Stop #4: Updates on Evapotranspiration Adjustment Factor Project
(A contract from CA Dept. of Water Resources)

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California's population exceeded 38 million in 2013 and is expected to reach 45 million by the year 2020. This projected increase, coupled with a severe multi-year drought and a statewide water distribution problem, necessitates further conservation of an already limited water supply. Landscape irrigation uses a significant amount of water. Approximately 40-50 percent of household water use is used outdoors to irrigate urban landscapes.

2014 and the first half of 2015 were some of the driest periods on record in the state. California Assembly Bill 1881 resulted in California enacting a law on January 1, 2010 reducing the Evapotranspiration Adjustment Factor (ETAF) from .8 to .7 in new landscapes over 2,500 square feet, mandating enhanced water conserving measures in urban landscapes. In December, 2015 a revised ETAF of .55 ETo for new landscapes over 500 square feet replaces the current .7 ETo necessitating even greater conservation. The .55 MAWA is a 21.4% reduction from the current .7 MAWA. It is important to note that recreational turf and food crops will remain exempt.

The goal of our California Department of Water Resources (DWR) project is to measure water use at 30 large urban landscapes in six climate zones that include a variety of ornamental plants with varying water use rates growing under a wide mixture of plant densities and microclimates. A further goal is to work with site managers to improve irrigation system distribution uniformity (DU) and overall irrigation efficiency at each site.

The Maximum Applied Water Allowance formula follows.

*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

Example of MAWA in Riverside, CA at .7 ETAF

Hypothetical Landscape Area = 50,000 sq ft
MAWA = (ETo) (0.7) (LA) (0.62)
MAWA = (51.1) (0.7) (50,000 sq ft) (0.62)
MAWA = 1,108,870 gallons/year

Example of MAWA in Riverside, CA at .55 ETAF

Hypothetical Landscape Area = 50,000 sq ft
MAWA = (ETo) (0.55) (LA) (0.62)
MAWA = (51.1) (0.55) (50,000 sq ft) (0.62)
MAWA = 871,255 gallons/year (21.4% reduction versus .7 ETAF)

Findings to date include:

- Properly functioning irrigation systems can significantly reduce water waste. Systems with matched heads, proper spacing, proper pressure, and unclogged heads can significantly reduce landscape water waste.
- Distribution uniformity can most often be increased without major redesign and installation efforts by switching to rotary sprinkler heads.
- Properly irrigating plants based on species, density, and climate and microclimate considerations can significantly reduce landscape water waste
- Landscapes consisting solely of cool season turfgrass (not deemed recreational and therefore non-exempt from the regulation) use water in excess of the .7 ETAF standard.
- Landscapes consisting solely of warm season turfgrass (not deemed recreational and therefore non-exempt from the regulation) often exceed .7 ETAF due to poor irrigation uniformity.
- Landscapes consisting of a mixture of mostly medium, low and very low water using plant species that are drip irrigated and mulched can include small areas of turfgrass and not exceed .7 ETAF. When a greater balance of low water using plants is included, ETAF of.55 is achieved.
- A 3 inch layer of mulch around ornamental plantings can significantly reduce water waste by reducing water evaporation from soil.

Water Use Classification of Landscape Species (WUCOLS) Project
(Funded by the California Department of Water Resources & CA Horticulture Industry)
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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 (the 4th edition, 2014) represents a substantial expansion in the number of plant evaluations. Over 1,500 entries have been added to the 3rd edition list, for a total of 3,546 entries. Essentially, the great majority of taxa available from wholesale nurseries in California are included.
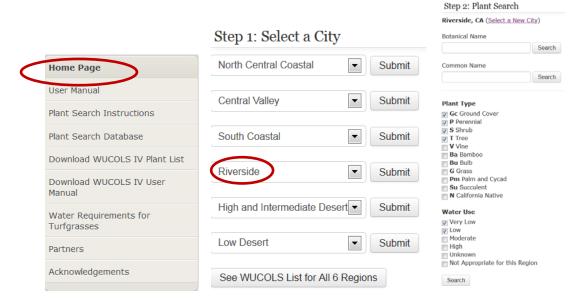
In addition, a number of species evaluations made in previous editions were revisited by the regional committees. If the committees believed that the evaluation of plant water needs should be changed (raised or lowered), it was changed. In some cases, a "?" was replaced by VL, L, M, or H (see the section "Categories of Water Needs"). As a result, users should be aware that species assignments from WUCOLS I, II, or III may not be the same as those found in WUCOLS IV.

WUCOLS IV "Key" Points

1. WUCOLS is a **guide** to plant water needs and is not a method for estimating landscape water needs.
2. WUCOLS 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.
5. WUCOLS is a list of 3,546 taxa. Less than 5% of species in WUCOLS have been evaluated for water use through field research.
6. WUCOLS evaluations have been adopted for use in many sectors (e.g., academic, professionals, municipalities and water agencies)
7. WUCOLS evaluations serve as an important guide in the selection of species for hydrozones.
8. WUCOLS 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 and adopted.

Under the Model Water Efficient Landscape Ordinance (MWELO), the plant factors used for calculating the landscape water budget "SHALL" be from WUCOLS**WUCOLS IV Website (http://ucanr.edu/sites/wucols/)**

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.

WUCOLS IV "Downloadable" Plant List (Riverside Example)

Riverside, CA			
Type	Botanical Name	Common Name	Water Use
S N	Abutilon palmeri	Indian mallow	Low
T	Acacia decurrens	green wattle	Low
P N	Acmispon glaber (Lotus scoparius)	deer weed	Very Low
P	Anacyclus pyrethrum depressus	Mount Atlas daisy	Low
S T N	Arctostaphylos manzanita	common manzanita	Low
S T	Callistemon citrinus	bottle brush	Low
S N	Ceanothus "Ray Hartman"	Ray Hartman ceanothus	Low
Gc N	Ceanothus maritimus "Valley Violet"	Valley Violet ceanothus	Low
P	Coreopsis auriculata "Nana"	dwarf coreopsis	Low
P	Crocosmia hybrids (Tritonia)	montbrieta	Low
Gc P	Dymondia margaretae	dymondia	Low
S N	Ericameria arborescens	golden fleece	Low
S N	Eriogonum giganteum	St. Catherine"s lace	Very Low