

Getting It Right Workshop

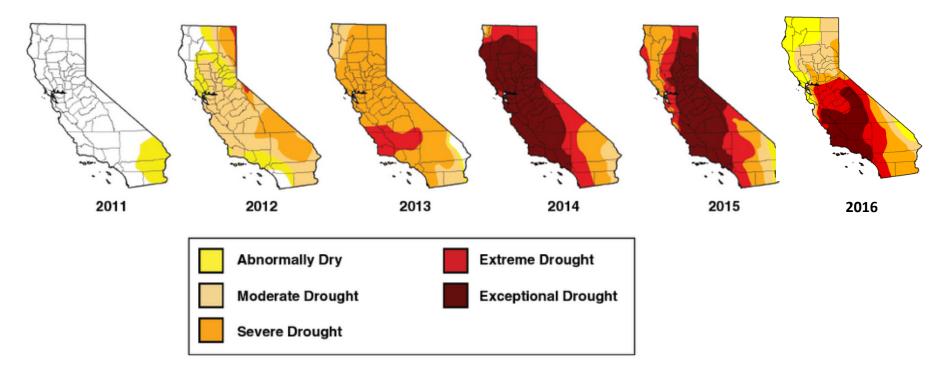
Water Use Classification of Landscape Species IV: What is it and How Do I Use it?

McMillan Center and Fair Oaks Horticulture Center Sacramento, CA October 4, 2016

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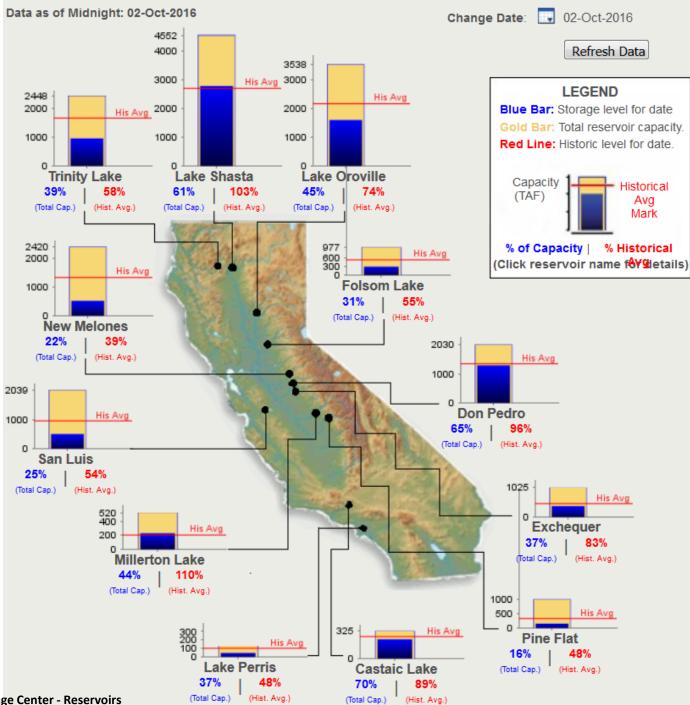
Drought Has Expanded, Intensified Across State

Statewide Drought Measurements From U.S. Drought Monitor, Taken Around October 1 Each Year^a



^a The U.S. Drought Monitor estimates drought intensity based on several indicators, including soil moisture, streamflow, and precipitation. October 1 is the beginning of the state's "water year" for annual precipitation calculations.

The U.S. Drought Monitor is jointly produced by the National Drought Mitigation Center at the University of Nebraska-Lincoln (NDMC-UNL), the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration. Maps courtesy of NDMC-UNL.



California Data Exchange Center - Reservoirs

THE OLD FARMER'S ALMANAC

FOUNDED IN 1792

ANNUAL WEATHER SUMMARY: NOVEMBER 2016 TO OCTOBER 2017

Winter temperatures and rainfall will be below normal, with below-normal mountain snows. The stormiest periods will be in late November, mid-December, and mid-January. The coldest temperatures will be in early and late December and mid- to late January.

April and May will be warmer and slightly rainier than normal.

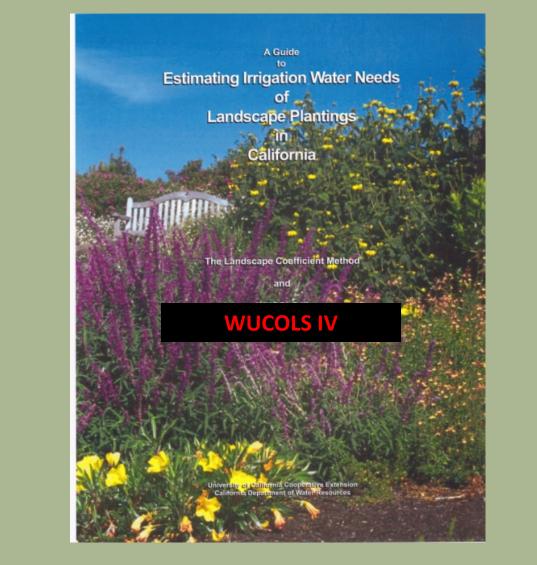














Drivers for converting landscapes to low water use

- Regulatory mandate: April 2015...replace 50M ft.² of turfgrass
- Turfgrass removal incentives
- Regulatory amendments: December 2015...changes to MWELO





AFTER: Photo from the same vantage point after the project is completed. Turf has been replaced with California Friendly plants.

Photos courtesy of Los Angeles Department of Water and Power





SoCal Water\$mart: "Cash for Grass"

- 1. In 2015, MWD allocated \$340M funding "Cash for Grass" programs
- 2. Goal was to remove approximately 170M ft.² of turfgrass
- 3. Allocation of funds ran out in 5 6 weeks.
- 4. Limited funding for future turfgrass replacement programs







MWELO Amendments (December 2015)

Description	MWELO 2009	MWELO 2016
New development	2,500 sf or greater	500 sf or greater
projects requiring a		
building or landscape		
permit		
Rehabilitated landscape requiring a	2,500 sf or greater	2,500 sf or greater
building or landscape		
permit		
Require dedicated water	5000 sf	5,000 sf for residential and
meter for		1,000 sf for commercial
landscapes		
Flow sensor	None	Required for 5,000 sf or larger
ET adjustment factor	0.7	0.55 for residential and
(ETAF) for new		0.45 for commercial
landscapes		



What is the "opportunity" in times of adversity?

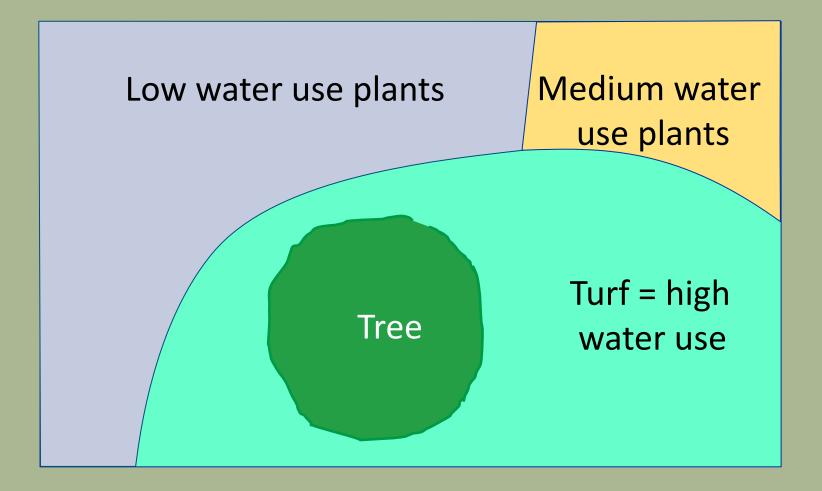
• What is replacing the turf in these landscapes?

WATER CONSERVING PLANTS

- Landscape water conservation strategy
 - Improve irrigation efficiency
 - Match water supply to plant needs (maintain landscape health and appearance) by creating "hydrozones"



Water Conservation Strategy = "hydrozone"





WUCOLS IV "Key" Points

- 1. A **guide** to plant water needs and is **not** a method for estimating landscape water needs.
- 2. Review process based on Qualitative Research approach
- Plant water use assignments (plant factors) were made by <u>consensus</u> <u>agreement</u> of leading horticultural professionals representing 6 different climatic regions in California. If a committee did not know a plant, it was not evaluated
- 4. Reviewed and updated to 3,546 taxa. Less than 5% of species have been evaluated through field research and have been included
- 5. The "PLANT FACTOR" for MWELO water budget calculation <u>shall</u> be from WUCOLS.



"Simplified" Water Budget Equation for MWELO

Maximum Applied Water Allowance (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

Estimated Total Water Use (ETWU) = ((Eto x PF) – Re) x (LA) x (0.62) / IE ETo = Reference ET data (inches)

WUCOLS

PF = Plant Factor Re = Effective rainfall (inches) LA = Landscaped Area (square feet) 0.62 = Conversion factor (to gallons) IE = Irrigation Efficiency (dependent on irrigation equipment)

Estimated Toal Water use = _____ gallons/year

To be in compliance with MWELO, ETWU <u>must</u> < MAWA.

If not, adjustments to the landscape design or irrigation scheduling is required.



CCUH Role in the WUCOLS Update Process

- Gain DWR & horticultural industry support
- Hire former WUCOLS authors as consultants, Larry Costello and Katherine Jones
- Six regional meeting process began late 2012 and ended one year later
- WUCOLS IV plant database live in 2014



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



Qualitative Research Process – Focus Groups

- Data collected through a semi-structured group interview process
- Moderated by a group leader
- Emphasis on a specific topic
- Impressions are collected rather than numbers









WUCOLS IV Regions

North Central		Central Valley		
Members	Affiliation	Members	Affiliation	
Barrie Coate	Coate and Associates	Lance Walheim	L. Walheim Assoc.	
Nelda Matheny	HortScience	Ellen Zagory	UCD Arboretum	
Don Mahoney	Strubing Arborotum	Karrie Reid	UCCE	
Dick Turner	Pacific Horticulture			
Nevin Smith	Suncrest Nurserv	Cheryl Buckwalter	Landscape Liasons	
Lori Palmquist	Irrigation and Design Consultation	Taylor Lewis	Cornflower Farms	
James MacNair		Missy Gable	ССИН	

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
х	В	Albuca juncifolia	rush leaved albuca						
Х	В	Albuca nelsonii	natal albuca						
Х	В	Albuca shawii							
	В	Alstroemeria spp.	Peruvian lily	М	Μ	Μ	Μ	?	Μ
х	В	Amarcrinum memoria-corsii	crinodonna						
Х	В	Amarygia hybrids	amarygia						
	В	Amaryllis belladona	naked lady	VL	VL	VL	L	L	L
x	В	Anemone coronaria	poppy-flowered anemone				VL		
	В	Arthropodium cirrhatum	star lily	М	?	м	?	/	/
х	В	Babiana spp.							İ
	В	Babiana stricta hybrids	baboon flower	L	L	L	?	/	/
х	В	Baeometra uniflora	beetle lily					, 	í
х	В	Bloomeraia crocea	golden stars						
Х	В	Boophone disticha	oxbane						
	В	Bravoa geminiflora (See Polyanthes geminiflora)							
	В	Bulbinella robusta	bulbinella	L	?	?	L	?	?
х	В	Calochortus spp.	Mariposa lily						
	В	Calostemma purpureum	garland lily	М	?	?	?	?	?
х	В	Camassia cusickii	Cusick's Quamash						
Х	В	Camassia quamash	camas						
	В	Canna spp.	canna	М	Μ	Μ	Н	Μ	Μ
х	В	Chlorogalum pomeridianum	soap plant						
х	В	Clintonia andrewiana	red clintonia						
	В	Colchicum agrippium	autumn crocus	VL	VL	м	М	М	М
	В	Crinum spp.	crinum lily, spider lily	М	Μ	М	М	М	?

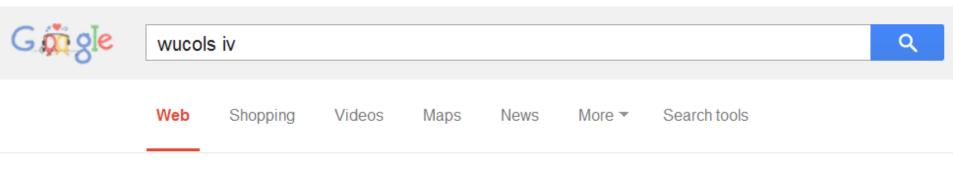
WUCOLS list divided into plant categories:

Bamboo
Bulb
Grass
Groundcover
Perennial
Palm and Cycad
Shrub
Succulent
Tree
Vine
California native



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



About 1,630 results (0.36 seconds)

WUCOLS IV - University of California Cooperative Extension ucanr.edu/sites/WUCOLS -

Water Use Classification of Landscape Species (WUCOLS IV) - Home Page.

Plant Search Database

... Species (WUCOLS IV) - Plant Search Database. ... Plant ...

Download WUCOLS IV Plan...

Click to download the WUCOLS IV Plant List Adobe ...

User Manual

User Manual. cover page. Page Last Updated: January 2, ...

More results from ucanr.edu »

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- ... of Landscape Species (WUCOLS IV)
- Download ...

Dr Dave Fujino Water Use Classification of Landscape Species (WUCOLS ...

Using WUCOLS Evaluations

WUCOLS Evaluations and Plant Cultural Requirements.

WUCOLS IV Water Use Classification of Landscape Species

Home Page

User Manual

Plant Search Instructions

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Download WUCOLS IV Plant List

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Partners

Acknowledgements

Home Page

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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.

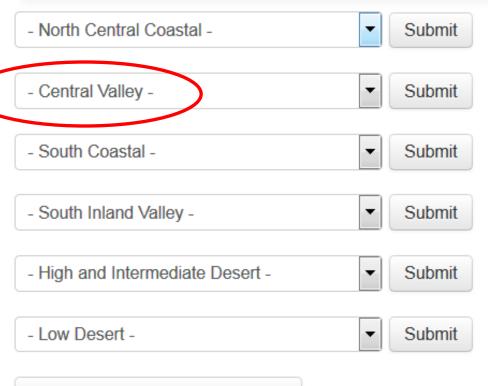
Water conservation is an essential consideration in the design and management of California landscapes. Effective strategies that increase water use efficiency must be identified and implemented. One key strategy to increase efficiency is matching water supply to plant needs. By supplying only the amount 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.



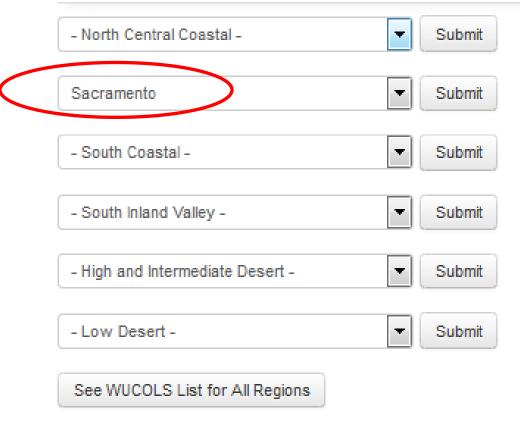
WUCOLS IV provides an assessment of irrigation water needs for over 3,500 taxa. Photo by Ellen Zagory.

Select a City by Region



See WUCOLS List for All Regions

Select a City by Region



	Plant Search		
<	Sacramento, CA		
	Botanical Name		
		Search by Botanical Name	

Common Name

	Search by Common Name	
--	-----------------------	--

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)
A (Arboretum All-star)
—

Water Use

Very Low
Low
Moderate
High
Unknown
Not Appropriate for this Region

Search By Plant Type and/or Water Use

All Plant Data for the Central Valley Region

Sacramento, CA

Botanical Name

Search by Botanical Name

Common Name

Search by Common Name

Plant Type

- Gc (Ground Cover)
- P (Perennial)
- S (Shrub)
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- A (Arboretum All-star)

Water Use

- Very Low
- Low
- Moderate
- 📄 High
- Unknown
- Not Appropriate for this Region

Search By Plant Type and/or Water Use

All Plant Data for the Central Valley Region

Desalte				
Sacram 679 resu	ento, CA Its	🖨 Start Over 🛛 Q Sea	rch Again 🖈 E	xport List 🔻
Туре	Botanical Name	Common Name	Water Use	Export
т	Abies pinsapo	Spanish fir	Low	
S N	Abutilon palmeri	Indian mallow	Low	
S	Acacia aneura	mulga	Low	
т	Acacia baileyana	Bailey acacia	Low	
S A	Acacia boormanii	Snowy River wattle	Low	
т	Acacia cognata (A.subporosa)	bower wattle	Low	
SТ	Acacia constricta	whitethorn acacia	Low	

Results

Sacramento,	CA
-------------	----

679 resul	ts	🖨 Start Over 🛛 🔍 Sear	rch Again 🔶 🕫	Export List Y
Туре	Botanical Name	Common Name	Water (Use	Check All Export
т	Abies pinsapo	Spanish fir	Low	
S N	Abutilon palmeri	Indian mallow	Low	
S	Acacia aneura	mulga	Low	
т	Acacia baileyana	Bailey acacia	Low	
S A	<u>Acacia boormanii</u>	Snowy River wattle	Low	
т	Acacia cognata (A.subporosa)	bower wattle	Low	
ST	Acacia constricta	whitethorn acacia	Low	

Result	ts				
Sacram	ento, CA				
679 resu	lts	🕷 Start Over	Q Search Again	★ Export List ▼	
Туре	Botanical Name	Common Name	Water Use	Uncheck All Add Selections	to Export Lis
т	Abies pinsapo	Spanish fir	Low		
SN	Abutilon palmeri	Indian mallow	Low		
S	Acacia aneura	mulga	Low		
т	Acacia baileyana	Bailey acacia	Low		
S A	Acacia boormanii	Snowy River wattle	Low	\checkmark	
т	Acacia cognata (A.subporosa)	bower wattle	Low		
SТ	Acacia constricta	whitethorn acacia	Low		

Export List

Sacramer	nto, CA			
679 result		🖨 Start Over	Q Search Again	★ Export List ▼
Туре	Botanical Name	Common Name	Water	Export to Excel
Т	Abies pinsapo	Spanish fir	Low	Uncheck All
SN	Abutilon palmeri	Indian mallow	Low	V
S	Acacia aneura	mulga	Low	
Т	Acacia baileyana	Bailey acacia	Low	V
S A	Acacia boormanii	Snowy River wattle	Low	
т	Acacia cognata (A.subporosa)	bower wattle	Low	
SТ	Acacia constricta	whitethorn acacia	Low	V
S T S A T	Acacia aneura Acacia baileyana Acacia boormanii Acacia cognata (A.subporosa)	mulga Bailey acacia Snowy River wattle bower wattle	Low Low Low	

Example of very low & low water use plant list for Sacramento

W000L0 - ;	Sacramento	/
Botanical Name	Common Name	Water Use
Abies pinsapo	Spanish fir	Low
Abutilon palmeri	Indian mallow	Low
Acacia aneura	mulga	Low
Acacia baileyana	Bailey acacia	Low
Acacia boormanii	Snowy River wattle	Low
Acacia cognata (A.subporosa)	bower wattle	Low
Acacia constricta	whitethorn acacia	Low
Acacia covenyi	blue bush	Low
Acacia cultriformis	knife acacia	Low
Acacia dealbata	silver wattle	Low
Acacia decurrens	green wattle	Low
Acacia erioloba	camel thorn	Low
Acacia greggii	catclaw acacia	Low
Acacia iteaphylla	willow wattle	Low
Acacia longifolia	Sydney golden wattle	Low
Acacia melanoxylon	blackwood acacia	Low
Acacia pendula	weeping acacia	Low
Acacia pravissima	ovens wattle	Low
Acacia rigidula	rigidula acacia	Low
Acacia saligna	blue leaf wattle	Low
	Botanical Name Abies pinsapo Abutilon palmeri Acacia aneura Acacia baileyana Acacia boormanii Acacia cognata (A.subporosa) Acacia constricta Acacia constricta Acacia covenyi Acacia cultriformis Acacia dealbata Acacia decurrens Acacia decurrens Acacia erioloba Acacia iteaphylla Acacia iteaphylla Acacia nelanoxylon Acacia pendula Acacia pravissima Acacia rigidula	Abies pinsapoSpanish firAbutilon palmeriIndian mallowAcacia aneuramulgaAcacia aneuraBailey acaciaAcacia baileyanaBailey acaciaAcacia boormaniiSnowy River wattleAcacia cognata (A.subporosa)bower wattleAcacia constrictawhitethorn acaciaAcacia covenyiblue bushAcacia dealbatasilver wattleAcacia dealbatasilver wattleAcacia decurrensgreen wattleAcacia greggiicatclaw acaciaAcacia teaphyllawillow wattleAcacia melanoxylonblackwood acaciaAcacia pendulaweeping acaciaAcacia pendulaweeping acaciaAcacia igidularigidula acacia



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Home Page

User Manual

Plant Search Instructions

Plant Search Database

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

Water Requirements for Turfgrasses

Warm-season and cool-season turfgrasses were not reviewed by the WUCOLS IV regional committees. Data here is from Harivandi, et. al., 2009 publication, *Managing Turgrasses During Drought*. The complete publication is cited below.

Туре	Common name	Optimal Irrigation* (% ET ₀)	Deficit Irrigation** (% ET ₀)
Warm season	Common bermudagrass	60	40
	Hybrid bermudagrass	60	40
	St. Augustinegrass	60	40
	Seashore paspalum	60	40
	Zoysiagrass	60	40
	Buffalograss	60	40
	Kikuyugrass	60	40
Cool Season	Tall fescue	80	60
	Perennial ryegrass	80	60
	Kentucky bluegrass	80	60
	Fineleaf fescues	80	60
	Creeping bentgrass	80	60
	Rough bluegrass	80	60

Water requirements for Warm-season and Cool-season Turfgrasses

* Optimum irrigation is the amount of water needed for most efficient growth, maximum quality, and best appearance.

** Deficit irrigation provides sufficient water to maintain adequate appearance with less growth (relative to optimum irrigation).

Note: For turfgrass blends, the species with the highest water requirement will generally determine the irrigation level for the blend. For instance, if a blend contained perennial ryegrass and common bermudagrass, then it would be irrigated at 80% ET₀ for optimal performance. If the sward appears to be overwatered, however, then a downward adjustment in irrigation level would be warranted.

Harivandi, A. M. 2009. *Managing Turfgrass During Drought*. Oakland: University of California Agriculture and Natural Resources Publication 8395, <u>http://anrcatalog.ucdavis.edu</u> /pdf/8395.pdf.



University of California Division of Agriculture and Natural Resources

http://anrcatalog.ucdavis.edu



PUBLICATION 8395 / AUGUST 2009

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

CALIFORNIA LANDSCAPE CONTRACTORS ASSOCIATION



Association of Professional Landscape Designers California Chapter















California Association of Nurseries and Garden Centers



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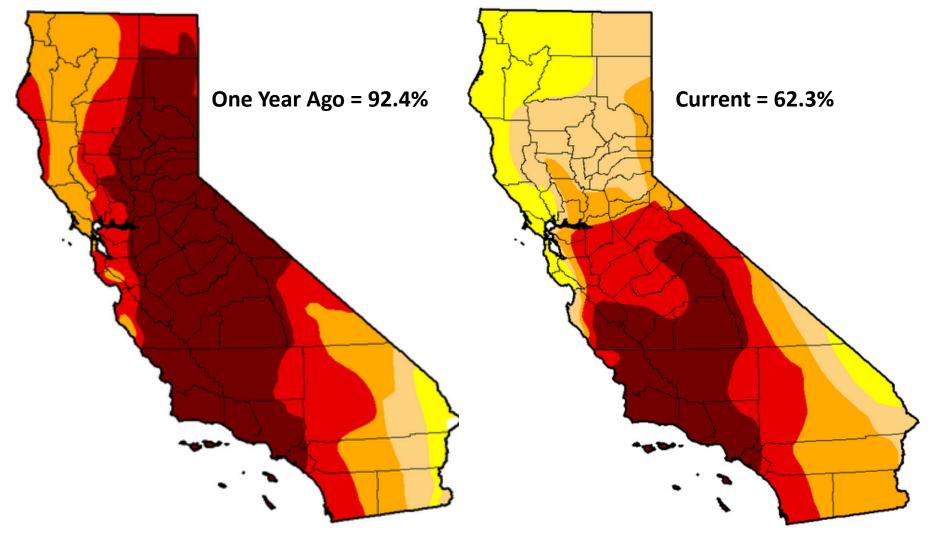




ASLA CALIFORNIA COUNCIL

Dave Fujino, Ph.D. **Executive Director** California Center for Urban Horticulture **UC** Davis (530) 754-7739 dwfujino@ucdavis.edu http://ccuh.ucdavis.edu





U.S. Drought Monitor California















What is currently happening in response to the drought?

- On April 1, 2015...replace 50M ft.² of turfgrass
- How many have you heard of "turf rebate" (aka "cash for grass") programs?
- Who was promoting "turf replacement" programs?