Planning a Low Water Landscape

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UC Cooperative Extension

August 26th, 2015

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Outline

- Updating and changing irrigation
  - Hydrozoning
  - Delivery system (ex. sprinkler, drip, etc…)
  - Control system (i.e. smart clock)
  - Scheduling Adjustments
- Graywater Systems
- Native and Mediterranean Plants
- Alternatives to Turf
- Rainwater Collection

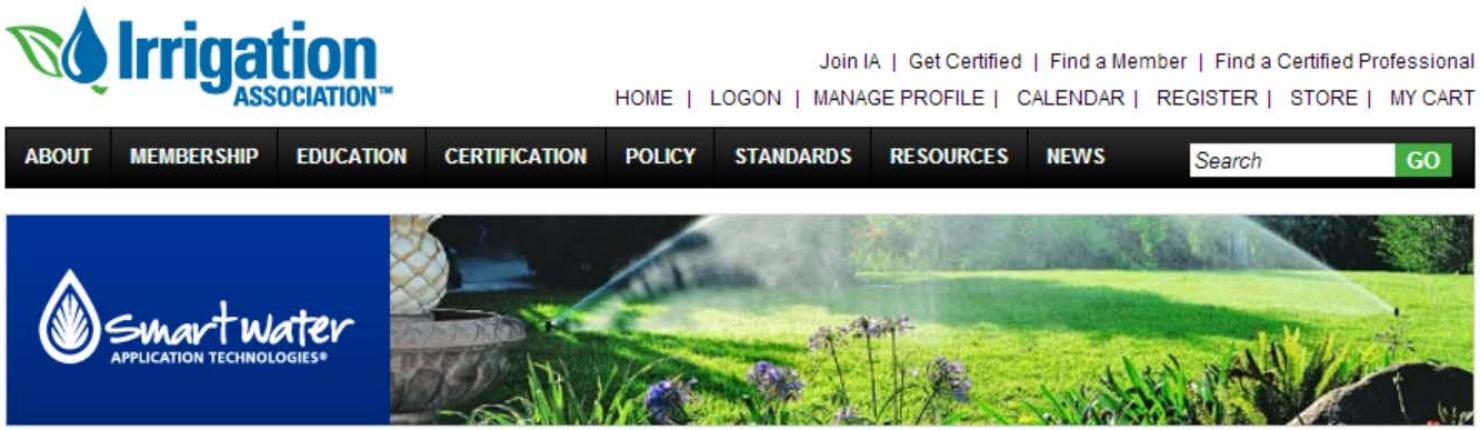
Updating & Changing Irrigation

Controller Types

- Time
- Weather (ET)
  - Uses weather information to estimate landscape water use
  - Adjusts irrigation program to replace water used by landscape

Controller Types

- Time
- Weather (ET)
- Soil moisture
  - Uses sensors to measure water content of the soil
  - Allows irrigation when soil is dry



http://www.irrigation.org/SWAT/swat.aspx?id=298

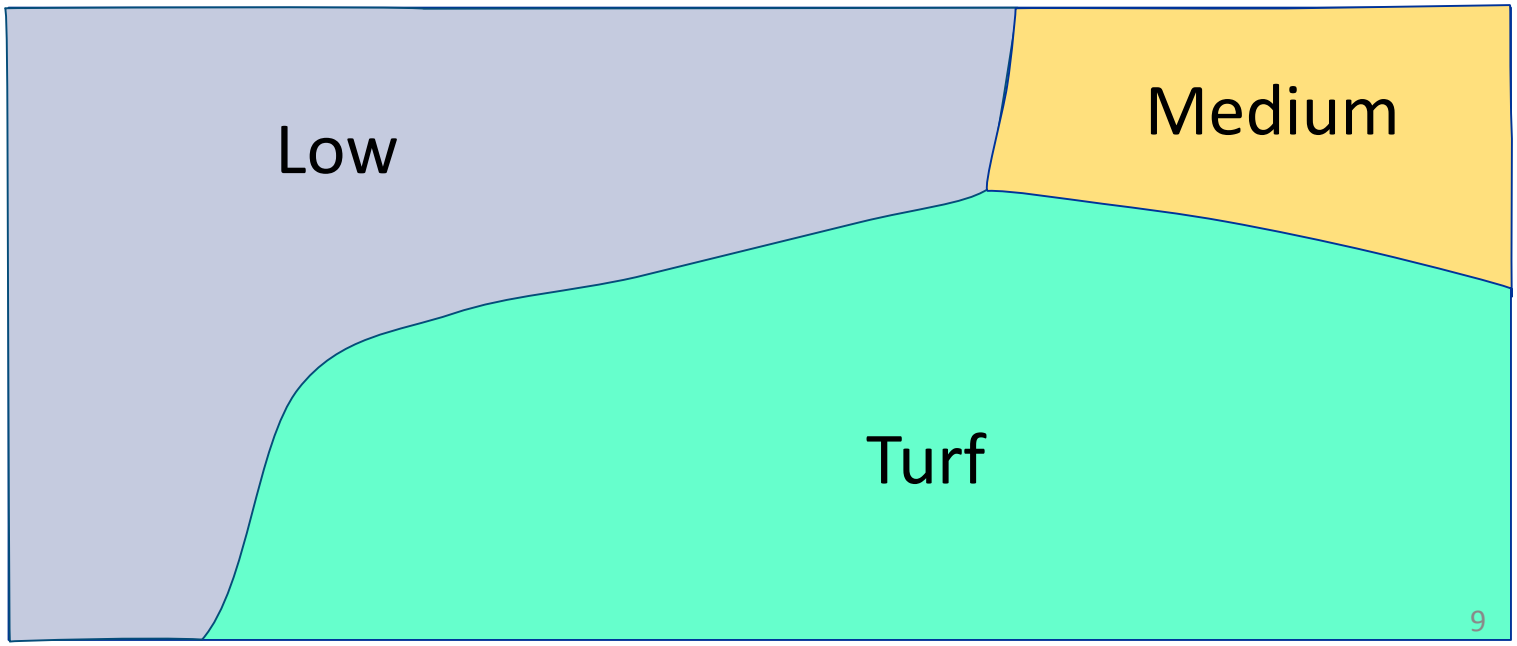
Tree Ring Irrigation Contraption (TRIC)

- Developed to irrigate trees during drought conditions, mainly where other landscape irrigation is turned off.
- Designed for applying water to significant depths.

http://ccuh.ucdavis.edu/public/drought/tree-ring-irrigation-contraption-tric-1/tree-ring-irrigation-contraption-tric

Plant selection & design

- Hydrozones
  - Plants with similar water use within an irrigation zone



Graywater Systems

Native and Mediterranean Plants

Plant selection & design

- Mediterranean climate-adapted plants
  - Adapted to dry summers
  - Other plants in landscapes use more water in the summer
  - Doesn’t only include California natives

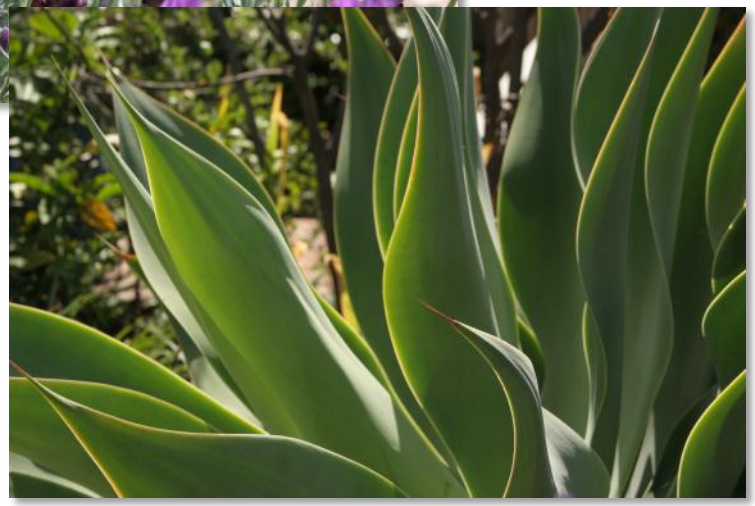
Water Efficient Plant Terminology

- Drought tolerant
  - A plant with the ability to survive in a dry environment
- Xerophyte
  - Plants that exist in dry environments

Drought Mechanisms

- Avoidance
  - Drought escape
  - Water conserving
  - Effective water uptake
- Tolerance
  - Turgor maintenance
  - Antioxidants- protective tissues
- Efficiency
  - Maintain growth under dry conditions

Characteristics of Water Efficient Plants



Structural

- Deep root system
- Internal water storage
- Strong internal support

Characteristics of Water Efficient Plants

Leaf Adaptations

- Smaller
- Gray, light-green, or blue-green in color
- **Uneven surfaces**
- **Orientation**
- Hairy
- Thick - often waxy

Plant selection & design

- Hydrozones
  - Plants with similar water use within an irrigation zone
  - Obtain information on predicted plant water use
    - WUCOLS- Water Use Classification of Landscape Species

www.ucanr.sites/WUCOLS

www.ucanr.sites/WUCOLS



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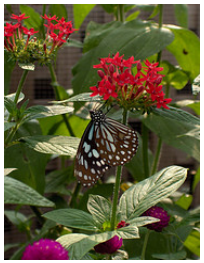
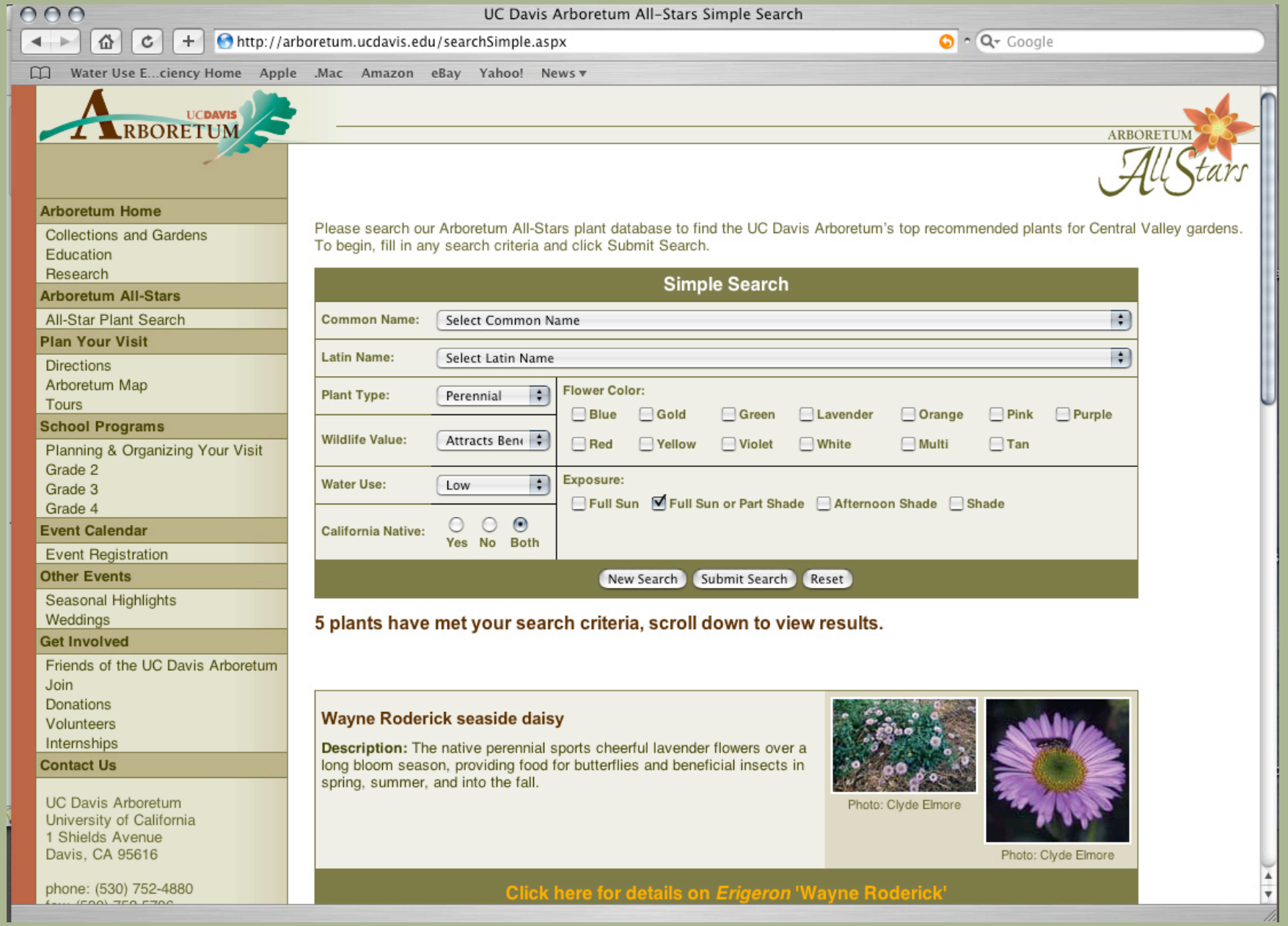


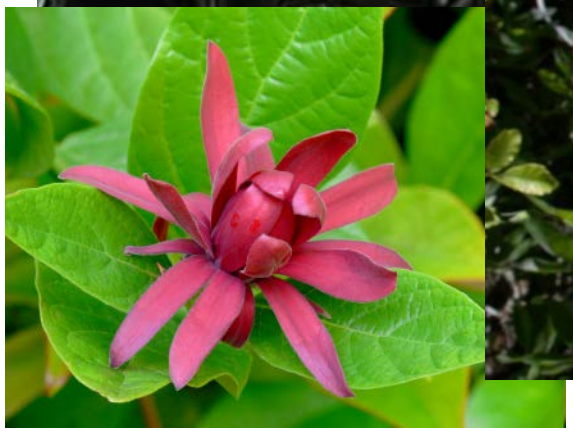
UC DAVIS ARBORETUM All Stars

For more information, visit http://arboretum.ucdavis.edu/

All-Stars Simple Search



‘Valley Violet’ California Lilac
Ceanothus maritimus

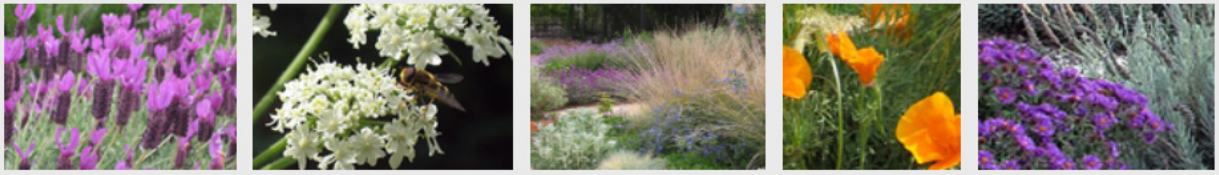


Field Testing

high, medium, and low water use

S.K. Reid and L.R. Oki. 2008. Field trials identify more native plants for urban landscaping. *California Agriculture.* 62(3): 97-104).

UCDAVIS COLLEGE OF AGRICULTURAL AND ENVIRONMENTAL SCIENCES



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Enhancing urban living through horticulture

Located at the University of California, Davis, the **California Center for Urban Horticulture (CCUH)** draws upon the knowledge and expertise of our partners in academia, industry, and the public with a mission to help Californians

- develop more water-conserving, pest-resistant and disease-resistant home gardens
- create environmentally sound public landscapes and parks
- produce better plant materials for sustainable urban landscapes

We seek to address the state's growing water demands, increasing chemical inputs into the environment, and loss of wild lands in order to improve the quality of urban life.

ccuh CALIFORNIA CENTER FOR URBAN HORTICULTURE

News

Save the Date! YSB: Creating a Living Landscape March 28th, 2015

Jan 14, 2015

Rose Weekend 2015-HOLD THE DATES! May 2nd & 3rd

Dec 01, 2014

More news...

Featured

New article about the TRIC on the UCANR Master Gardener Website!

Low Water Use Landscaping Presentations from Nov 8th Available Here

Tree Ring Irrigation Contraption (TRIC): A New Way to Water Trees with Confidence

New Presentations Available about the PRE (Plant Risk Evaluation) Tool

Academic Plant Trials-UCD & UCANR researchers discover how plants can use less water and still look good in the garden

ccuh.ucdavis.edu

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UC Davis Irrigation Field Trials for Landscape Plants

UC Davis horticulturists are evaluating landscape plants with the potential to be good performers in low-water use gardens. Some of these plants have been from the UC Davis Arboretum All-Stars lists, and others are provided by growers and breeders who want to evaluate their new plant varieties for low-water use in hot California gardens. These plants are being tested under four different irrigation frequencies for growth, heat tolerance, pest and disease resistance and attractive appearance. Additionally, Master Gardener volunteers are growing these plants in demonstration gardens throughout the state, documenting their appearance and performance in their varied climate zones. The results of these trials are providing growers and retailers the information they need to successfully distribute and market these plants to the public.

Irrigation Trials

After being grown for a full year on a regular watering regime to establish deep, healthy roots, plants are irrigated through the second year at four levels, ranging from 20-80% percent of normal evapotranspiration (total water lost through evaporation from plants and surrounding soil). A weather station collects data to calculate these percentages, while height and width are measured to calculate a growth index for each species at each water level. Overall appearance, flowering time and duration, and pest or disease problems are noted to provide a comprehensive assessment of performance.

Upcoming Events

Get Ahead or Get Parched: Six Ways to Survive the Drought

A workshop on landscape management during drought, designed for landscape irrigation managers.

Apr 09, 2014

Rose Weekend-Saturday May 3rd & Sunday May 4th, 2014

Final agenda and Rose Catalog coming soon!

May 03, 2014

See more events

News

Pollinator Gardening Workshop Presentations

Mar 26, 2014

Current Issues in Invasive/Emerging Pests & Diseases Workshop Available for Download

Feb 11, 2014

More news...

Featured

Landscaping Resources During Drought (**NEW 3/3/14**: Drought Messages for Landscape Managers)

WUCOLS IV Website

Kurapia: Low Water Groundcover

Landscape Water Conservation Resources Map





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New R

We've create
map, you'll fi
plants, rebate

NEW: As of D
include upcor

Select the ap

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Landscape Water Conservation Resources

In this map, you'll find information published by your local municipalities, including conservation practices, low-water plants, rebate programs, and more.

Please email us at jjtso@ucdavis.edu with feedback or to add resources to the map. To add your site, include the name, water conservation webpage URL, and the jurisdiction of the entity (counties covered).

Unlisted · 4 Collaborators · 6,273 views
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- **Alameda County**
  City Alameda Albany Berkeley Dublin Emeryville Fremont Hayward Livermore Newark Oakland Piedmont Pleasanton San Leandro Union City County Alameda County Water District Bay-Friendly Landscaping Regi...
- **Alpine County**
  Regional Bear Valley Water District Kirkwood Meadows Public Utilit District State Save Our Water
- **Amador County**
  City Amador City Ione Jackson Plymouth Sutter Creek County Wate Conservation Tips Regional Kirkwood Meadows Public Utility Distric State Save Our Water
- **Butte County**
  City Biggs Chico Gridley Oroville [Cal Water] Paradise (Irrigation District) Regional Del Oro Water Company State Save Our Water
- **Calaveras County**
  City Angels Camp County Calaveras County Water District Region Calaveras Public Utility District State Save Our Water
- **Colusa County**
  City Colusa Williams State Save Our Water

Sonoma County
Updated yesterday

City
Cloverdale
Cotati
Healdsburg
Larkfield
Petaluma
Rohnert Park
Santa Rosa
Sebastopol
Sonoma [Sonoma Conserves]
Windsor

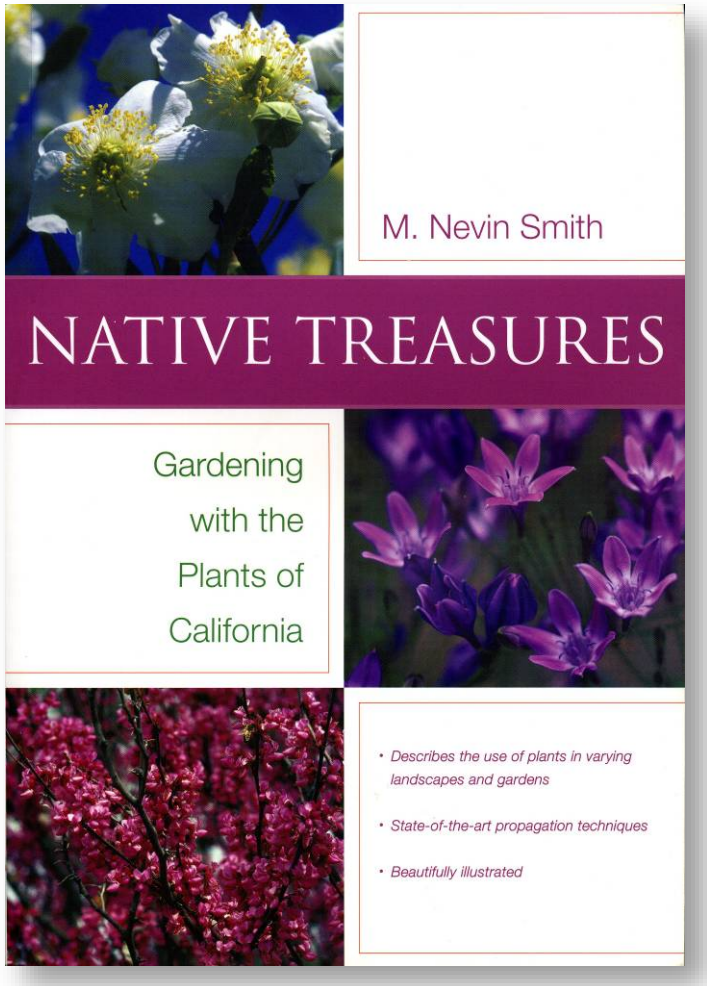
County
Sonoma County Water Agency
Water-wise Gardening in Sonoma County

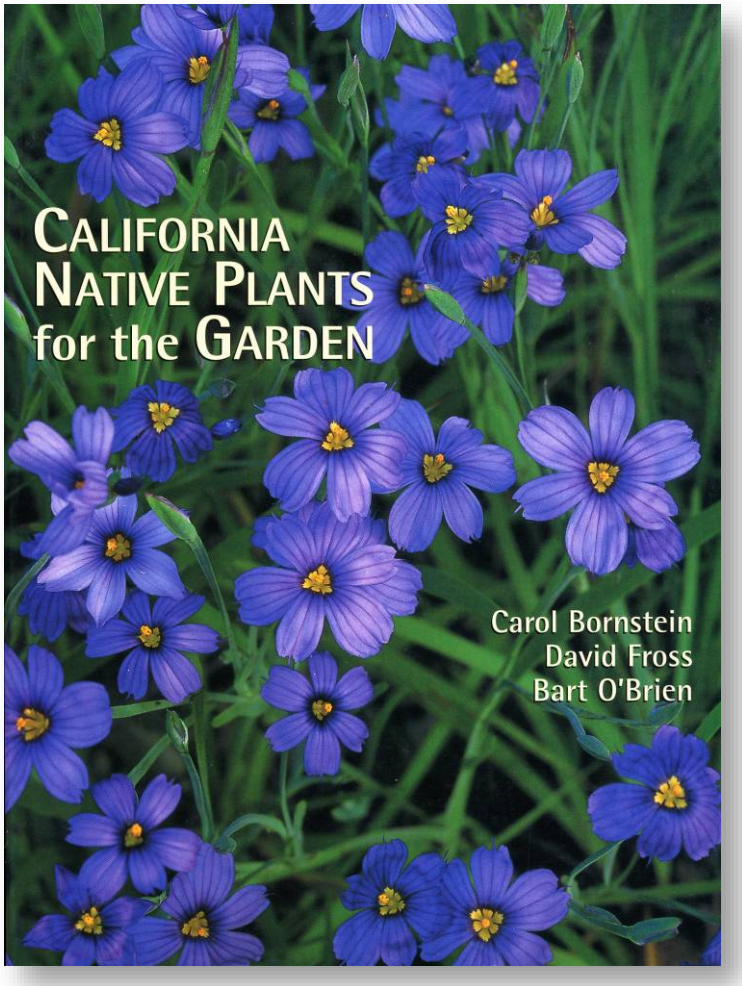
Regional
Russian River Watershed Association
Valley of the Moon Water District
Water-wise Gardening in the Bay Area

State
Save Our Water

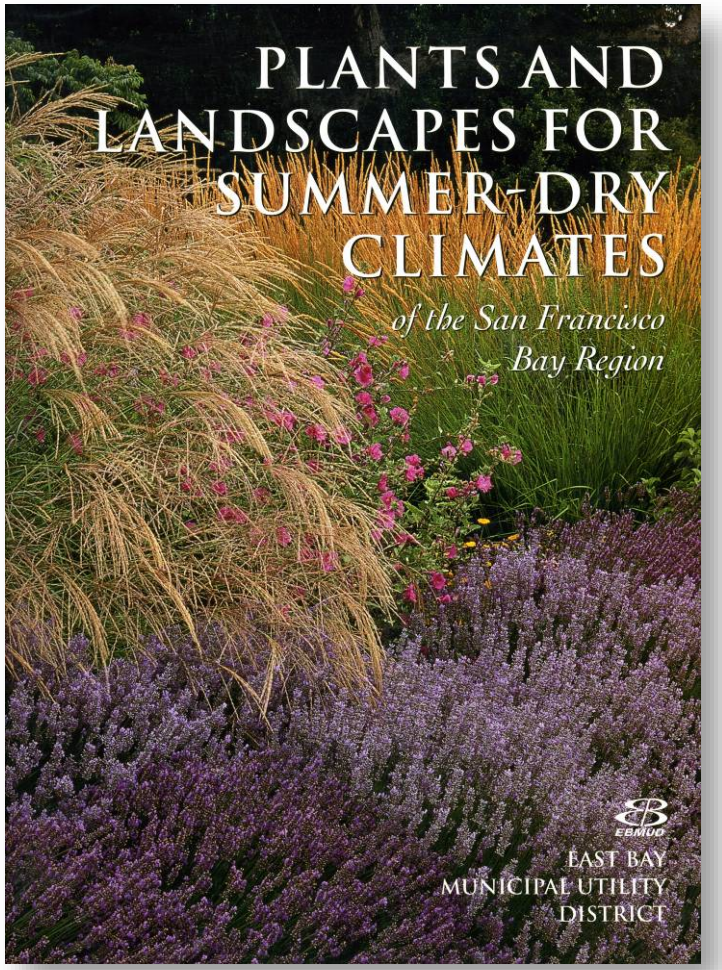
Landscape Water Conservation Resources Map

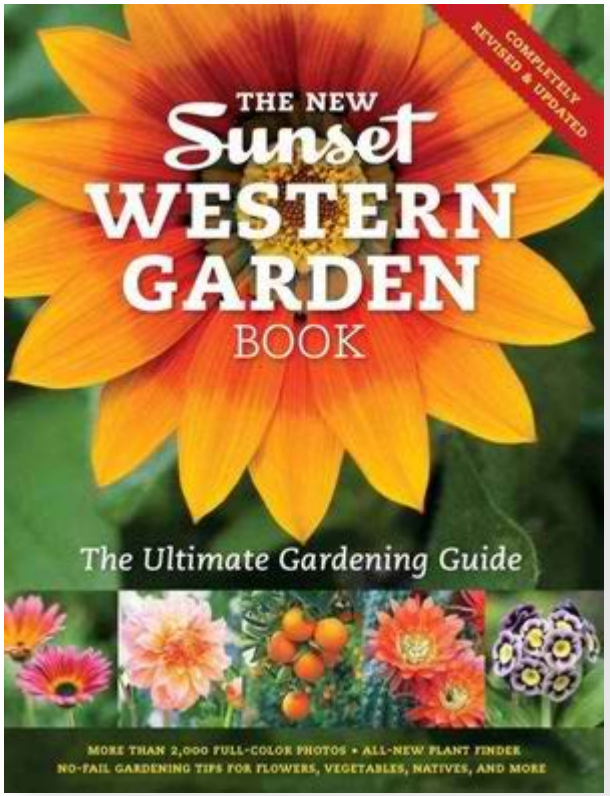
Sustainable Landscaping Information





Sustainable Landscaping Information





bewaterwise.com

THE METROPOLITAN WATER DISTRICT of SOUTHERN CALIFORNIA and THE FAMILY of SOUTHERN CALIFORNIA WATER AGENCIES

THE WATERING INDEX

The current watering index = 71 %

- About the Watering Index
- Santa Barbara County Residents

THE WATERING CALCULATOR

Create your own custom watering schedule >>

California Friendly Garden Guide

The California Friendly Garden is a slice of California's past, filled with the native and California Friendly plants perfectly suited to our mild winters and warm, dry summers.

Guide Features

Gardens
Browse through a photo gallery of beautiful California Friendly gardens to find ideas for front yards, hillsides, patios and much more.

Advanced Search
Use our powerful search function to look for plants by color of leaves or flowers, height, sun/shade requirements, soil type needed and blooming habits.

Browse Our Catalog
Sift through our database of 1,000 California Friendly plants by type, function, characteristics or common or botanical names.

My Plant List
Save your favorite plants in a customized plant list you can print out or access again.

Garden Resources

What is a California Friendly Garden?

Today, California's California Friendly is rarely seen
because we have filled our landscape with palm trees, citrus groves and hibiscus, glorying in our ability to create tropical paradises and English gardens. In doing so, we changed the look, the feel, the smell and even the sound of our landscape.

But the California Friendly Garden does exist, and when we stumble upon one - in a neighbor's yard, a city's demonstration garden or at an institution such as Claremont's Rancho Santa Ana Botanic Garden - we find that the garden's natural rhythm allows us to step back in time, to find ourselves instantly at home and in harmony with the surrounding environment. It also gives voice to the land, allowing it to speak to us about the region we call home. And in doing so, the California Friendly Garden helps restore the sense of place too often lost in our urban settings.

The California Friendly Garden links us to our past, but also offers the path to our future. In this age of water restrictions and our unpredictable weather cycle, reducing outdoor watering is the surest solution. Native and California Friendly plants accomplishes this without sacrificing beauty.

http://www.bewaterwise.com/knowledge01.html

Alternatives to Turf

Water Saving Turf or Alternative Turf for Southern California

- Minimize the size of non-recreation lawn areas.
- Utilize warm season turfgrass species
  - Buffalo grass
  - Zoysia grass
  - Bermuda grass
- Utilize alternative plant species in non-recreation areas.
  - Yarrow (*Achillea* spp.)
  - Blue gramma (*Bouteloua gracilis*)
  - Sedges (*Carex pansa* or *C. tumuicola*)
  - Kurapia (*Lippia nodiflora* 'Kurapia')

Buffalo grass

‘UC Verde’

Carex tumuicola


University of California
Agriculture and Natural Resources
Lippia nodiflora
Kurapia
Kurapia
Lippia nodiflora
ccuh

Rainwater Collection

Solutions for Rooftop Runoff

- Rain collection devices
  - Cisterns (underground or aboveground)
  - Availability has improved considerably.
  - Utilize captured water for irrigation during dry periods or use them to catch first flush minimizing pollutant loading to storm drains.
  - Check local water providers for rebate availability.


Source: Experiments in Sustainable Urban Living

Example: Roof Square Footage

= 500 square feet

1” of rain * (0.6) * 500 square feet

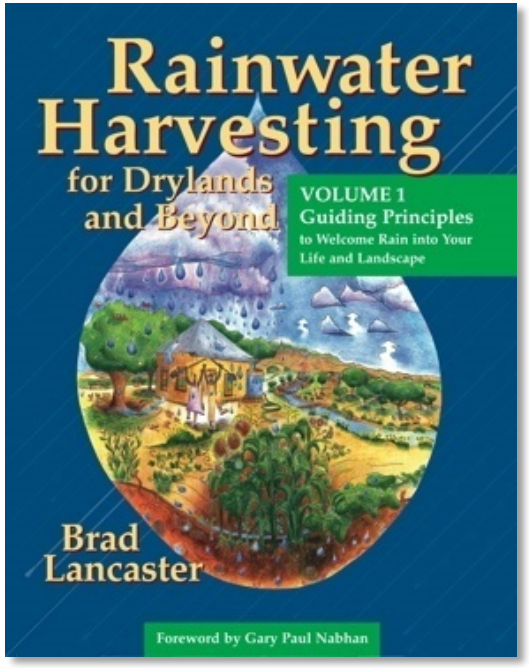
= 300 gallons

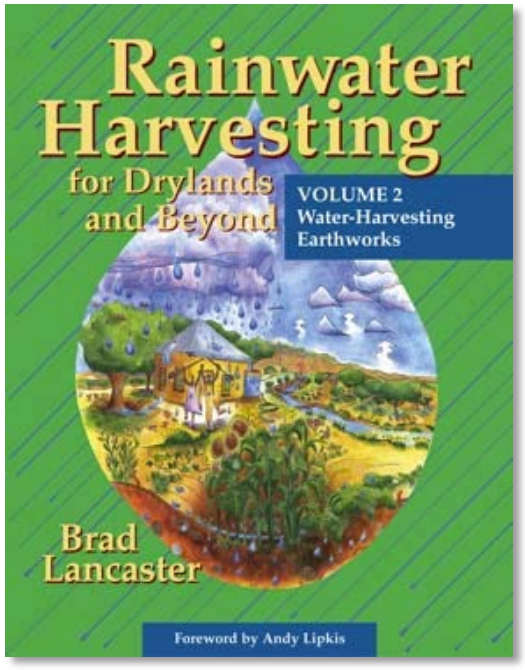
Average Orange County rainfall is approx. 12”

= 3,600 gallons

Source: Experiments in Sustainable Urban Living

Sustainable Landscaping Information

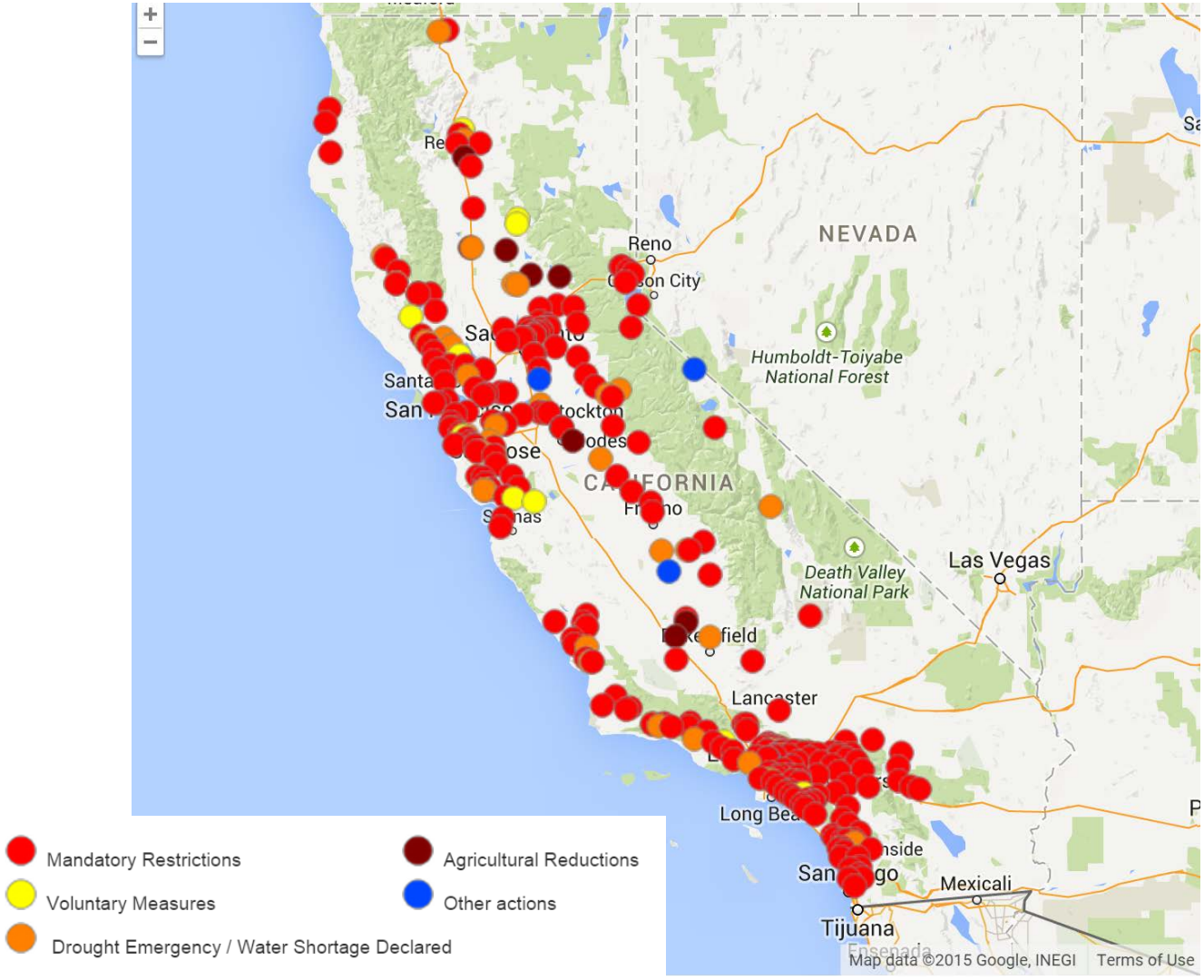


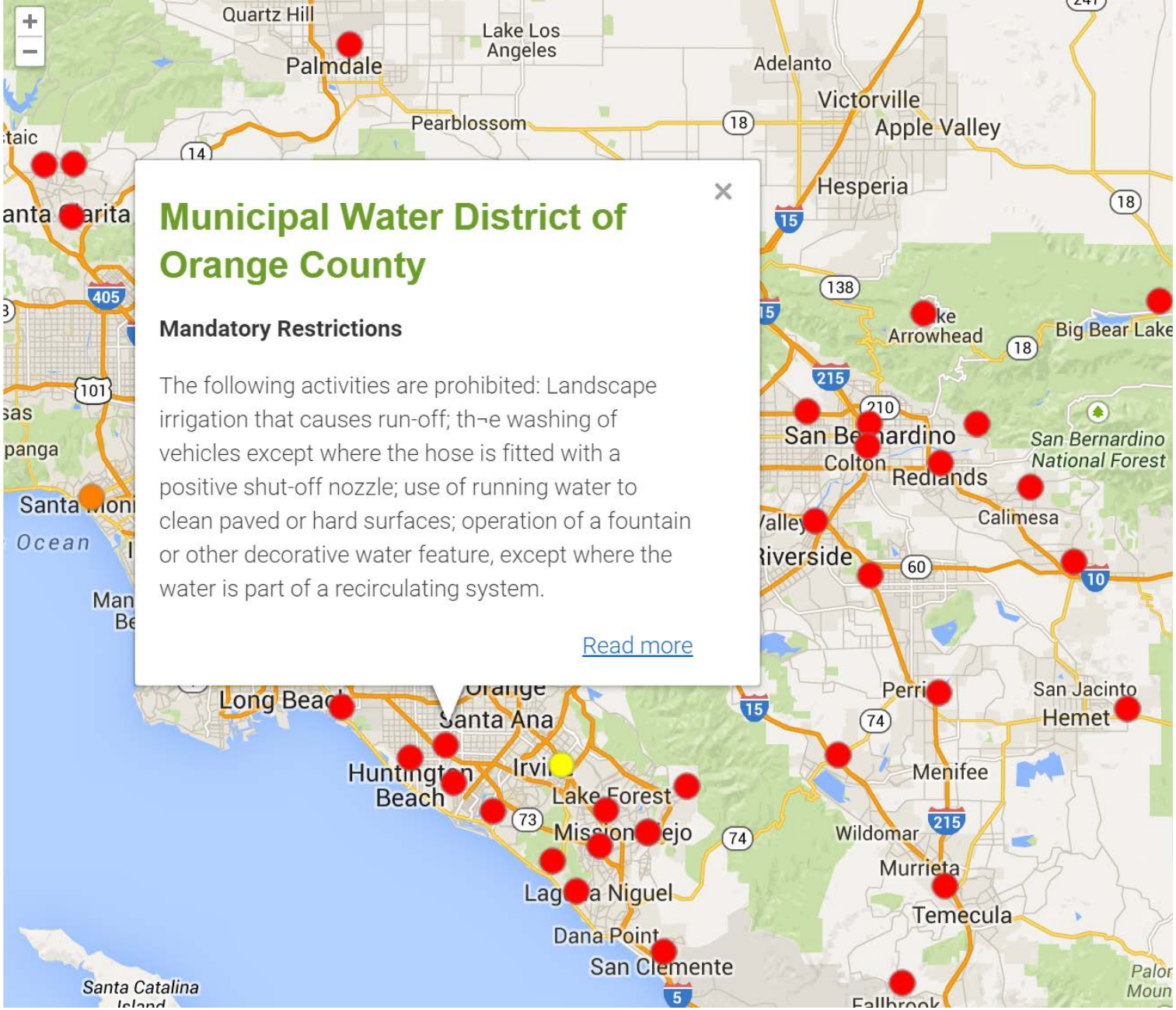


http://www.harvestingrainwater.com/

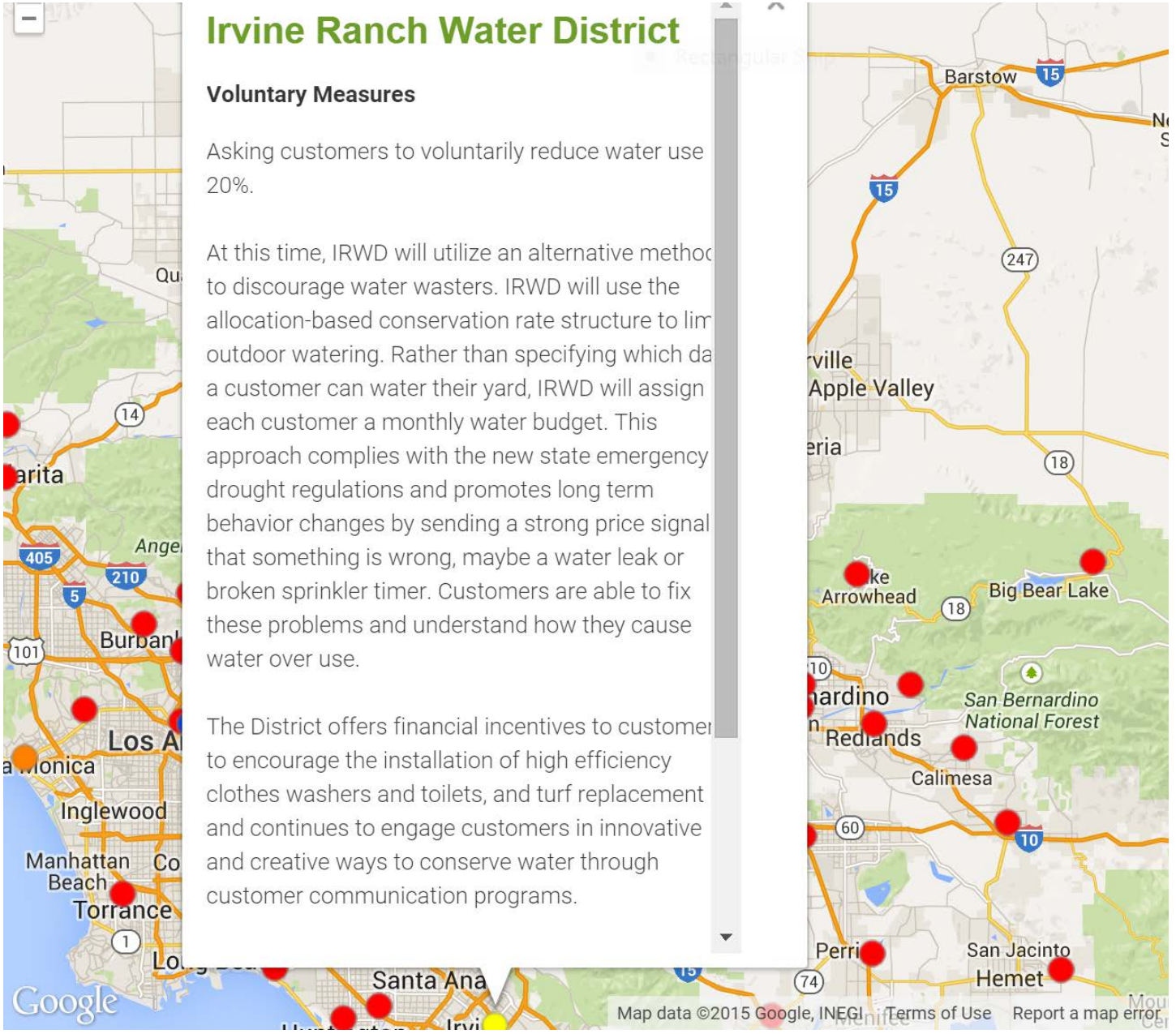
Local Ordinances

What is Required Locally?





http://www.acwa.com/content/drought-mapr


Irvine Ranch Water District
Voluntary Measures
Asking customers to voluntarily reduce water use 20%.
At this time, IRWD will utilize an alternative metho to discourage water wasters. IRWD will use the allocation-based conservation rate structure to lim outdoor watering. Rather than specifying which da a customer can water their yard, IRWD will assign each customer a monthly water budget. This approach complies with the new state emergency drought regulations and promotes long term behavior changes by sending a strong price signal that something is wrong, maybe a water leak or broken sprinkler timer. Customers are able to fix these problems and understand how they cause water over use.
The District offers financial incentives to customer to encourage the installation of high efficiency clothes washers and toilets, and turf replacement and continues to engage customers in innovative and creative ways to conserve water through customer communication programs.
Barstow
Apple Valley
Arrowhead
Big Bear Lake
San Bernardino National Forest
Redlands
Calimesa
Hemet
San Jacinto
Inglewood
Manhattan Beach
Torrance
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Water Rates

Example of 2008 Tiered Residential Allocation Based Rates*

Tier	Potable Rate per CCF**	Use (% allocation)
Low Volume	$0.91	0-40
Base Rate	$1.07	41-100
Inefficient	$2.14	101-150
Excessive	$4.28	151-200
Wasteful	$8.56	201 +

• Based on number of individuals in home (75 gallons/person/day) and the landscape allocation is adjusted daily based on evapotranspiration (ET) of 1300 square feet (0.03 acre) of **100% cool season turfgrass**.

*July 1, 2008 effective rates

**One ccf =748 gallons

Example of 2015 Tiered Residential Allocation Based Rates*

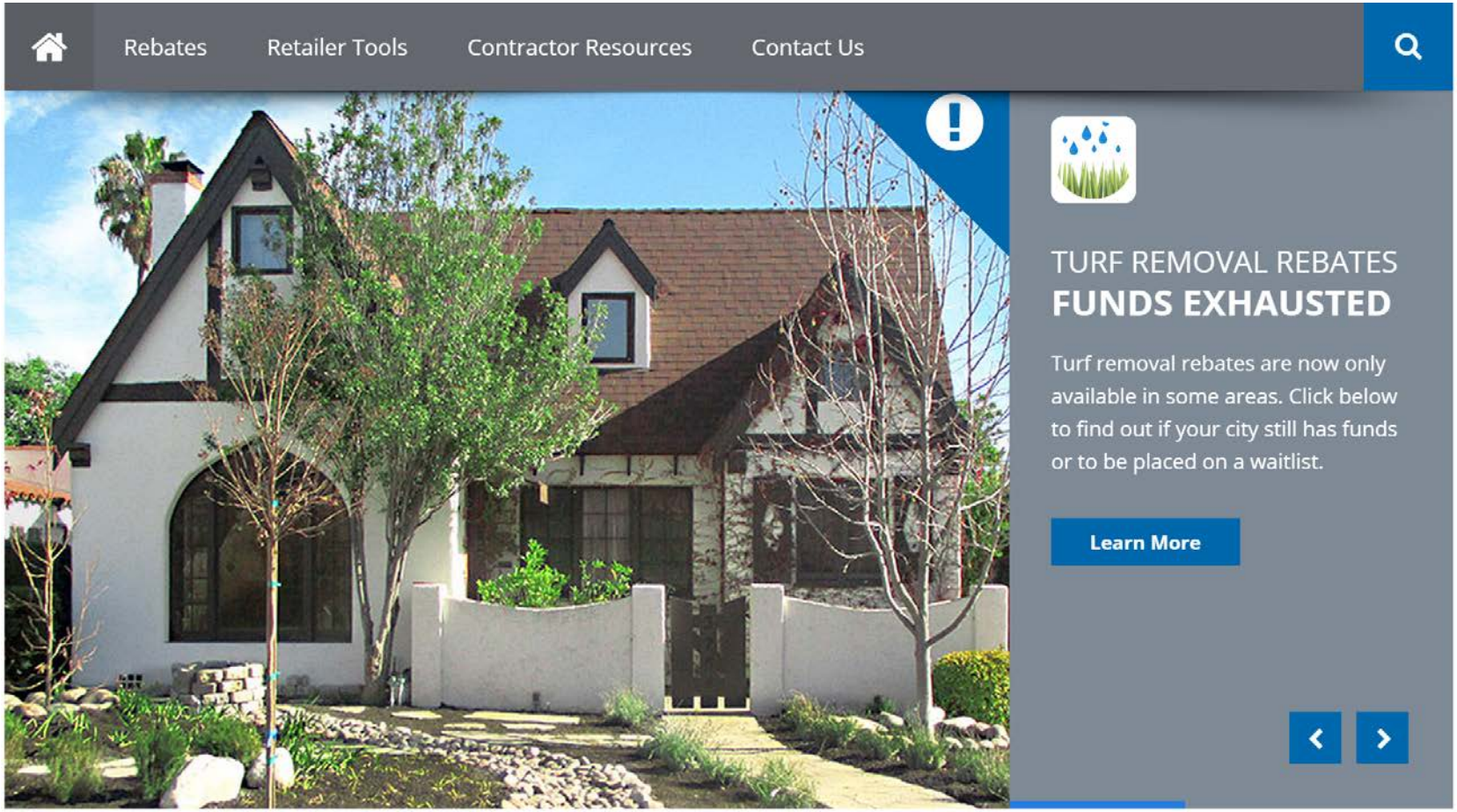
Tier	Potable Rate per CCF**	Use (% allocation)
Low Volume	$1.11	0-40
Base Rate	$1.62	41-100
Inefficient	$3.92 ($9.30 step 2)	101-130
~~Excessive~~	NA	NA
Wasteful	$14.53 ($19.92 step 2)	131+

- Based on number of individuals (4 default) in home (50 gallons/person/day) and the landscape allocation is adjusted daily based on evapotranspiration (ET) of 1300 square feet (0.03 acre) using a crop coefficient of 50% of ET and an irrigation efficiency of 85%.

*July 1, 2015 effective rates
**One ccf =748 gallons

Allocation Calculation:
ET x K_c x 1.18 x LA

Basics of Local ‘Cash for Grass’ Programs



http://socalwatersmart.com/

http://ucanr.edu/sites/urbanwatermgmt/

http://www.overwateringisout.org/

ORANGE COUNTY GARDEN FRIENDLY

http://www.overwateringisout.org/oc-garden-friendly/

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