who have been certified by an EPA WaterSense® labeled certifying organization to provide irrigation system auditing, design, and maintenance. These professionals can bring specific expertise on improving the efficiency of irrigation systems. [www.irrigation.org](http://www.irrigation.org); [www.qwel.net](http://www.qwel.net)

**Water Managers** are a big part of ongoing landscape maintenance. Learning how to manage your own water is best, but if you are still using an irrigation system for your landscape, you may consider hiring a certified professional who has demonstrated expertise in water management.

**Watershed Wise Landscape Professionals** are people who are certified to provide site evaluation and consulting on using the watershed approach to landscaping in design, construction, and maintenance. [www.greengardensgroup.com](http://www.greengardensgroup.com)

**Plant Selection** specialists include your local retail nursery and garden center, native plant societies, Master Gardeners, and professional gardeners. The best plant selector, however, is you! Do the homework to select plants that are both climate-appropriate and locally native to your place, and you will be rewarded with a better understanding and appreciation of your garden as it evolves over time. Plus, you can advise your friends on their plant selections!

**Maintenance** of sustainable landscapes requires an understanding of the watershed approach to landscaping and water management. While there will be less mowing of lawns and blowing of leaves, there will be more fine pruning, irrigation flushing and tuning, cleaning and checking rain barrels and other water retention devices and soil building. Maintenance people should demonstrate an ability to think critically, be open to the techniques and ideas outlined in these guidelines and understand how to implement IPM, mulching, basic irrigation tune-ups, and native plant husbandry.



# Landscape like a Professional



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## Scope Your Project

If your budget is limited, you may want to make small improvements first and then bigger changes in a year or two. Working with a professional designer can help you plan these phases. You may start with weed removal and preliminary planting, then add features such as raised vegetable boxes or a rain garden. Plan ahead before you lose the lawn. Like anything, an ounce of prevention is worth a pound of cure. Implementing the basic functionality of the watershed approach does not add to your overall installation budget.

When you invest in your landscaping, you are investing in the long-term value of your property. Don't forget to plan an ongoing maintenance budget allocation for keeping the garden healthy over time (see p. 58). Stretch your dollars by taking advantage of rebates and incentives offered by MMWD.

## Landscape = Softscape + Hardscape

Softscape includes ground preparation, planting, irrigation, and lighting; hardscape refers to everything that is built. Consider that the landscape is raw ground to be prepared, graded, etc. All of the typical building trades work on a landscape: plumbing, electrical, and if you are installing hardscape or covered structures, expect to include masonry, carpentry, fixtures and appliances. Many people who go DIY can remove turf, make grade changes and build soil through sheet mulching. Planting also can be accomplished using the techniques outlined in this book. The more you do yourself, work with what you have, or select low cost materials, the more affordable you will make your landscape changes.

There is no such thing as a typical budget for landscape design and installation. While a good **RULE OF THUMB** is to budget 5% - 10% of your home's current market value in a landscape renovation, every site is different, and the situations encountered on that site will dramatically influence the overall budget for the project. Location, expectations of the neighborhood, and aesthetics must be combined with all the functional requirements discussed in this book to inform the final budget for your landscape. When you take into consideration special site circumstances such as slopes or tricky drainage, expect to spend more on design and installation. If you include hardscape, covered structures, or other built amenities like outdoor kitchens and pools, the prices rise exponentially.

## All-in Planting costs = Plants + Installation Labor

An all-in price for planting that includes the labor costs for a professionally installed plant may be 2x - 3x the purchase price of the plant because the installer should provide a 30 - 90 day plant replacement guarantee. In general, remember that professionals must add a percentage to the purchase price of the materials AND the labor. This percentage covers their business operations and ensures their long-term viability too.

## Invest in Design



The more time you spend researching your options and planning your garden, the better prepared you will be during construction. Measure twice, dig once! Spend the time yourself, or expect to pay 10% - 20% of your budget on professional design assistance.

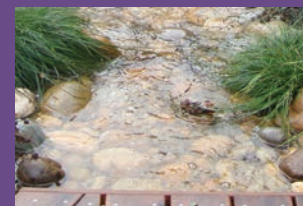
## Invest in Soil



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Soil preparation is the single greatest investment you can make in the long term health and beauty of your garden. Buy your compost in bulk, and expect to spend at least 10% of your budget on building healthy Living Soil (see pp. 40-41).

## Invest in Rain



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Capturing and holding on to rainfall from the roof and adjacent hard surfaces, helps prepare your garden for the long, dry summer and reduces irrigation demand. Expect to spend up to 20% of your budget on labor for grading for rain detention and materials for drainage (see pp. 42-45).

## Invest in Stewardship



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Plan for the maintenance of your landscape right from the beginning. Select experienced gardeners who are on board with your vision. Expect to see your gardener less frequently for greater periods of time, and expect to pay for sustainable expertise (see pp. 58-59).

# Use this Project Plant List

Form	P	Botanical (Latin) Name	Common Name	Plant Factor	Sun	Dimension H' x W'	D/E/S	Flower Color	Notes	Page
Grass		Agrostis pallens	Bent grass	M/L	PS/S	1' x 1'	E	green	Tough Spot	19
Grass	x	Bouteloua gracilis 'Blonde Ambition'	Blonde Ambition blue grama	L/VL	F	2' x 2'	S	wheat	Berm Plants	29
Grass		Calamagrostis foliosa	Leafy reed grass	L	F/PS	2' x 2'	E	wheat	Grassland/Meadow	27
Grass		Carex pansa	California meadow sedge	M/L	F	1' x 1'	E	wheat	Tough Spot	19
Grass		Carex tumulicola	Foothill sedge	L	F/PS	1' x 2'	E	cream, rust	Mixed Evergreen Forest	27
Grass	x	Deschampsia cespitosa	Tufted hairgrass	M/L	F/PS	1' x 3'	D	wheat	Habitat Corridor	15
Grass	x	Elymus glaucus	Blue wild rye	L	F/S	5' x 1'	S	yellow	Deer Resistant	25
Grass		Festuca californica	California fescue	L	F/PS	4' x 3'	E	wheat	Woodland	9
Grass		Festuca glauca	Blue fescue	L	F	0.8' x 2'	E	wheat	Tough Spot	19
Grass		Festuca idahoensis	Idaho fescue	VL	F	1.5' x 1'	E	wheat	Grassland/Meadow	27
Grass		Melica harfordii	Harford's oniongrass	L/VL	PS/S	4' x 2'	E	wheat	Oak Woodland	26
Grass		Melica imperfecta	Small flowered melica	VL	F/PS	4' x 1'	S	wheat	Plant Right	56
Grass		Muhlenbergia capillaris 'Regal Mist'	Pink muhly grass	M/L	F	4' x 4'	E	pink	Hydrozone - Moderate	53
Grass		Muhlenbergia rigens	Deer grass	L/VL	F	5' x 5'	E	wheat	Hydrozone - Low	53
Grass	x	Stipa (Nasella) pulchra	Purple needlegrass	L/VL	F	3.5' x 1.5'	E	wheat	Inland Chaparral	27
Grass		Stipa cernua	Nodding needlegrass	L	F/PS	3.5' x 2'	S	wheat	Plant Right	56

Groundcover	x	Achillea millefolium	Common yarrow	L	F	2' x 3'	S	various	Pollinator	24
Groundcover		Anemopsis californica	Yerba mansa	M	F/PS	1' x 10'+	S	cream, red	Swale Plants	29
Groundcover	x	Arctostaphylos uva ursi 'Green Supreme'	Creeping manzanita	M/L	F/PS	0.5' x 12'	E	white	Groundcover	19
Groundcover	x	Artemisia californica 'Montara'	Montara sagebrush	L/VL	F	3' x 6'	E	grey, green	Hillside	20
Groundcover/Shrub		Berberis aquifolium	Oregon grape	L/VL	F/S	6' x 5'	E	yellow	Inland Chaparral	27
Groundcover	x	Berberis aquifolium var. repens (Mahonia repens)	Creeping Oregon grape	VL	F/PS	3' x 5'	E	yellow, purple	Woodland	8
Groundcover		Campanula poscharskyana	Serbian bellflower	M	F/PS	0.5' x 3'+	E	blue	Plant Right	56
Groundcover	x	Ceanothus griseus horizontalis 'Yankee Point'	Carmel Mountain lilac	L	F	3' x 12'	E	blue	Hillside	20
Groundcover		Cerastium tomentosum	Snow-in-summer	M	PS/S	0.5' x 3'	E	white	Groundcover	19
Groundcover	x	Cistus salviifolius 'Prostratus'	Sageleaf rockrose	L	F	2' x 6'	E	white	Hillside	20
Groundcover		Clinopodium douglasii (Satureja douglasii)	Yerba buena	M	PS/S	0.5' x 3'+	E	white	Swale Plants	29
Groundcover	x	Fragaria chiloensis	Beach Strawberry	L	F/PS	0.5' x 1'	E	white	Tough Spot	19
Groundcover	x	Grevillea rosmarinifolia	Rosemary grevillea	L	F	5' x 8'	E	pink	Low and Easy	11
Groundcover	x	Phyla nodiflora (aka Lippia repens)	Common lippia	L	F	0.25' x 2'	E	white, pink	Groundcover	19
Groundcover	x	Salvia 'Bee's Bliss'	Bee's Bliss sage	L	F/PS	2' x 5'	S	pink, lavender	Low and Easy	10
Groundcover	x	Salvia leucophylla 'Point Sal Spreader'	Point Sal purple sage	L/VL	F	3' x 8'	E	lavender	Berm Plants	29
Groundcover	x	Salvia sonomensis	Creeping sage	L	F/PS	1.5' x 15'	E	blue, lavender	Hillside	20
Groundcover	x	Symphoricarpos mollis	Creeping snowberry	VL	PS	1' x 6'	S	pink	Woodland	8
Groundcover	x	Thymus serpyllum	Creeping thyme	L	F	0.25' x 1'	E	magenta	Groundcover	19
Groundcover		Veronica liwanensis	Turkish speedwell	M	F	0.25' x 1'	E	blue	Groundcover	19

Perennial	x	Agastache spp.	Hummingbird mint	M	F/PS	3' x 2'	S	pink, purple, orange, blue	Low and Easy	11
Perennial	x	Allium schoenoprasum	Chives	M	F	1.5' x 1.5'	D	purple, pink	Family Fun Spot	13
Perennial	x	Aquilegia formosa	Western columbine	M/L	PS	3' x 1'	S	red, yellow	Mixed Evergreen Forest	27

## Plant List Key

Form:	Water Use:	Sun:	P:	D/E/S:	Notes:
Natural shape taken by the plant	<b>M=Moderate</b> <b>L=Low</b> <b>VL=Very Low</b>	<b>F=Full</b> <b>PS=Part Shade</b> <b>S=Shade</b>	Plant supports life cycle of pollinators, butterflies and insects	<b>D=Deciduous,</b> <b>E=Evergreen,</b> <b>S=Semi-Deciduous</b>	Section of the book where you can read more about this plant



# Use this Project Plant List

Form	P	Botanical (Latin) Name	Common Name	Plant Factor	Sun	Dimension H' x W'	D/E/S	Flower Color	Notes	Page
Perennial	x	<i>Asclepias fascicularis</i>	Narrow leaf milkweed	M/L	F	3' x 1'	D	white, pink	Pollinator	24
Perennial		<i>Bergenia cordifolia</i>	Elephant ears	M	PS/S	1.5' 1.5'	E/S	pink	Fire Fighter	22
Perennial	x	<i>Diplacus aurantiacus</i>	Sticky monkeyflower	VL	F/PS	5' x 5'	E	orange, yellow	Habitat Corridor	14
Perennial	x	<i>Epilobium canum 'Catalina'</i>	Catalina fuchsia	VL	F	1.5' x 3'	S	red	Hillside	20
Perennial	x	<i>Epilobium canum var. latifolium 'Everett's Choice'</i>	Everett's California fuchsia	VL	F	0.5' x 5'	S	orange red	Berm Plants	29
Perennial	x	<i>Erigeron glaucus</i>	Seaside daisy	L/VL	F/PS	1' x 2'	E	lavender, yellow	Fire Fighter	22
Perennial/Annual	x	<i>Eschscholzia californica</i>	California poppy	L/VL	F	2' x 2'	D	orange, yellow	Grassland/Meadow	27
Perennial		<i>Geranium sanguineum</i>	Bloody cranesbill	M	F/S	2' x 3'	S	fuchsia pink	Groundcover	19
Perennial	x	<i>Gaura lindheimeri</i>	Butterfly flower	L	F	4' x 2'	E	various, pink	Low and Easy	11
Perennial		<i>Helleborus foetidus</i>	Bear's foot hellebore	M	PS/S	2' x 1.5'	E	creamy green	Woodland	9
Succulent	x	<i>Hesperaloe parvifolia</i>	Red yucca	VL	F	4' x 5'	E	rose	Fire Fighter	22
Perennial	x	<i>Heuchera 'Old La Rochette'</i>	Old La Rochette coral bells	M/L	PS/S	2' x 2'	E	pink	Oak Woodland	26
Perennial	x	<i>Heuchera maxima</i>	Island alum root	M/L	PS	1' x 2'	E	white, pink	Pollinator	24
Perennial	x	<i>Iris douglasiana</i>	Douglas iris	M/L	F/S	2' x 3'	E	various	Woodland	8
Perennial		<i>Juncus patens / Juncus effusus</i>	California wiregrass	M	F/PS	3' x 3'	E	brown	Swale Plants	29
Perennial	x	<i>Kniphofia spp.</i>	Red hot poker	M	F	3' x 1'	E	orange, yellow	Low and Easy	10
Perennial	x	<i>Lavandula spp.</i>	Lavender varieties	L	F	3' x 3'	E	purple	Family Fun Spot	12
Perennial	x	<i>Mimulus cardinalis</i>	Scarlet monkeyflower	M	F/PS	3' x 3'	D	red, orange	Habitat Corridor	15
Perennial	x	<i>Monardella villosa</i>	Coyote mint	L/VL	F/PS	2' x 3'	S	pink, lavender	Low and Easy	10
Perennial	x	<i>Oenothera elata ssp. hookeri</i>	Yellow evening primrose	M/L	F/PS	5' x 5'	D	yellow	Grassland/Meadow	27
Perennial	x	<i>Origanum vulgare</i>	Oregano	L	F	3' x 2'	E	purple	Family Fun Spot	13
Perennial		<i>Pacific Coast iris</i>	Pacific Coast iris hybrids	M/L	PS	2' x 1'	E	various	Grassland/Meadow	27
Perennial	x	<i>Penstemon heterophyllus</i>	Foothill penstemon	L	F/PS	5' x 5'	S	blue, purple	Deer Resistant	25
Perennial/Fern		<i>Polystichum munitum</i>	Western sword fern	L	S	6' x 3'	S	none	Woodland	8
Perennial	x	<i>Romneya coulteri</i>	Coulter's matilija poppy	VL	F	10' x 20'+	S	white, yellow	Deer Resistant	25
Perennial	x	<i>Salvia spathacea</i>	Hummingbird sage	L	PS/S	3' x 3'	E	pink, red	Woodland	8
Succulent		<i>Sedum nussbaumerianum</i>	Orange stonecrop	L/VL	F/PS	1' x 1.5'	E	pink	Fire Fighter	22
Perennial		<i>Sisyrinchium californicum</i>	Yellow-eyed grass	M	F/PS	1' x 0.5'	E	cream, yellow	Mixed Evergreen Forest	27
Perennial	x	<i>Solidago velutina ssp. californica</i>	California goldenrod	L	F/S	5' x 10'+	E	yellow	Deer Resistant	25
Perennial	x	<i>Sphaeralcea ambigua</i>	Desert globemallow	VL	F	5' x 4'	E	orange, pink, lavender	Hydrozone - Low	53
Perennial	x	<i>Symphotrichum chilense (Aster chilensis)</i>	California aster	L/VL	F/PS	3' x 3'	D	blue, lavender	Habitat Corridor	14
Perennial	x	<i>Teucrium chamaedrys</i>	Wall germander	L	F	2' x 3'	E	magenta	Family Fun Spot	12
Perennial	x	<i>Verbena bonariensis</i>	Purpletop vervain	L	F	4' x 3'	E	purple	Habitat Corridor	14
Perennial	x	<i>Verbena lilacina 'De la Mina'</i>	Cedros Island verbena	L	F	3' x 3'	S	purple	Pollinator	24
Perennial		<i>Westringia fruticosa 'Morning Light'</i>	Coast rosemary	M	F	4' x 4'	E	white	Family Fun Spot	12

Shrub		<i>Abelia x grandiflora</i>	Glossy abelia	M	F/PS	6' x 6'	E/S	white	Hydrozone - Moderate	53
Shrub		<i>Aloysia citrodora</i>	Lemon verbena	L	F	8' x 10'	E	cream, pale lavender	Family Fun Spot	13
Shrub	x	<i>Arctostaphylos densiflorus 'Howard McMinn'</i>	Howard McMinn manzanita	L	F	6' x 12'	E	pink, white	Low and Easy	10
Shrub	x	<i>Berberis (Mahonia) 'Skylark'</i>	Skylark Oregon grape	M/L	PS	5' x 5'	E	yellow	Low and Easy	11
Shrub		<i>Calycanthus occidentalis</i>	Western spicebush	M/L	F/PS	13' x 12'	D	red, brown	Hydrozone - Moderate	53

# Use this Project Plant List

Form	P	Botanical (Latin) Name	Common Name	Plant Factor	Sun	Dimension H' x W'	D/E/S	Flower Color	Notes	Page
Shrub	x	Carpenteria californica	Bush anemone	M/L	F/PS	10' x 10'	E	white, yellow	Woodland	9
Shrub	x	Ceanothus 'Julia Phelps'	Small leaf mountain lilac	M	F/PS	7' x 7'	E	purple	Habitat Corridor	14
Shrub	x	Cistus x purpureus	Purple rockrose	L	F	3' x 3'	E	purple	Family Fun Spot	12
Shrub		Daphne odora variegata	Variegated winter daphne	M	PS/S	4' x 4'	E	white	Woodland	9
Shrub	x	Eriogonum fasciculatum	California buckwheat	VL	F	6' x 3'	E	cream, pink, rusty	Habitat Corridor	14
Shrub	x	Eriogonum giganteum	St. Catherine's lace	VL	F	5' x 10'	E/S	cream, pink, rusty	Hydrozone - Low	53
Shrub		Escallonia spp.	Escallonia	M	F/PS	6' x 6'	E	pink, red	Fire Fighter	22
Shrub	x	Frangula californica	Coffeeberry	L	F/S	15' x 15'	E	white	Low and Easy	10
Shrub	x	Holodiscus discolor	Cream bush	M/L	PS/S	16' x 15'	D	white, green, rust	Deer Resistant	25
Shrub	x	Lepechinia fragrans	Fragrant pitcher sage	L	F/S	5' x 5'	E	lavender, purple	Deer Resistant	25
Shrub/Vine	x	Lonicera hispidula var. vacillans	Hairy honeysuckle	L/VL	PS	4' x 8'	D	pink	Oak Woodland	26
Shrub	x	Lonicera involucrata	Twinberry	M	F/PS	15' x 5'	D	orange, yellow	Hydrozone - Moderate	53
Shrub		Morella californica	California wax myrtle	M/L	F/PS	20' x 20'	E	yellow	Woodland	9
Shrub	x	Peritoma arborea (Isomeris arborea)	Bladderpod	L/VL	F	6.5' x 6'	E	yellow	Plant Right	56
Shrub		Pittosporum tobira 'Wheeler's Dwarf'	Wheeler's Dwarf mock orange	M	F/PS	3' x 5'	E	white	Low and Easy	11
Shrub	x	Rhododendron occidentale	Western azalea	M	PS	15' x 10'	D	white, pink	Mixed Evergreen Forest	27
Shrub	x	Rhus ovata	Sugar bush	VL	F/PS	30' x 30'	E	pink, white	Low and Easy	11
Shrub	x	Ribes menziesii	Canyon gooseberry	L	S	10' x 10'	S	pink, red	Hydrozone - Low	53
Shrub	x	Ribes sanguineum var. glutinosum	Pink flowering currant	M	F/PS	13' x 7'	D	pink, purple	Woodland	9
Shrub	x	Salvia apiana var. apiana	White sage	VL	F	5' x 8'	S	white	Inland Chaparral	27
Shrub	x	Salvia mellifera	Black sage	L/VL	F	6' x 10'	S	lilac, white	Hydrozone - Low	53

Tree/Shrub		Acca sellowiana	Pineapple Guava	L	F	20' x 15'	E	pink	Family Fun Spot	13
Tree	x	Acer macrophyllum	Big leaf maple	M	F/PS	110' x 65'	D	yellow, pink	Landscape Trees	16
Tree	x	Aesculus californica	California buckeye	VL	F/PS	40' x 40'	D	white, cream, pink	Oak Woodland	26
Tree	x	Alnus rhombifolia	White alder	M	F/PS	80' x 35'	D	cream	Mixed Evergreen Forest	27
Tree	x	Arbutus 'Marina'	Hybrid strawberry tree	L	F	50' x 40'	E	pink	Landscape Trees	16
Tree/Shrub	x	Ceanothus spp.	California lilac (various)	M/L	F/PS	3' - 15'	E	various	Pollinator	24
Tree/Shrub	x	Cercis canadensis 'Forest Pansy'	Forest Pansy redbud	M	F	20' x 25'	D	purple	Patio Tree	17
Tree/Shrub	x	Cercis occidentalis	Western redbud	M	F/PS	20' x 15'	D	pink	Hydrozone - Moderate	53
Tree/Shrub	x	Cercocarpus betuloides	Mountain mahogany	L/VL	F/PS	20' x 12'	S	cream, white	Inland Chaparral	27
Tree/Shrub	x	X Chitalpa taskentensis	Chitalpa	L	F/PS	25' x 30'	D	lavender	Patio Tree	17
Tree/Shrub		Citrus 'Improved Meyer'	Improved Meyer lemon	M	F	10' x 12'	E	white	Family Fun Spot	13
Tree	x	Cornus kousa	Korean dogwood	M	F/PS	30' x 30'	D	white	Landscape Trees	16
Tree/Shrub	x	Cornus sericea	Creek dogwood	M	F/S	13' x 15'	D	white, purple	Habitat Corridor	15
Tree/Shrub		Garrya elliptica	Silk tassel bush	L	F/PS	16' x 10'	E	cream, green	Inland Chaparral	27
Tree/Shrub	x	Heteromeles arbutifolia	Toyon, Christmas berry	L/VL	F/PS	30' x 15'	E	white, red, gold	Plant Right	56
Tree	x	Lyonothamnus floribundus ssp. asplenifolius	Fernleafed ironwood	VL	F	50' x 24'	E	cream	Landscape Trees	16
Tree/Shrub	x	Prunus ilicifolia ssp. lyonii	Catalina cherry	L/VL	F/S	40' x 20'	E	white	Family Fun Spot	12
Tree		Prunus salicina 'Santa Rosa'	Santa Rosa plum	M	F	30' x 20'	D	white	Family Fun Spot	13
Tree	x	Quercus agrifolia	Coast live oak	VL	F/PS	80' x 35'	E	yellow, cream	Landscape Trees	16
Tree/Shrub	x	Sambucus nigra ssp. caerulea	Blue elderberry	L	F/PS	30' x 30'	D	cream, purple	Oak Woodland	26
Tree/Shrub		Styrax japonicus	Japanese snowbell	M	F/PS	30' x 30'	D	white	Patio Tree	17

# Use this Project Checklist

## Prepare to work

p.6

- Clean up Your Property**
  - Remove trash and debris, weeds, dead plants
- Orient Yourself**
  - Check with MMWD for watering restrictions and rebates
  - Check with your city if permits are required, and secure them if needed
  - Find out if you are in a hillside grading area or special viewshed
  - Confirm fire regulations in your area
- Make a List of Things You Want In Your New Landscape**
  - Think about how much maintenance you want to do
  - Consider how much rainwater you want to catch in barrels or cisterns
  - Determine how much of your property you want to change – and how much lawn to remove

## Notes

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## Plan before digging

pp. 32-51

### Do you need design help?

### Walk around and take photos (for BEFORE)

#### Make a Site Plan

- Take measurements
- Make a Microclimate Plan

#### Water Plan

- Do roof area calculations
- Note location of downspouts
- Calculate water available from each downspout

#### Grading Plan For Capturing Rainwater

- Look at slope of the site
- Plan for where to stockpile topsoil if project is large
- Identify trees to be protected during construction

#### Test Soil Type

- Percolation Test – Brick or Sponge?
- Jar Test - Sand, Silt or Clay?

#### Make an Existing Irrigation System Plan

- Run irrigation and make immediate adjustments
- Fix broken heads or lines, move blocked heads
- Adjust controller program time to eliminate runoff (cycle and soak)

#### Draft a Hardscape Plan

- Note existing hardscape that needs to become more permeable
- Draw in new hardscape

#### Do Some Shopping and Research

- Source rain chains, rainbarrels and cisterns
- Source mulch and compost
- Identify permeable hardscape options
- Go to nurseries for plants and watch for native plant sales
- Make appointments
- Install gutters, if you want to harvest more water

# Use this Project Checklist

## Design for plants

pp.52-56

### What do you want in your yard?

### Follow guidelines for hillside planting

### Ask for help at a nursery or native plant sale

- Make A Planting Plan**
  - Assign Plant Factors to existing material
  - Research native plant communities for your area
  - Consider butterflies and pollinators
  - Where are the swales and berms (wet and dry feet!)?
  - Add in edibles and fruit trees
  - Select one or two shade trees
  - Check [www.plantright.org](http://www.plantright.org) for the BAD GUYS
  - Scale plants for maturity
  - Hydrozone

## Notes

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## Begin your project installation

pp. 38-43

### Do you need construction/installation help?

### **CALL USA NORTH 8-1-1 before beginning work**

- Make Calls to Order Equipment, Material, Deliveries**
  - Rent a sod cutter and dumpster, if necessary
  - Order organic matter for the soil
  - Select boulders and gravel for creek beds
  - Order catch basins or piping for irrigation and drainage
  - Deliver rain barrels and cisterns
- Stockpile Soil and Protect Trees**
  - Protect trees from construction damage (limbs and roots)
  - Remove plants that are not wanted
- Change Existing Hardscape to Make It More Permeable**
- Remove Grass and Build Soil With Soil Lasagna**
  - Continue to water your lawn up to two days before removal
  - Remove your turf without chemicals through Sheet Mulching
- Contour Site For Rain**
  - Contour soil to hold onto First Flush (first inch of rain)
  - Remember not to remove soil; use it to create your contours
  - Add organic matter to the soil
  - Install catch basins, drainage pipe and sleeves under hardscape
- Repair Irrigation**
  - Set back spray irrigation 24" from hard surfaces
  - Identify or move future drip irrigation points of connection
  - Replace valves for low pressure valves
  - Install pressure regulator, flow meter, or landscape sub-meter
  - Install low-head check valves on slopes and grade changes
- Capture Rainwater**
  - Lay out plan using flour, chalk or builder's inverted spray paint
  - Install any new hardscape surfaces, draining to the landscape
  - Install boulders and materials for creek beds or swales
  - Install rain barrel or cisterns

# Use this Project Checklist

## **Install** new plants

p. 57

### **Compare Planting Plan with Existing Irrigation Plan**

**Fall is the best time to get free rain irrigation!**

**Order or purchase plants and gather materials necessary for planting**

Lay Out Planting Plan

Lay out your Planting Plan using flour or chalk

Make your “in field” adjustments

Install your plants into the Soil Lasagna

Be sure to respect correct plant placement for mature size

If drainage is poor, auger holes and wait to complete

Thoroughly and completely water holes, plants, and surrounding soil

## **Upgrade** and adjust new irrigation

p. 49

**Consider hand watering until landscape is established (1-2 dry seasons)**

### **Accommodate the Planting Plan**

Where spray head sprinklers are used, convert to low flow rotary nozzles

Convert spray head sprinklers to drip or install new drip lines

Cap all unused spray head sprinklers

Install tattle-tale flush assemblies

Install end caps on the drip zones

Create an “as built” drawing of the new irrigation layout

Install a weather-based irrigation controller

## **Establish** and steward new landscape

p. 58

### **Complete Irrigation Installation**

Irrigation for establishment is best used during fall, winter and spring months if rainfall is limited

Adjust irrigation to eliminate runoff

Regularly flush drip irrigation lines, especially during the first year

Seasonally adjust automatic irrigation schedule

Reduce in fall; turn it off in winter!

Move drip irrigation and add emitters as the tree grows in order to maintain the wetting zone at the outside edge of the tree’s canopy (dripline)

### **Maintain Living Soil and Plants**

Maintain 2” – 4” of living mulch and add more annually

Practice Integrated Pest Management

### **Maintain Rainwater Capture Systems**

Make sure gutters are not clogged

Clean rainbarrels/cisterns and clean out catch basins

Make sure mosquito screen is not ripped

Flush pipes

Remove debris from swales, especially at inlets/outlets

## Notes

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# Use these Resources for Success

## Botanical and Demonstration Gardens

UC Berkeley Botanical Garden  
[botanicalgarden.berkeley.edu](http://botanicalgarden.berkeley.edu)

San Francisco Botanical Garden  
[www.sfbotanicalgarden.org](http://www.sfbotanicalgarden.org)

Tilden Regional Park - Regional Parks Botanic Garden  
[www.ebparks.org](http://www.ebparks.org)

CA Native Pollinator Garden at the Bay Model, Sausalito  
[www.cnpsmarin.org](http://www.cnpsmarin.org) and [www.spn.usace.mil](http://www.spn.usace.mil)

Ruth Bancroft Gardens  
[www.ruthbancroftgarden.org](http://www.ruthbancroftgarden.org)

Harvey's Garden at Blackie's Pasture  
[marinmg.ucanr.edu/Community\\_Service\\_Projects/Demonstration\\_Gardens/Blackies\\_Pasture/](http://marinmg.ucanr.edu/Community_Service_Projects/Demonstration_Gardens/Blackies_Pasture/)

Marin Art & Garden Center  
[magc.org/gardens/unique-gardens/www.rsabg.org](http://magc.org/gardens/unique-gardens/www.rsabg.org)

Falkirk Cultural Center  
[marinmg.ucanr.edu/Community\\_Service\\_Projects/Demonstration\\_Gardens/Falkirk\\_Greenhouse\\_and\\_Demonstration\\_Gardens/](http://marinmg.ucanr.edu/Community_Service_Projects/Demonstration_Gardens/Falkirk_Greenhouse_and_Demonstration_Gardens/)

## Fire Protection Landscaping

FireSafeMarin [www.firesafemarin.org/landscaping](http://www.firesafemarin.org/landscaping)

Fire Recovery Guide [cnps@cnps.org](mailto:cnps@cnps.org)

## Garden Magazines, Tours, Shows and Classes

California Native Plant Society [cnpsmarin.org](http://cnpsmarin.org)

Mediterranean Garden Society  
[www.mediterraneangardensociety.org](http://www.mediterraneangardensociety.org)

Pacific Horticulture [www.pacifichorticulture.org](http://www.pacifichorticulture.org)

Sunset Magazine & Western Garden Book

East Bay Garden Tours in May  
[www.bringingbackthenatives.net](http://www.bringingbackthenatives.net)

May Garden Tours (Marin and Sonoma)  
[www.savingwaterpartnership.org](http://www.savingwaterpartnership.org)

Occidental Arts and Ecology [www.oaec.org](http://www.oaec.org)

Marin County Stormwater Pollution Prevention Program  
[www.mcstoppp.org](http://www.mcstoppp.org)

## Irrigation

MMWD - Create A Custom Irrigation Schedule  
[www.marinwater.water-wise-gardening.com/cal/](http://www.marinwater.water-wise-gardening.com/cal/)

How to Install Efficient Irrigation  
[www.h2ouse.org/tour/step-3.cfm](http://www.h2ouse.org/tour/step-3.cfm)

Irrigation Tutorials  
[www.irrigationtutorials.com](http://www.irrigationtutorials.com)

## Integrated Pest Management

[www.ipm.ucdavis.edu/GENERAL/whatisipm.html](http://www.ipm.ucdavis.edu/GENERAL/whatisipm.html)

## Invasive Plants

California Invasive Plants Council [www.cal-ipc.org](http://www.cal-ipc.org)

Plant Right! Avoid Invasive Plants [www.plantright.org](http://www.plantright.org)

## Landscape Materials

Pt. Reyes Compost Company [www.prcompostco.com](http://www.prcompostco.com)

West Marin Compost [westmarincompost.org](http://westmarincompost.org)

A & S Landscape Materials [ansmaterials.com](http://ansmaterials.com)

Shamrock [www.shamrockmaterials.com](http://www.shamrockmaterials.com)

Marin Landscape Materials [www.marinlandscapematerials.com](http://www.marinlandscapematerials.com)

Martin Brothers (Mill Valley at Tam Junction)  
[www.martinbrotherssupply.com](http://www.martinbrotherssupply.com)

## Nurseries and Garden Centers

Annie's Annuals (Richmond) [www.anniesannuals.com](http://www.anniesannuals.com)

The Watershed Nursery (Richmond)  
[www.watershednursery.com](http://www.watershednursery.com)

Cal Flora Nursery [www.calfloranursery.com](http://www.calfloranursery.com)

CNL Native Plant Nursery (Mill Valley)  
[www.prooflab.com/cnl-native-plant-nursery](http://www.prooflab.com/cnl-native-plant-nursery)

Cottage Gardens [www.cottagegardensofpet.com](http://www.cottagegardensofpet.com)

Emerisa Gardens [www.emerisa.com](http://www.emerisa.com)

Green Jeans Garden Supply (Mill Valley)  
[Greenjeansgardensupply.com](http://Greenjeansgardensupply.com)

Larner Seeds (Bollinas) [www.larnerseeds.com](http://www.larnerseeds.com)

Mostly Natives Nursery (Pt. Reyes Station)  
[www.mostlynatives.com](http://www.mostlynatives.com)

O'Donnells Fairfax Nursery (Fairfax)  
[www.odonnellsnursery.com/ODonnells\\_Fairfax\\_Nursery/](http://www.odonnellsnursery.com/ODonnells_Fairfax_Nursery/)

Sloat Garden Center (Mill Valley, San Rafael)  
[www.sloatgardens.com](http://www.sloatgardens.com)

West End Nursery (San Rafael)  
[www.westendnursery.com](http://www.westendnursery.com)

## Plant Choices

MMWD Water-Wise Gardening  
[www.marinwater.water-wise-gardening.com](http://www.marinwater.water-wise-gardening.com)

Water Use Classification of Landscape Species  
[ucanr.edu/sites/WUCOLS/](http://ucanr.edu/sites/WUCOLS/)

Calscape [www.calscape.org](http://www.calscape.org)

## Other Resources

ReScape California [rescapeca.org](http://rescapeca.org)

Marin Master Gardeners  
[marinmg.ucanr.edu/Great\\_Gardening\\_Information/Gardening\\_Tips\\_Techniques\\_and\\_Terminology](http://marinmg.ucanr.edu/Great_Gardening_Information/Gardening_Tips_Techniques_and_Terminology)

CLCA [clca.org/consumers/consumers\\_home.php](http://clca.org/consumers/consumers_home.php)

Home Ground Habitats [www.homegroundhabitats.org](http://www.homegroundhabitats.org)

# You're ready to **Shop!**

## My Shopping List

### My Garden Microclimate Notes

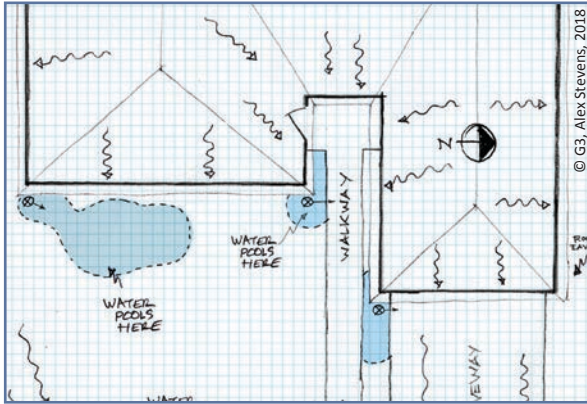
### My Supply Stores & Nurseries

	<b>name</b>	<b>size</b>	<b>quantity</b>
trees			
shrubs			
perennials			
grasses			
ground cover			
other plants			

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# MARIN MUNICIPAL WATER DISTRICT



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