



**CALIFORNIA CENTER FOR  
URBAN HORTICULTURE**

**UC DAVIS**

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**COLLEGE OF AGRICULTURAL & ENVIRONMENTAL SCIENCES**



# Your Sustainable Backyard: Low Water Use Landscaping

[Giedt](#) Hall, UC Davis

November 8, 2014



UC | University of California  
CE | Agriculture and Natural Resources

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**ARBORETUM AND  
PUBLIC GARDEN**





## **Special Thank You**

- **Department of Water Resources**
- **UC Davis Arboretum**
- **UC Cooperative Extension**
- **Master Gardener Coordinators**
  - **Sacramento and Yolo Counties**
  - **Solano County**
  - **San Joaquin County**

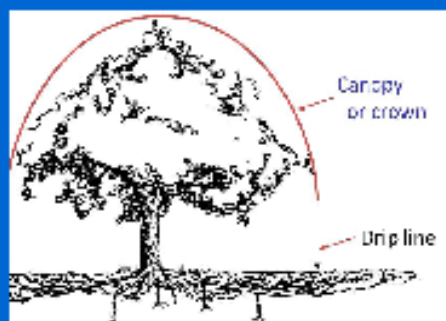
# TREE RING IRRIGATION CONTRAPTION (TRIC)

*An Innovative Way to Water Trees*



## A “Kit” You Put Together

- Cost is about \$100 for dripline, adapters, coupling, timer & filter



## The TRIC

- You can calculate the time required to irrigate a tree to a specific depth, and for a specific soil type.

## TRIC Resources

- PowerPoint User Guide
- Calculator Spreadsheet

<http://ccuh.ucdavis.edu>



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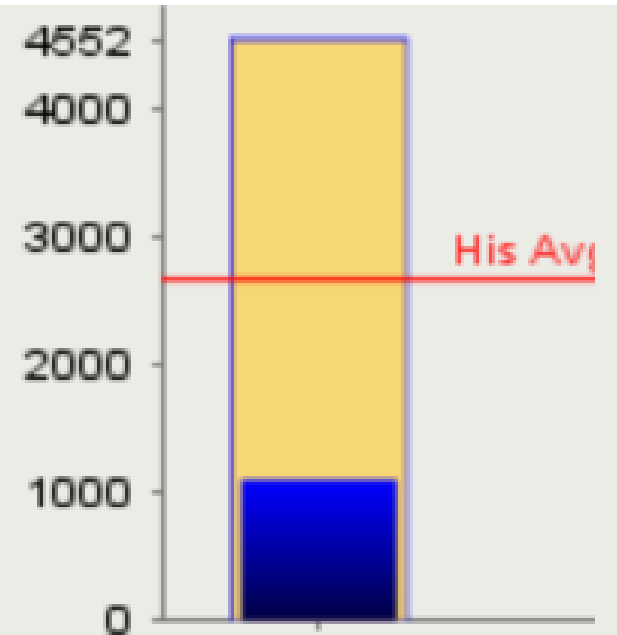
## **Truth or Myth: 10 Things about saving water during the Drought**

- 1. Converting to drip irrigation will save water.**
- 2. California native plants don't require irrigation.**
- 3. If you plant in the fall, you won't need to irrigate drought tolerant plants.**
- 4. Established trees don't require irrigation.**
- 5. I can reduce irrigation by lowering the run time on my irrigation controller from 20 to 10 minutes.**
- 6. One drip emitter per plant is sufficient.**
- 7. To irrigation my tree, I can just put my hose on it and let it dribble.**
- 8. If I see a dry spot on my lawn, I can just increase the run time on my controller.**
- 9. All turf grasses need a lot of water.**
- 10. Managing irrigation is an easy thing to do.**



SERIOUS DROUGHT  
HELP SAVE WATER





## Lake Shasta

**24%**  
(Total Cap.)

**41%**  
(Hist. Avg.)





## Why are we here & what is the concern?

- On July 29, 2014 for ALL urban water users in California:
  - **Using potable water to water outdoor landscapes in a manner that causes runoff to adjacent property, non-irrigated areas, private and public walkways, roadways, parking lots or structures.**
    - The application of potable water to any driveway or sidewalk.
    - Using a hose that dispenses potable water to wash a motor vehicle unless the hose is fitted with a shut off nozzle.
    - Using potable water in a fountain or decorative water feature, unless the water is recirculated. Recycled water is not mandated, but encouraged for fountain use.
- Landscape water conservation
  - Improve irrigation efficiency
  - Match water supply to plant needs (maintain landscape health and appearance)
  - Requires knowledge of plant water needs





*Photos courtesy of JoEllen Jacoby, City of San Diego*



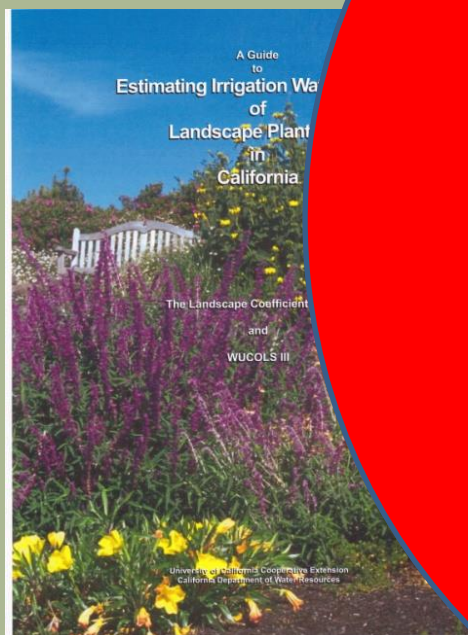


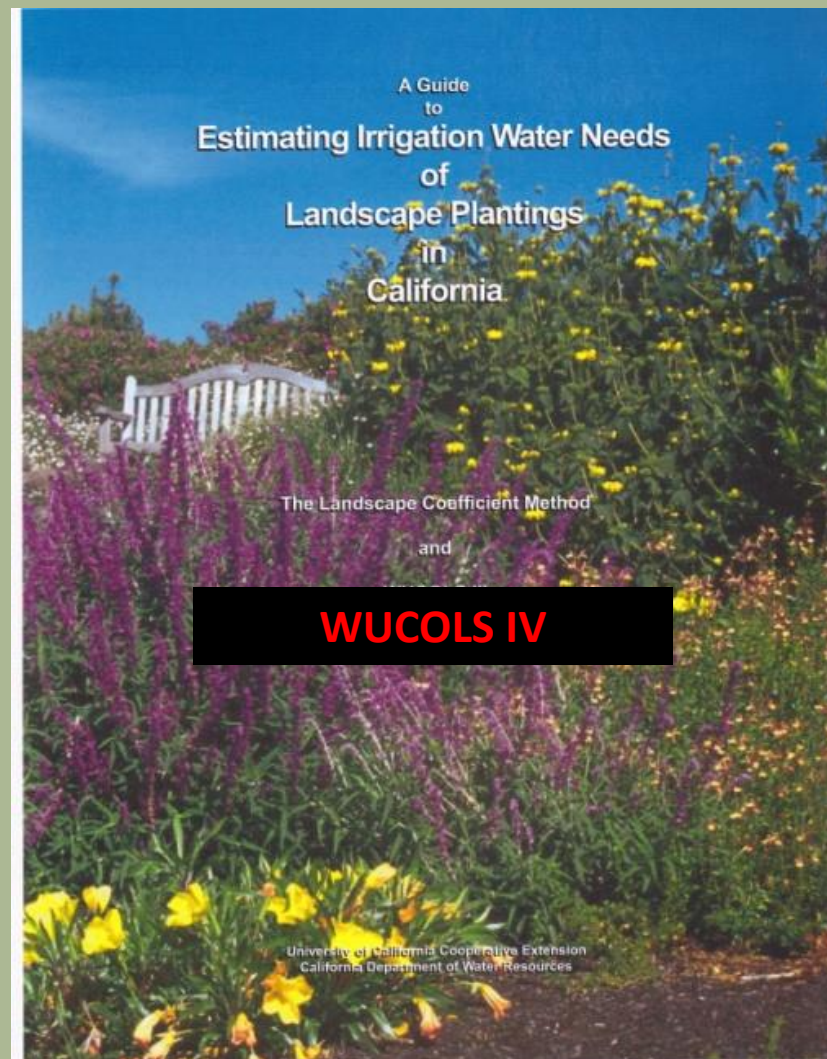
## Water Use Climate Species

### III: Review and

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## WUCOLS IV “Key” Points

1. A **guide** to plant water needs and is **not** a method for estimating landscape water needs.
2. WUCOLS IV evaluations were made by leading horticultural professionals representing 6 different climatic regions in California.
3. Plant water use designation was based on the collective field experience and observations of evaluators. Although limited, available field research was included as well.
4. Plant water use assignments were made by consensus agreement of the evaluators. If a committee did not know a plant, it was not evaluated. If the plant was not appropriate for a region, it was so noted.



## WUCOLS IV Key Points (cont.)

5. Reviewed and updated to 3,546 taxa. Less than 2% of species have been evaluated through field research.
6. The plant factor for MWELo water budget calculation shall be from WUCOLS.
7. Evaluations serve as an important guide in the selection of species for hydrozones and are used by academic, professionals, municipalities and water agencies.
8. Is not perfect and it is based on “horticultural experience & wisdom”, and it serves as a “bridge” to meet a critical need until a “science-based tool or methodology is developed.



## Water Use Field Study Projections

- Assumptions
  - 3,546 plant taxa listed (WUCOLS) minus 170 plant taxa (north and south) = 3,376 plant taxa requiring research
  - For N. Calif. study, current research capacity = 30 species researched per 2 years on 1 acre
- Therefore, it would take **112.5 acres** and 2 years to complete the balance of the WUCOLS plant list (N. Calif. only)
- Or, it would take **225 years** to complete WUCOLS list at 30 plants every 2 years





## Current Situation

- All local agencies (cities, counties, charter cities and charter counties) have until January 1, 2010 to adopt DWR's updated MWELO (Model Water Efficient Landscape Ordinance) or their own local water efficient landscape ordinance.
- MWELO states that the "plant factors shall be from WUCOLS" for calculating water budgets
- Landscape architects & designers, contractors, city planners, retailers, irrigation consultants and wholesale nursery growers are limited to the number of plants that can be utilized to comply with the water budget calculation of MWELO.
- Bottom line, if plants are not specified in WUCOLS or have science-based data, they will not be included in MWELO water budget calculation.



## Role of the CCUH in the WUCOLS Update Process

- Gain DWR approval to shift contract funds for WUCOLS III review & update
- Confirm and solicit support from outside stakeholders (landscape architects & designers, contractors, city planners, retailers, irrigation consultants and wholesale nursery growers)
- Hire former WUCOLS authors as consultants, Larry Costello and Katherine Jones
- CCUH began the sponsorship process in 2012 and completed procurement of funds in 2013
- Six regional meetings began in October 2012 and ended one year later
- Provide project oversight and leadership.



## **WUCOLS IV Sponsors**

- ***Regional Water Authority (Northern California)***
- ***American Society of Landscape Architects (CCASLA)***
- ***Association of Professional Landscape Designers (APLD)***
- ***American Society of Irrigation Consultants (ASIC; north and south)***
- ***Cagwin & Dorward (N. Calif. landscape construction & maintenance)***
- ***California Association of Nurseries and Garden Centers (CANGC)***
- ***California Landscape Contractors Association (CLCA State)***
- ***California Landscape Contractors Association (San Diego Chapter)***
- ***San Diego County Water Authority***
- ***Water Forum***
- ***Glenn Schmidt Landscaping, Inc.***
- ***Department of Water Resources, Water Use Efficiency***





## WUCOLS IV Regions

### North Central

Members	Affiliation
Barrie Coate	Coate and Associates
Nelda Matheny	HortScience
Don Mahoney	Strybing Arboretum
Dick Turner	Pacific Horticulture
Nevin Smith	Suncrest Nursery
Lori Palmquist	Irrigation and Design Consultation
James MacNair	MacNair & Assoc.

### Central Valley

Members	Affiliation
Lance Walheim	L. Walheim Assoc.
Ellen Zagory	UCD Arboretum
Karrie Reid	UCCE
Cheryl Buckwalter	Landscape Liasons
Taylor Lewis	Cornflower Farms
Missy Gable	CCUH

### South Inland

Members	Affiliation
Bob Perry	B. Perry Assoc.
Bart O'Brien	Rancho Santa Ana BG
Ken Kammeyer	KK Associates
Pam Pavela	Western Municipal Water District
Ron Kammeyer	KK Associates
Marilee Kuhlman	Comfort Zones Garden Design
Dave Giddens	Giddens Irrig. Design



## WUCOLS IV Regions

### South Coastal

Members	Affiliation
Randy Baldwin	San Marcos Growers
Carol Bornstein	LA Nat'l History Museum
Kathy Musial	Huntington BG
Don Hodel	UC Cooperative Ext.
Mike Evans	Tree of Life Nursery
Kathy Copley	Lightfoot Planning Planning Group

### South Coastal (San Diego)

Members	Affiliation
Paul Redeker	Cuyamaca College
Megan Allison	Mira Costa College
Nan Sterman	Garden Writer
Dave Ehrlinger	San Diego BG
Jim Bishop	SD Hort Soc.
David Reed	ASLA

### High/Low Desert

Members	Affiliation
Spencer Knight	Palm Desert
Diane Hollinger	Palm Desert
Randy Meyers	RG Meyers & Nurseries
Ray Lopez	Ray Lopez and Associates
Jeff Place	College of the Desert
Hudson Hale	Horttech Landscape Construction
Bob Perry	B. Perry Associates



## Selection Criteria



- Professional diversity (disciplines including nursery professionals, landscape contractors, landscape architects, botanical garden/arboreta staff members, consultants, and academics)
- “Must have” is that we select only the very best "plants people" --- this is crucial to the success of this work
- Availability to meet in person (flexible)
- Team size = 6 – 9 reviewers





## WUCOLS IV Sample Work Sheet

Additions	TYPE	Botanical Name	Common Name	1	2	3	4	5	6
X	B	Albuca juncifolia	rush leaved albuca						
X	B	Albuca nelsonii	natal albuca						
X	B	Albuca shawii							
	B	Alstroemeria spp.	Peruvian lily	M	M	M	M	?	M
X	B	Amarcrinum memoria-corsii	crinodonna						
X	B	Amarygia hybrids	amarygia						
	B	Amaryllis belladonna	naked lady	VL	VL	VL	L	L	L
X	B	Anemone coronaria	poppy-flowered anemone				VL		
	B	Arthropodium cirrhatum	star lily	M	?	M	?	/	/
X	B	Babiana spp.							
	B	Babiana stricta hybrids	baboon flower	L	L	L	?	/	/
X	B	Baeometra uniflora	beetle lily						
X	B	Bloomeraia crocea	golden stars						
X	B	Boophone disticha	oxbane						
	B	Bravoia geminiflora (See Polyanthes geminiflora)							
	B	Bulbinella robusta	bulbinella	L	?	?	L	?	?
X	B	Calochortus spp.	Mariposa lily						
	B	Calostemma purpureum	garland lily	M	?	?	?	?	?
X	B	Camassia cusickii	Cusick's Quamash						
X	B	Camassia quamash	camas						
	B	Canna spp.	canna	M	M	M	H	M	M
X	B	Chlorogalum pomeridianum	soap plant						
X	B	Clintonia andrewiana	red clintonia						
	B	Colchicum agrippium	autumn crocus	VL	VL	M	M	M	M
	B	Crinum spp.	crinum lily, spider lily	M	M	M	M	M	?

WUCOLS list divided into plant categories:

<b>Bamboo</b>
<b>Bulb</b>
<b>Grass</b>
<b>Groundcover</b>
<b>Perennial</b>
<b>Palm and Cycad</b>
<b>Shrub</b>
<b>Succulent</b>
<b>Tree</b>
<b>Vine</b>
<b>California native</b>



## Consultants & Project Leaders

- Larry Costello
- Katherine Jones



## Project Oversight & Support by CCUH

- Missy Gable
- Sally Mohr
- Dave Fujino





## Searchable Database Requirements

1. WUCOLS IV designated website (<http://ucanr.edu/sites/WUCOLS>)
2. Print entire plant list (all regions)
3. Search by region by selected city
4. Search:
  - a. Botanical name
  - b. Common name
  - c. Plant Type
  - d. Water Use
5. Create “your own” list
6. Save to an Excel file

# WUCOLS IV

## Water Use Classification of Landscape Species

### Home Page

[User Manual](#)[Plant Search Instructions](#)[Plant Search Database](#)[Download WUCOLS IV Plant List](#)[Download WUCOLS IV User Manual](#)[Water Requirements for Turfgrasses](#)[Partners](#)[Acknowledgements](#)

### Home Page

#### GETTING STARTED

If you are using the WUCOLS list for the first time, it is essential that you read the *User Manual*. The manual contains very important information regarding the evaluation process, categories of water needs, plant types, and climatic regions. It is necessary to know this information to use WUCOLS evaluations and the plant search tool appropriately. To access the *User Manual*, click on the tab (on left) and view specific topics.

Water conservation is an essential consideration in the design and management of California landscapes. Effective strategies that increase water use efficiency must be identified and implemented. One key strategy to increase efficiency is matching water supply to plant needs. By supplying only the amount of water needed to maintain landscape health and appearance, unnecessary applications that exceed plant needs can be avoided. Doing so, however, requires some knowledge of plant water needs.

WUCOLS IV provides evaluations of the irrigation water needs for over 3,500 taxa (taxonomic plant groups) used in California landscapes. It is based on the observations and extensive field experience of thirty-six landscape horticulturists (see the section "Regional Committees") and provides guidance in the selection and care of landscape plants relative to their water needs.



WUCOLS IV provides an assessment of irrigation water needs for over 3,500 taxa. Photo by Ellen Zagory.



# Plant Search Database

## Step 1: Select a City

North Central Coastal



Submit

Central Valley



Submit

South Coastal



Submit

South Inland Valley



Submit

High and Intermediate Des



Submit

Low Desert



Submit

See WUCOLS List for All 6 Regions

# Plant Search Database

## Step 1: Select a City

North Central Coastal



Submit

Davis



Submit

South Coastal



Submit

South Inland Valley



Submit

High and Intermediate Deser



Submit

Low Desert



Submit

See WUCOLS List for All 6 Regions

# Plant Search Database

## Step 2: Plant Search

**Davis, CA** ([Select a New City](#))

Botanical Name

Search

Common Name

Search

### Plant Type

- ☒ **Gc** Ground Cover
- ☒ **P** Perennial
- ☒ **S** Shrub
- ☒ **T** Tree
- ☐ **V** Vine
- ☐ **Ba** Bamboo
- ☐ **Bu** Bulb
- ☐ **G** Grass
- ☐ **Pm** Palm and Cycad
- ☐ **Su** Succulent
- ☐ **N** California Native

### Water Use

- ☐ Very Low
- ☒ Low
- ☐ Moderate
- ☐ High
- ☐ Unknown
- ☐ Not Appropriate for this Region

Search

All Plants for this Region



# Plant Search Database

## Results

Davis, CA

629 results. ([Start Over](#) | [Search Again](#))

Add Selected to my List

Type	Botanical Name	Common Name	Water Use	Select for my List
T	Abies pinsapo	Spanish fir	Low	<input type="checkbox"/>
S N	Abutilon palmeri	Indian mallow	Low	<input type="checkbox"/>
S	Acacia aneura	mulga	Low	<input type="checkbox"/>
T	Acacia baileyana	Bailey acacia	Low	<input type="checkbox"/>
S	Acacia boormanii	Snowy River wattle	Low	<input type="checkbox"/>
T	Acacia cognata (A.subporosa)	bower wattle	Low	<input type="checkbox"/>
S T	Acacia constricta	whitethorn acacia	Low	<input type="checkbox"/>
S	Acacia covenyi	blue bush	Low	<input type="checkbox"/>
S	Acacia cultriformis	knife acacia	Low	<input type="checkbox"/>
T	Acacia dealbata	silver wattle	Low	<input type="checkbox"/>
T	Acacia decurrens	green wattle	Low	<input type="checkbox"/>

# Plant Search Database

## Results

Davis, CA

13 results. ([Search Again](#) | [Export to Excel](#))

Type	Botanical Name	Common Name	Water Use	Select to Remove from My List
T	Abies pinsapo	Spanish fir	Low	<input type="checkbox"/>
T	Acacia baileyana	Bailey acacia	Low	<input type="checkbox"/>
Gc P	Achillea tomentosa	woolly yarrow	Low	<input type="checkbox"/>
Gc S V	Bougainvillea spp.	bougainvillea	Low	<input type="checkbox"/>
S T	Callistemon citrinus	bottle brush	Low	<input type="checkbox"/>
Gc N	Ceanothus maritimus "Valley Violet"	Valley Violet ceanothus	Low	<input type="checkbox"/>
P	Clivia species, hybrids and cvs	hybrid clivia	Low	<input type="checkbox"/>
P	Coreopsis auriculata "Nana"	dwarf coreopsis	Low	<input type="checkbox"/>
S	Daphne odora	winter daphne	Low	<input type="checkbox"/>
P Su	Echinopsis spp. (Trichocereus spp.)	torch cactus	Low	<input type="checkbox"/>
P N	Eriophyllum confertiflorum	golden yarrow	Low	<input type="checkbox"/>
S	Forsythia X intermedia	forsythia	Low	<input type="checkbox"/>
P	Gaillardia x grandiflora and cultivars	blanket flower	Low	<input type="checkbox"/>

[Start Over](#) | [Search Again](#)

Remove from My List

# Example of low water use plant list for Davis

Davis, CA			
Type	Botanical Name	Common Name	Water Use
T	Abies pinsapo	Spanish fir	Low
T	Acacia baileyana	Bailey acacia	Low
Gc P	Achillea tomentosa	woolly yarrow	Low
Gc S V	Bougainvillea spp.	bougainvillea	Low
S T	Callistemon citrinus	bottle brush	Low
Gc N	Ceanothus maritimus "Valley Violet"	Valley Violet ceanothus	Low
P	Clivia species, hybrids and cvs	hybrid clivia	Low
P	Coreopsis auriculata "Nana"	dwarf coreopsis	Low
S	Daphne odora	winter daphne	Low
P Su	Echinopsis spp. (Trichocereus spp.)	torch cactus	Low
P N	Eriophyllum confertiflorum	golden yarrow	Low
S	Forsythia X intermedia	forsythia	Low
P	Gaillardia x grandiflora and cultivars	blanket flower	Low





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University of California  
Division of Agriculture and Natural Resources

<http://anrcatalog.ucdavis.edu>



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# Managing Turfgrasses during Drought

**M. ALI HARIVANDI**, University of California Cooperative Extension Advisor, San Francisco Bay Area; **JAMES BAIRD**, Turfgrass Specialist, University of California, Riverside; **JANET HARTIN**, University of California Cooperative Extension Advisor, San Bernardino County; **MICHAEL HENRY**, University of California Cooperative Extension Advisor, Riverside County; **DAVID SHAW**, University of California Cooperative Extension Advisor, San Diego County





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