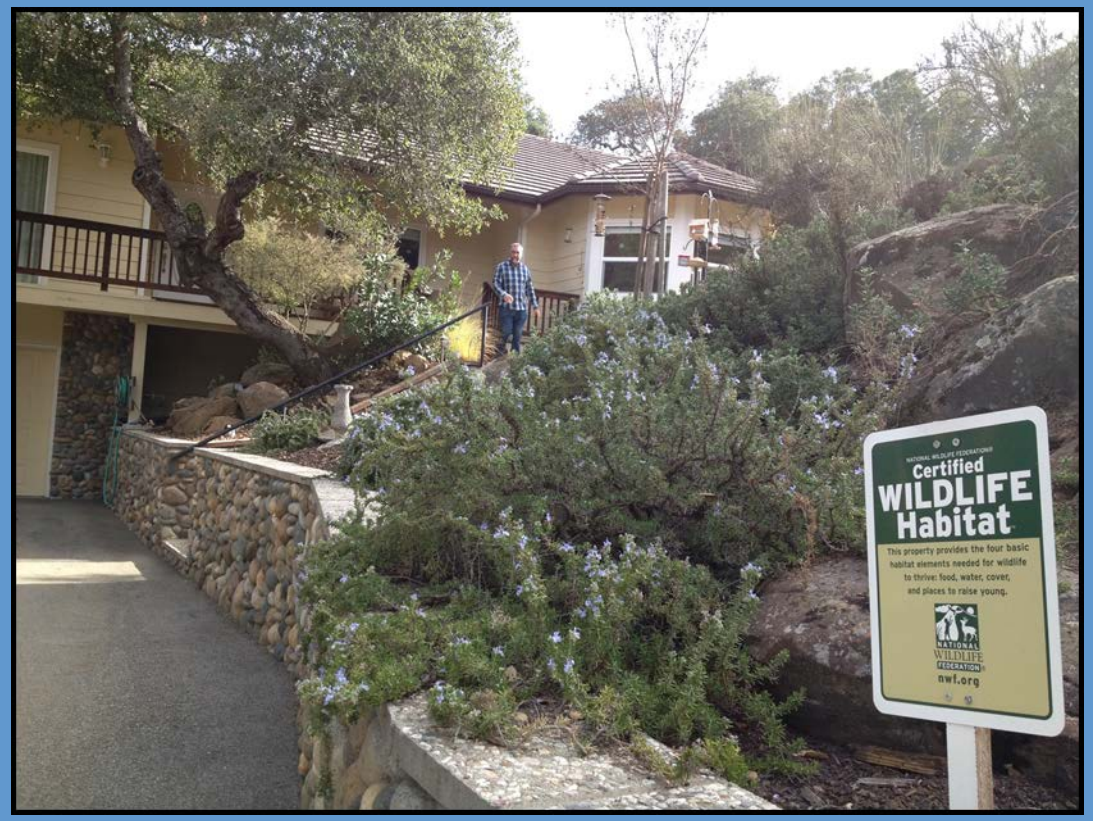
The New California Landscape:
Good Water Management Means More Choices!

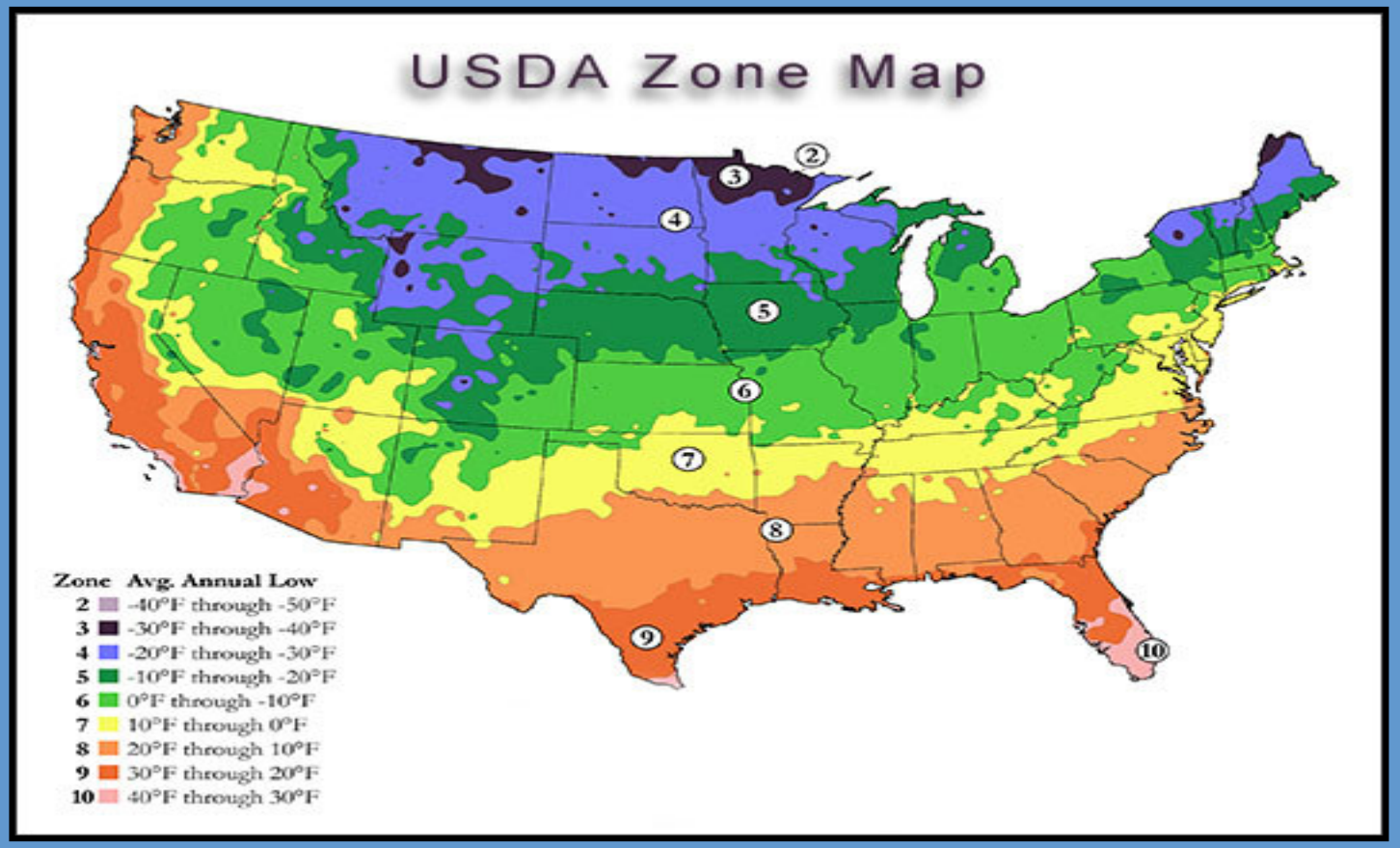


Beautify Your Landscape, Protect the Environment, and Save Water, Money, and Time!

Can you Identify the Problems?

Select Plants Recommended For Your *Sunset Zone*

USDA Zone 9
(Not As Specific As Sunset Zones)



Sunset Zones Are Smaller and More Accurate (8, 9, and 14 in Central Valley)

Northern & Southern San Joaquin Valley
(relatively low winter ETo due to fog and relatively high summer ETo) **ETo = 53 inches/year**

East Side Sacramento - San Joaquin Valley
(low winter & high summer ETo) **ETo = 58 inches/year**

Irrigation Scheduling Involves Applying the Right Amount of Water at the Right Time

What Factors are Involved in Irrigation Scheduling?

- Plant water use
- Soil water holding capacity
- Water infiltration rate
- Plant rooting depth
- Irrigation system output

Plant Water Use

- Varies Among Species
- Influenced By Microclimate
- Varies By Density

ET (Landscape Species) = ETo (Reference Evapotranspiration) X Kc (Crop Coefficient)

Reference Evapotranspiration (ETo)

- ETo = The Amount Of Water Used by a Large Uniform Planting of a Cool-season Grass Growing 3-6 Inches Tall Given Unlimited Water.

Factors That Determine ETo

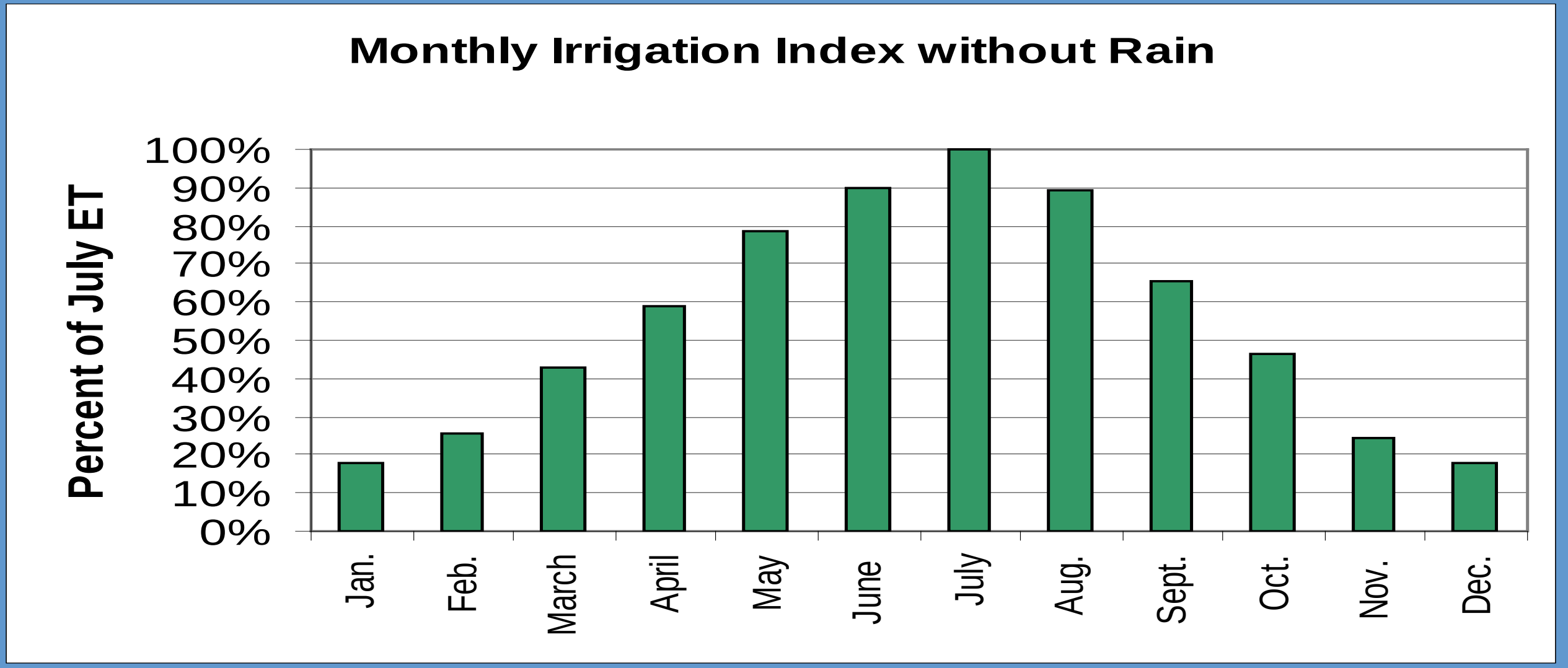
- Solar Radiation
- Temperature
- Wind Speed
- Relative Humidity

www.cimis.water.ca.gov

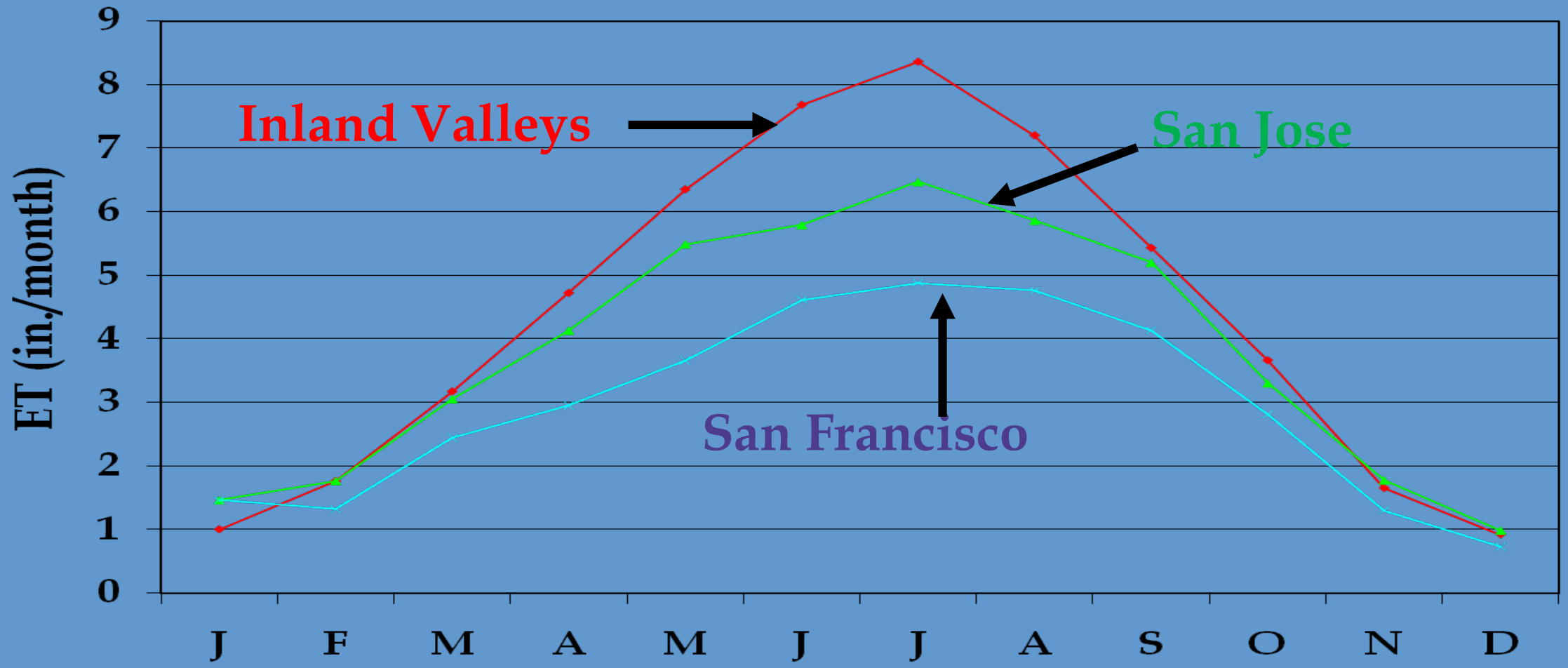
California Irrigation Management Information System

CIMIS Station

Avg. Monthly Irrigation Percentages



Average (Mean) ETo

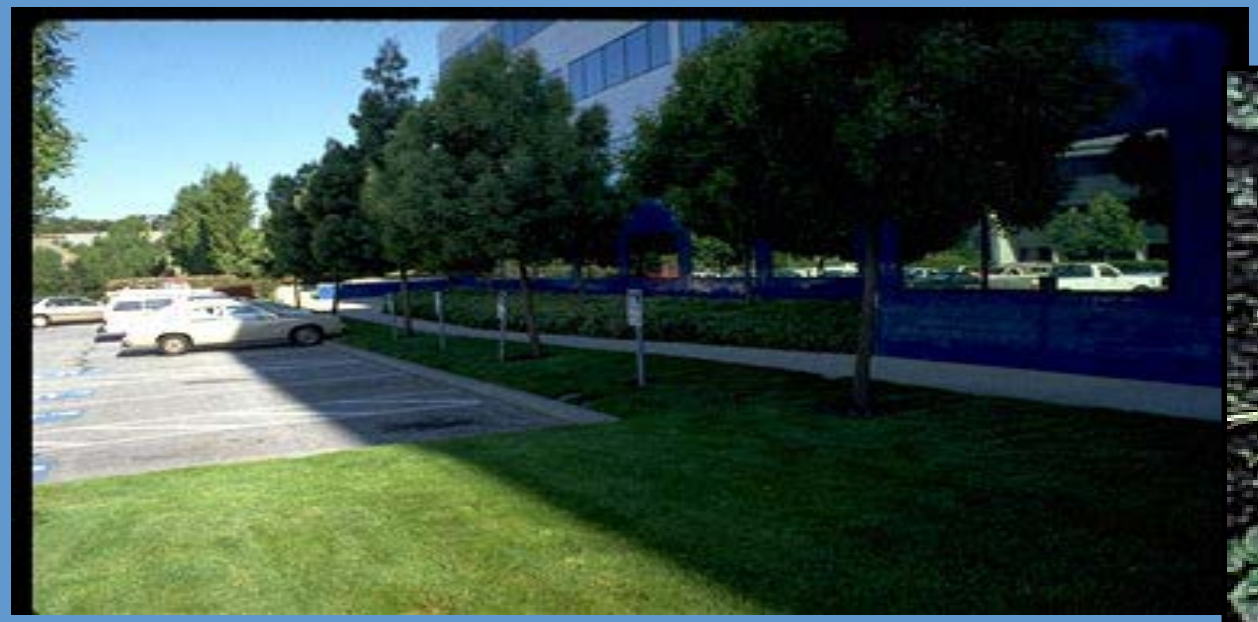


Plant ET Often Higher Than Actual Water Required For Acceptable Performance (Mesquite And Ficus)

Water Needs of the Same Species Vary Depending on Microclimate

- Landscape Plants in Heat Islands Require up to 50% More Water Than the Same Species in a Park Setting

Shade Vs Full Sun



Lawns And Groundcovers More ‘Crop-like’ Than Mixed Species With Varying Densities And Microclimates

Kc (Warm Season Turf) = .6

Kc (Cool Season Turf) = .8

‘Crop’ Of Turf

UC ANR's ***Lawn Watering Guide*** Based On Warm Season Kc = .6 And Cool Season Kc = .8 And a Distribution Uniformity Of 80%

http://ucanr.Org/Freepubs/Docs/8044.Pdf

How To Use The ‘Lawn Watering Guide’

- Determine Type Of Lawn (Warm Vs Cool Season Turf)
- Conduct A ‘Can Test’ To Determine Sprinkler System Output And Distribution Uniformity
- Determine How Long To Irrigate (Minutes Per Week) Based On Climatic Chart Provided
- Determine Maximum Amount Of Time To Water Per Event Until Runoff Just Begins

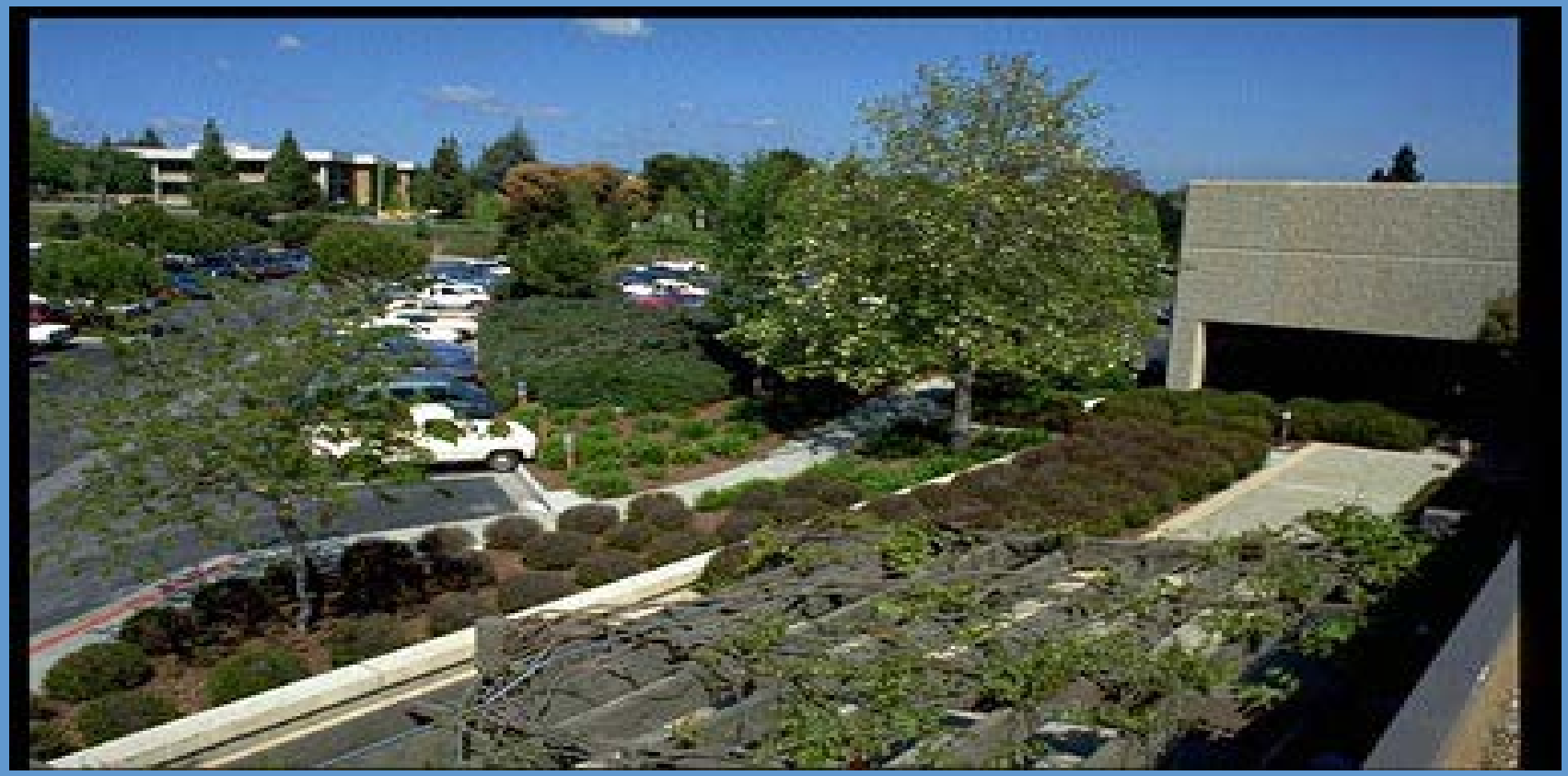
Identify And Repair Leaks, Low Heads, Broken Sprinklers, Unmatched Sprinklers And Pressure And Spacing Problems

Improve Distribution Uniformity To Improve Turf And Groundcover Health And Reduce Water Waste

Good (top) and Poor (bottom) Distribution Uniformity

Water Cycling May Be Necessary To Avoid Run-off. Divide The Total Amount Of Water Required Per Day Into 2-4 Cycles. Apply Water As Close To Initial Event As Possible Before Soil Dries Out.

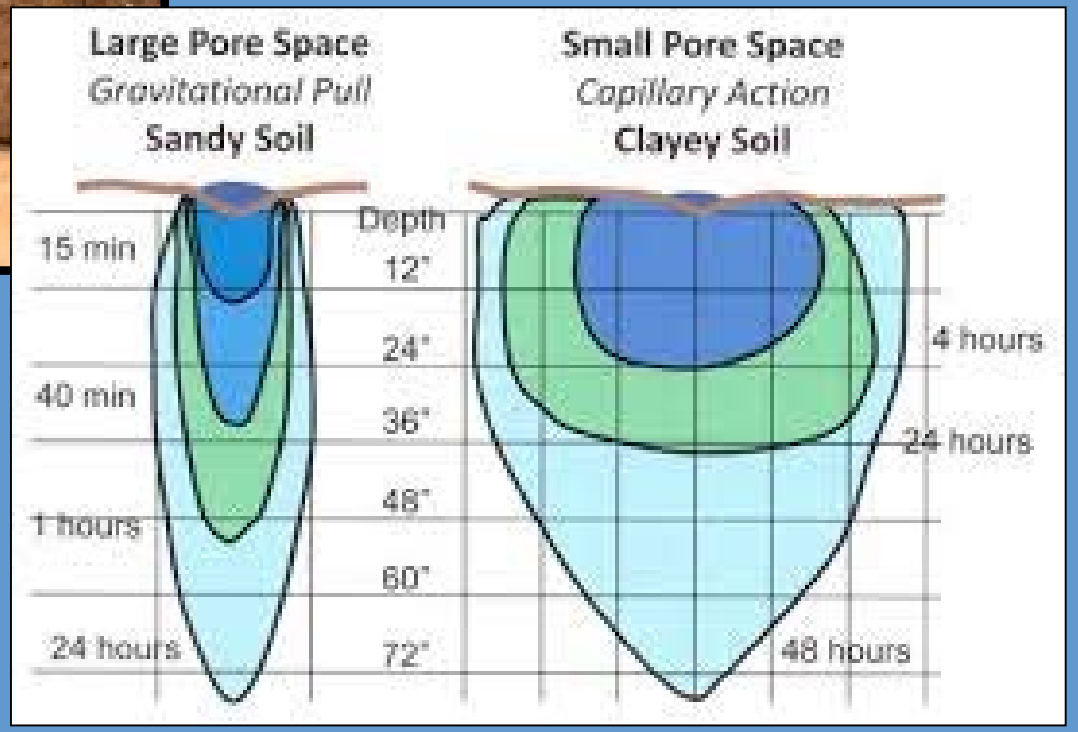
Planting Density Affects Water Requirement



Multi-tiered Canopy Uses More Water Than Single Tier Canopy

Low Density Planting

Determining When to Irrigate is as Important as Knowing How Much Water to Apply


Large Pore Space
Gravitational Pull
Sandy Soil
Small Pore Space
Capillary Action
Clayey Soil
Depth
15 min
40 min
1 hours
24 hours
12"
24"
36"
48"
60"
72"
4 hours
24 hours
48 hours

Use the ‘Feel’ Test

Dry

Medium

Wet

Or Fancy Devices

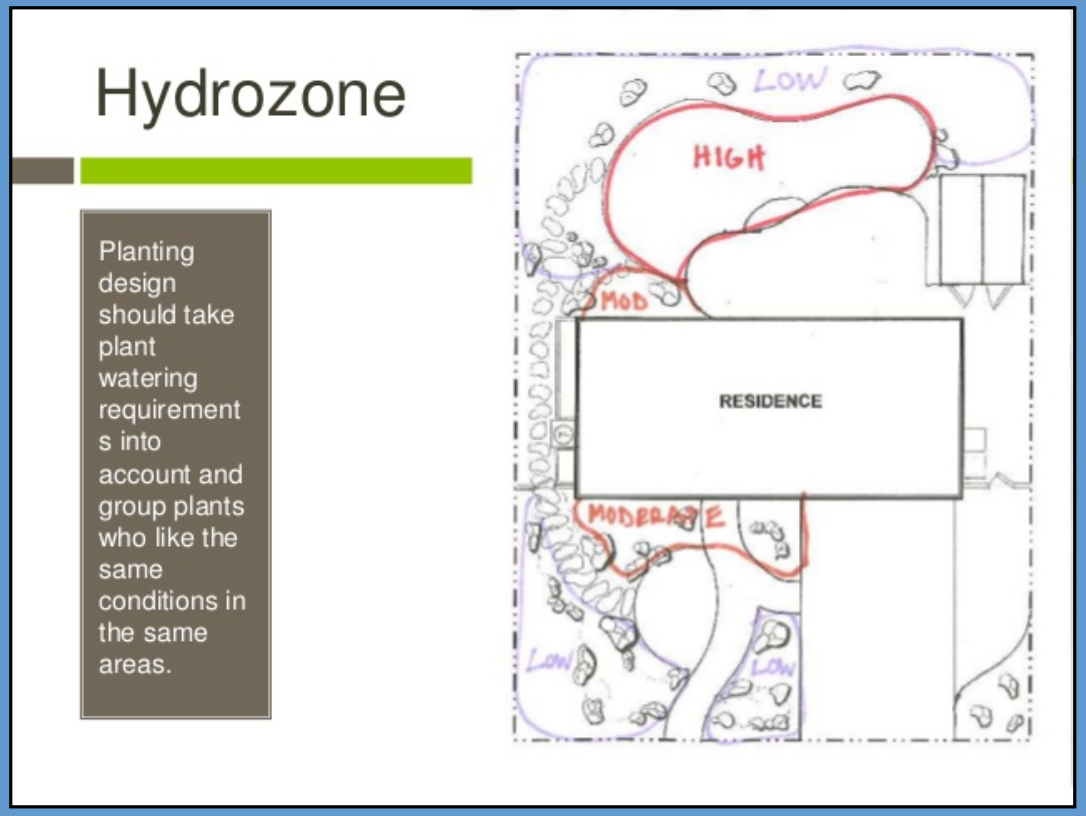
Soil probe

Soil sampling tube

- Recently Transplanted Plants are at Greatest Risk of Drought Damage Due To Root Loss.

- Established Plants (trees) are Less at Risk.

Hydrozone: Plant Species With Similar Water Needs Together



DWR WATER BUDGET

*MAWA = (ETO) (0.7) (LA) (0.62)

ETo = Reference Evapotranspiration (Inches Per Year)

0.7 = ET Adjustment Factor

LA = Landscaped Area (Square Feet)

0.62 = Conversion Factor (To Gallons)

***Maximum Applied Water Allowance** = _____ **Gallons/Year**

Example of Maximum Applied Water Allowance (MAWA)

- Annual Historical ETo = (Central Valley 58 inches/year)
- Hypothetical Landscape Area = 5,000 Sq Ft
- MAWA = (ETo) (0.7)* (LA) (0.62)**
- MAWA = (58.0) (0.7) (5,000 Sq Ft) (0.62)
- **MAWA = 125,680 Gallons Per Year**

*Et Adjustment Factor

** Conversion Factor From Inches To Gallons

Example of Maximum Applied Water Allowance (MAWA) as of December 1, 2015:

- Annual Historical ETo = (Central Valley 58 inches/year)
- Hypothetical Landscape Area = 5,000 Sq Ft
- MAWA = (ETo) (0.55)* (LA) (0.62)**
- MAWA = (58.0) (0.55) (5,000 Sq Ft) (0.62)
- **MAWA = 98,890 Gallons Per Year**

*Et Adjustment Factor

** Conversion Factor From Inches To Gallons

What Else Can You Do Right Now Without Starting Over?

Mulch

- Apply 2-3” of mulch around garden plants and trees to hold water in and reduce soil evaporation.
- Keep it several inches away from tree trunks!
- Make sure to water beneath the mulch.

Mulch Keeps Weeds Out And Water In!

Mulch

- Reduces water evaporation from soil
- Buffers soil temperature
- Reduces weeds
- Prevents mechanical weed whip damage

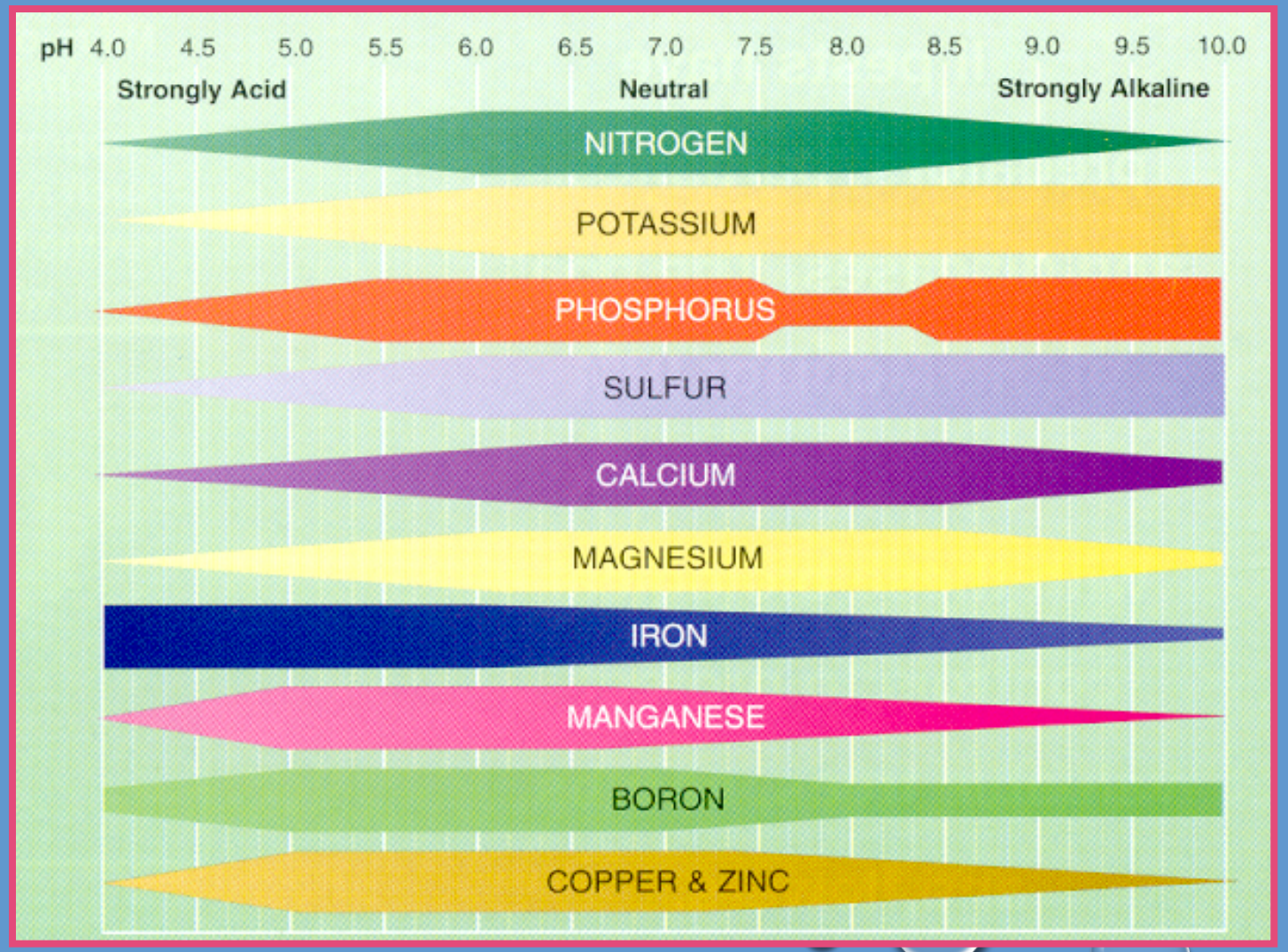
CORRECT MULCH APPLICATION?

16 INCHES OF MULCH!

Avoid Overfertilizing

- Too much nitrogen results in lush, weak new growth, and increases the need for even more water.
- Too much fertilizer can lead to pollution of waterways.

pH and Nutrient Uptake



Iron Chlorosis

Avoid Planting New Plants

- Young plants require frequent irrigation until established and should not be planted during a drought or under water restrictions.
- Even native plants require continually moist root zones during establishment.

Keep Weeds Out!

- Weeds often outcompete garden plants and trees for water.
- Avoid using chemical herbicides; hand-weed instead. Overuse of pesticides can lead to waterways pollution.
- Mulch prevents weed seeds from germinating, as well

Use a Broom Instead of a Hose to Clean up After Gardening/Pruning

- Save water and avoid polluting waterways.
- Get some exercise!

What about Long-Term Solutions?

- Once water restrictions are lifted think about replacing all or a portion of your lawn with drip-irrigated water-efficient ornamentals.
- Hydrozone: place plants with similar water needs together.
- Before planting, mix compost evenly several inches into garden soil to hold water in longer and decrease the chance of waterway pollution from runoff (clay soils) or drainage below the root zone into groundwater (sandy soils).

Improve Water-holding Capacity and/Or Drainage With Compost Mixed Evenly Into Soil (6” – 1’)

Useful Websites With Plant Lists

- http://www.fresnogardening.org/plants.php

- http://sunsetwesterngardencollection.com/plant-collection

- California Native Plant Society: http://www.cnps.org/cnps/grownative/lists.php

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

HTTP://SUNSETWESTERNGARDENCOLLECTION.COM/PLANT-COLLECTION/PLANT/BEYOND-BLUE-FESTUCA

‘Beyond Blue’ Fescue

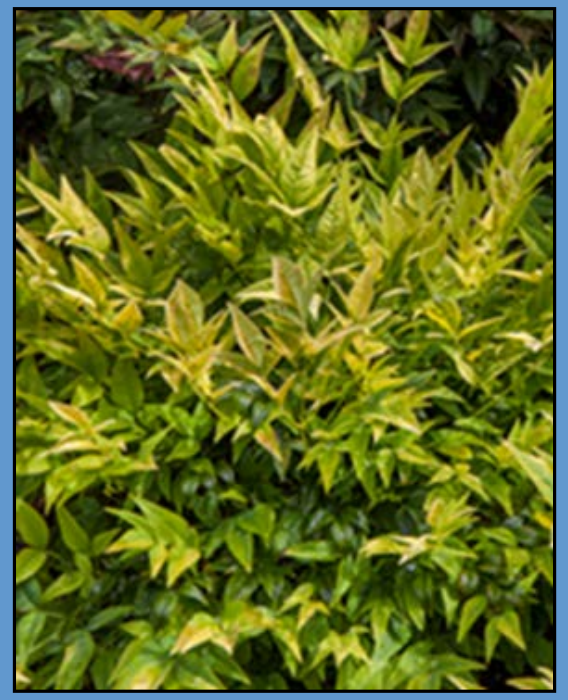
(*Festuca glauca*)

- Intense, powder blue foliage year-round
- Evergreen or deciduous evergreen
- USDA zones: hardy to -30°F USDA zones 4
- Sunset zones: 1-24
- Special features: drought resistant, low maintenance, deer resistant
- Landscape uses: border, container, slope, groundcover

‘Clarity Blue’ Dianella
(*Dianella* hybrid)

- Exposure full coastal sun to part shade inland
- USDA Zones Hardy to 10
- Sunset Zones 4-7 (with protection), 8-9, 14-24
- Drought resistant, low maintenance, deer resistant
- Dimension 24-30" H x 18-24" W
- Growth rate slow to moderate
- Plant type evergreen
- Water low water needs

‘Lemon Lime’ Nandina
(*Nandina domestica Alba*)



- Bright lime green new foliage
- Evergreen
- USDA zones: 6-9 (hardy to -10°F)
- Sunset zones: 3 (with protection), -33
- Special features: drought resistant, compact habit, deer resistant
- Landscape use: border, container, slope, firescaping/fire wise, hedge, mass planting

Hesperaloe parviflora 'Perpa' Brakelights

- Size: 2 feet x 2 feet
- Flower color: bright red
- Flower season: Sept - June
- Growth rate: slow
- Exposure: full sun

Hesperaloe spp. 'Pink Parade'

size (h x w) 3-4 ft x 3-4 ft
flower color
pink
flower season spring to fall
exposure full sun, reflected heat
water low
growth rate slow to moderate
hardiness -10° f, usda zone 6
pruning remove spent flow

Tecoma hybrid Crimson Flare®

Red flowers from spring - fall
Drought resistant
Sunset zones:12-13, 16, 18-24; USDA 8
Attracts hummingbirds
Rapid growth rate
Size (h x w) 6-8 feet x 6-8 feet

Tecoma Hybrid Solar Flare®

Bright yellow/orange flowers spring - fall
Drought resistant
Sunset zones:12-13, 16, 18-24; USDA 8
Attracts hummingbirds
Rapid growth rate
Size (h x w) 6-8 feet x 6-8 feet

DURANGO DELIGHT®
(*AGAVE SCHIDIGERA*)

- size (h x w) 2 feet x 2-3 feet
- flower color reddish - purple
- flower season winter, spring
- growth rate moderate
- hardiness 15° f, usda zone 8

Little Miss Sunshine Cistus (rockrose)

(*Cistus Corbariensis* hybrid)

- Feature/white flowers in spring; year-round colorful foliage
- Evergreen or deciduous evergreen
- USDA zones hardy to 20°F USDA zones 9-11
- Sunset zones 5-9, 14-24, 26, 28, 31
- Special features deer resistant, disease / pest resistance, easy car wise
- Landscape use border, container, slope, rock gardens, groundcover

Containers, Condos, Apartments (Drought Resistant Plants for Small Spaces)

Chef's Choice® Rosemary
(*Rosemary officinales*)

- Violet blue flowers in spring
- Evergreen or deciduous evergreen
- USDA zones: hardy to -10°F USDA zones 6-11
- Sunset zones: 4-24
- Drought resistant, aromatic, deer resistant, food seasoning
- Use as landscape plant, border, container, or mass planting

Purple Pixie® Weeping Loropetalum

- Profuse pink flowers in spring
- Evergreen or deciduous evergreen
- USDA zones hardy to 0°F USDA zones 7-11
- Sunset zones 4-5 (with protection); 6-9; 14-24
- Drought resistant, low maintenance, compact, pest resistance, easy care
- Use as border, container, slope, or groundcover

‘Little Kiss’ Salvia
(*Salvia microphylla*)

- Feature/red and white bi-color blooms spring to fall
- Evergreen or deciduous evergreen
- USDA zones hardy to -10°F zones 8-10
- Sunset zones 5, 7-24
- Drought resistant, attracts pollinators, clumping habit, heat tolerant
- Use as an accent plant, border, container, or in mass planting

‘Black And Bloom’ Salvia
(*Salvia guaranitica*)

- Dark blue flowers mid-spring to mid-fall
- Evergreen or deciduous evergreen
- USDA zones hardy to 10°F USDA zones 8-10
- Sunset zones 4-7 (with protection), 8-24
- Drought resistant, low maintenance, attracts pollinators, deer resistant
- Use as a landscape or container plant

‘Love And Wishes’ Salvia
(*Salvia* spp.)

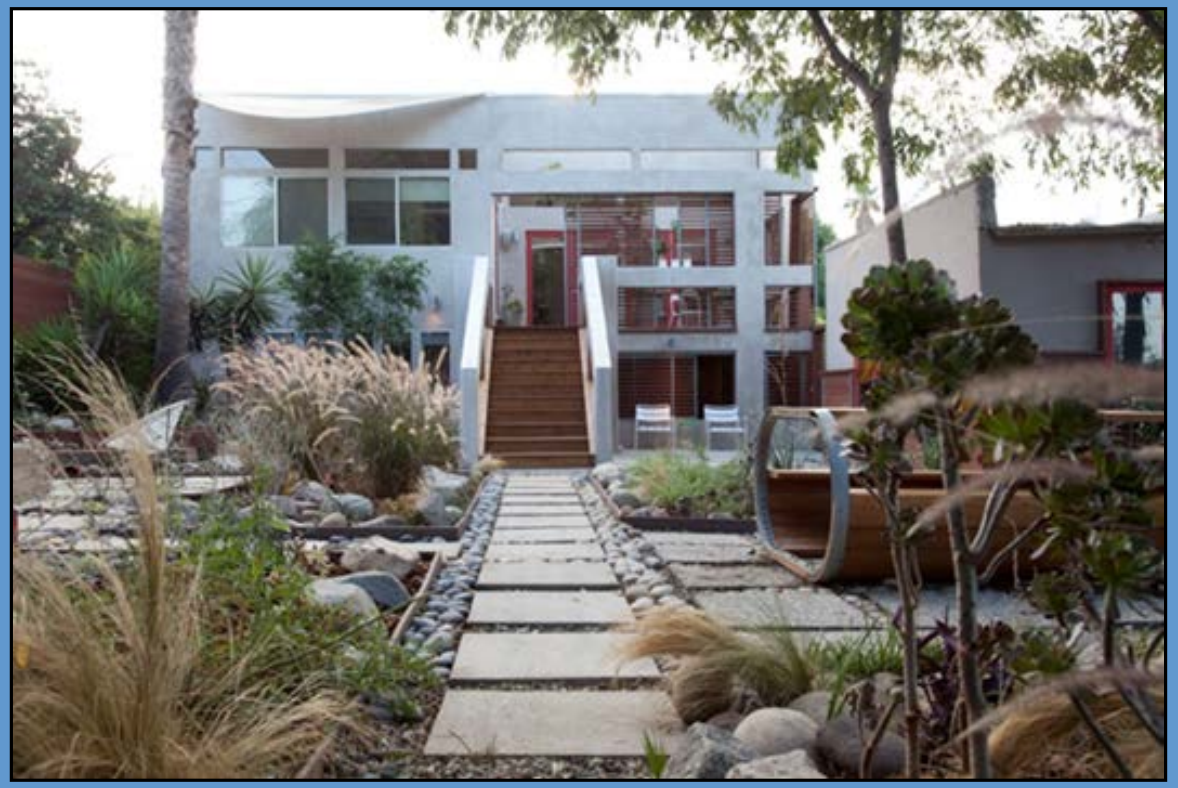
- Dark purple flowers in fall
- Evergreen or deciduous herbaceous
- USDA zones hardy to 25
- Sunset zones 16-24; annual in cooler areas
- Drought resistant and heat tolerant
- Attracts pollinators
- Use as a landscape or container plant

Orange Rocket Berberis

(*Berberis thunbergii* 'Orange Rocket')

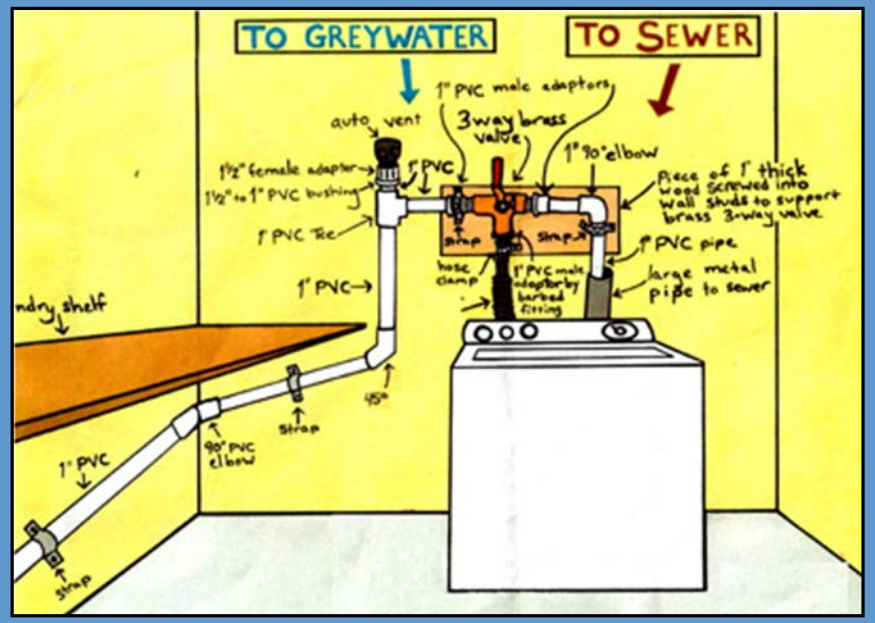
- Deciduous
- USDA zones hardy to -20°F USDA zones 5-9
- Sunset zones 2B, 3-24
- Drought resistant, low maintenance, heat tolerant, beautiful foliage
- Use as a landscape, border, container, slope, or rock garden plant

Use of Graywater to Irrigate California Landscapes



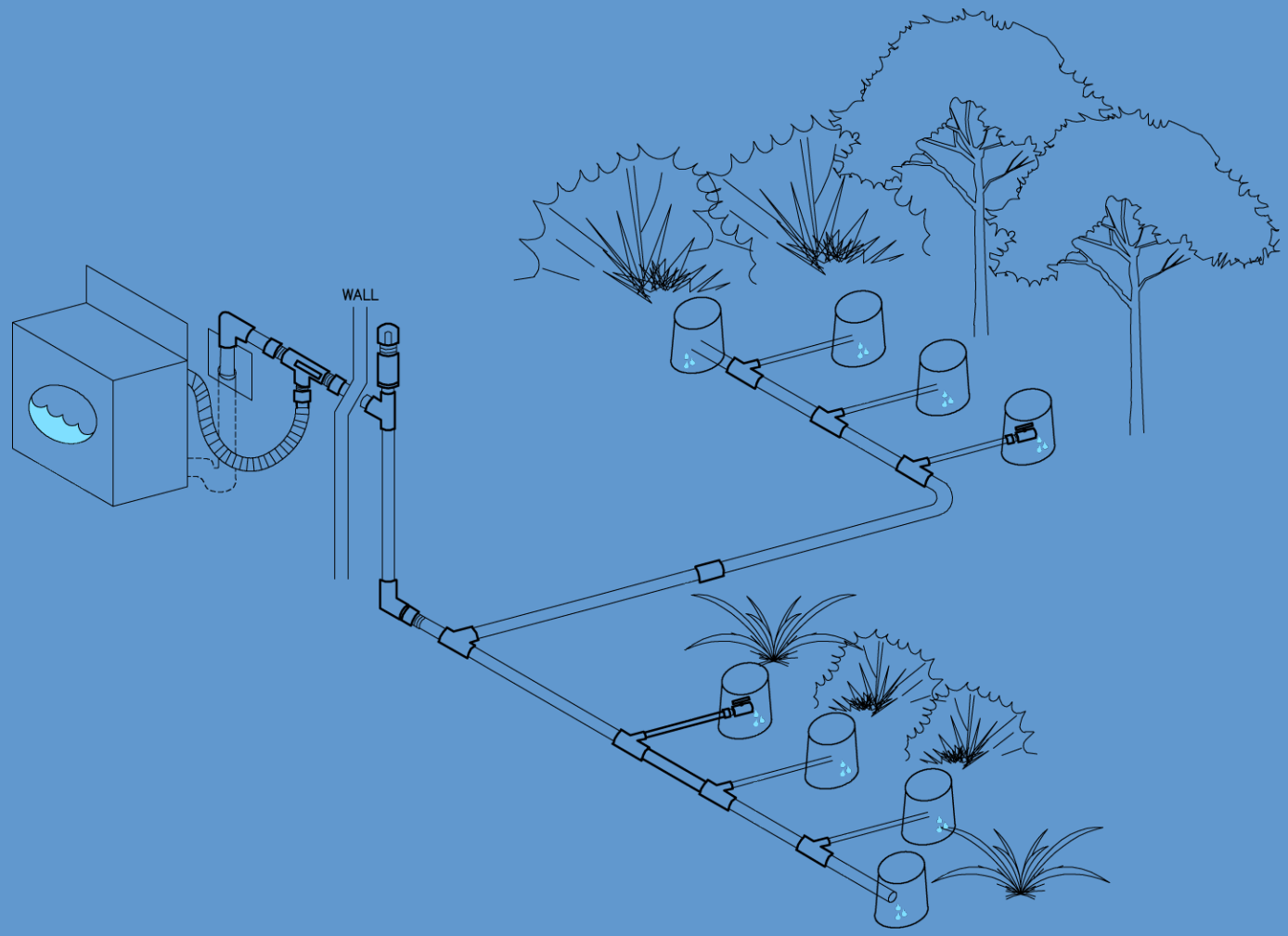
The use of graywater (also spelled greywater, grey water and gray water) to irrigate landscape plants is increasing throughout the united states, particularly in California and other arid states. Municipalities are rapidly amending their codes to encourage the use of home graywater systems.

A construction permit is no longer required for the installation of a single-family or two-family residential graywater irrigation system from a washing machine to an outdoor irrigation or disposal field as long as it does not alter the household plumbing.

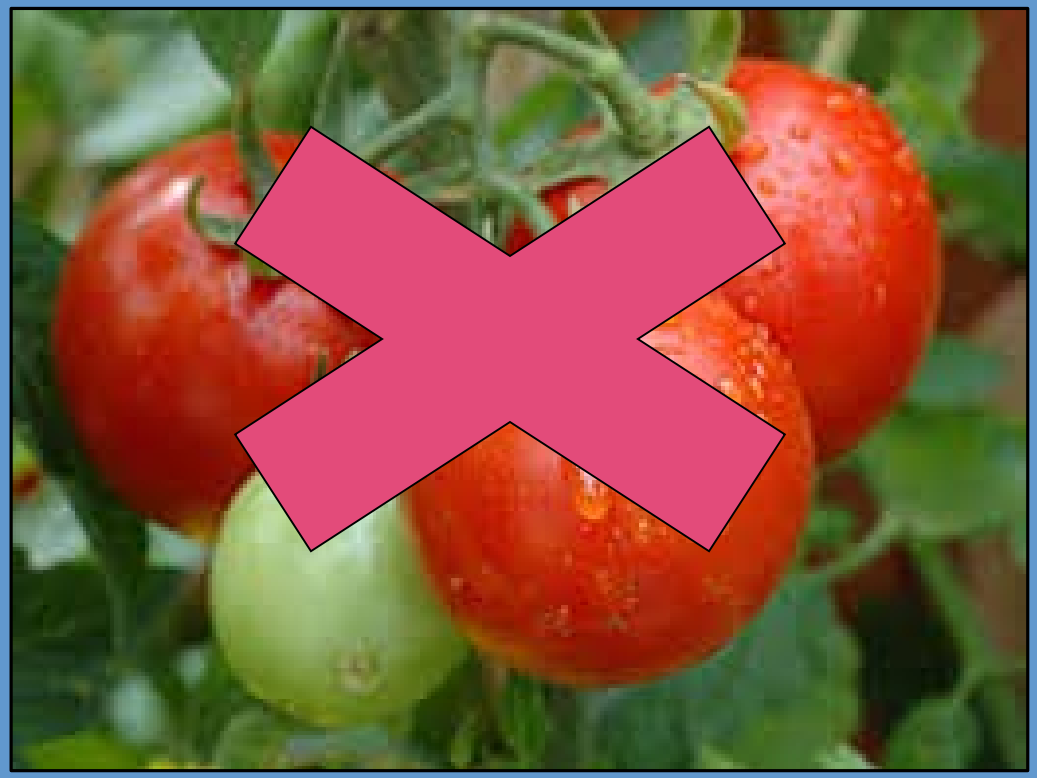


How Much Graywater Can be Generated?

- Between 10 And 25 Gallons Per Washing Machine Load Is Generated From A Horizontal Drum Machine (Side Loader)
- About 40 Gallons Per Washer Load Is Generated From A Top Loader.


WALL

Due to low but potential health risks, graywater should not be used to irrigate - or come into contact with - edible plants.



Affordable housing project in Los Angeles (Casa Domingues) irrigated with a large, complex graywater system

- Graywater is often directed to mulch basins constructed by replacing several inches of soil with coarse organic mulch
- They work well for irrigating flower beds and small ornamentals
- however, basins constructed within the drip line of mature trees are not recommended and can result in injury to established roots and unstable and unsafe trees

Know Your Soil (Type) Texture

Table 16A-2 Design Criteria of Six Typical Soils

Type of Soil	Square Feet	Gallons	Square Meters	Liters
	Minimum square feet of irrigation/leaching area per 100 gallons of estimated graywater discharge per day	Maximum absorption capacity in gallons per square foot of irrigation/leaching area for a 24-hour period	Minimum square meters of irrigation/leaching area per liter of estimated graywater discharge per day	Maximum absorption capacity in liters per square meter of irrigation/leaching area for a 24-hour period
Coarse sand or gravel	20	5.0	0.005	203.7
Fine sand	25	4.0	0.006	162.9
Sandy loam	40	2.5	0.010	101.8
Sandy clay	60	1.7	0.015	69.2
Clay with considerable sand or gravel	90	1.1	0.022	44.8
Clay with small amounts of sand or gravel	120	0.8	0.030	32.6

Water Use Of Trees At Luxury Consumption

Climate	Relative Water Requirement of Tree/Shrub (July)	50 square foot canopy	100 square foot canopy	200 square foot canopy
Coastal (historical evapotranspiration = 1 inch/week)	Low	10	19	38
	Medium	16	31	62
	High	25	50	100
Inland (historical evapotranspiration = 2 inches/week)	Low	19	38	76
	Medium	31	62	124
	High	50	100	200
Desert (historical evapotranspiration = 3 inches/week)	Low	28	57	114
	Medium	47	93	186
	High	75	150	300

Thank You
for Your Service as a UCCE Master Gardener

Questions?

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