Stop #12: Updates on Evapotranspiration Adjustment Factor and Spanish Language Materials for Professional Landscapers Projects

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Evapotranspiration Adjustment Factor Project
(a contract received from California Department 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 50 percent of water used to irrigate urban landscapes is used outdoors.

2013 was one of the driest years on record in the state. Governor Jerry Brown recently declared a statewide drought emergency outlining 20 measures to reduce water waste including a 20 percent voluntary water consumption reduction spearheaded by the Department of Water Resources. Increasing the use of practices leading to greater water use efficiency of large-acreage landscapes is consistent with goals of the CALFED Bay-Delta program to maximize existing water resources for assuring a steady and reliable water source for the future of California. 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 further water conserving measures in urban landscapes.

Several 'best management practices' have been developed within UC ANR that can help the landscape industry maintain healthy landscapes and irrigate at or below the newly instated .7 ETAF, including: proper plant selection; proper irrigation system design and installation; hydrozoning; proper irrigation scheduling; mulching; and, regular maintenance of irrigation systems.

The goal of our California Department of Water Resources (DWR) project is to reduce water waste and increase adoption of .7ETAF by the landscape industry by setting up 30 large demonstrations sites at publically and commercially maintained landscape sites that exemplify research-based 'best management practices.' The sites represent a variety of ornamental plants with varying evapotranspiration rates growing under a wide array of plant densities and microclimates.

*Maximum Allowable 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 Maximum Applied Water Allowance (MAWA): Riverside, California

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 per year
*ET Adjustment Factor ** Conversion factor from inches to gallons

Findings to date include:

- A 3 inch layer of mulch around ornamental plantings can significantly reduce water waste by reducing soil evaporation.
- Landscapes consisting solely of cool season turfgrass (not deemed recreational and therefore non-exempt from the regulation) exceed .7 ETAF.
- 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 and low water using plant species that are drip irrigated and mulched can contain small areas of turfgrass and not exceed .7 ETAF.
- 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.
- Irrigating plants based on species, density, and climate and microclimate considerations can significantly reduce landscape water waste.

Water Use Classification of Landscape Species (WUCOLS) Project (Funded by the California Department of Water Resources & CA Horticulture Industry)

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.

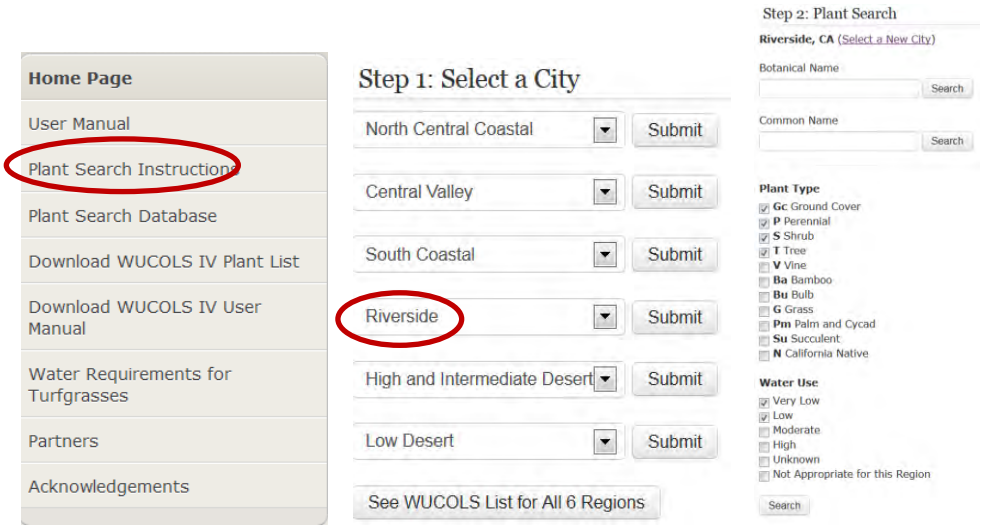
In addition, a number of species evaluations made in previous editions were revisited by the regional committees. If the committees believed that the evaluation of plant water needs should be changed (raised or lowered), it was changed. In some cases, a "?" was replaced by VL, L, M, or H (see the section "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 2% of species 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 not perfect, 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 and adopted.

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

Expanding IPM Education to Southern California Spanish-speaking Landscapers

(a contract received from CA Department of Pesticide Regulation)

Principal Investigator: Janet Hartin

Soil runoff and groundwater pollution are leading sources of water quality degradation in urban areas of Southern California and are largely due to overuse and improper use of pesticides and fertilizers. Approximately 75,000 Spanish-speaking landscapers and gardeners make decisions and/or apply pesticides and fertilizers annually in Southern California. Many lack adequate expertise in Integrated Pest Management (IPM) and safe use of pesticides in part due to inadequate training opportunities available in Spanish. Increasing educational services stressing pest prevention to this large clientele – which has quadrupled over 20 years - can significantly reduce overuse and misuse of pesticides in urban environments and improve the health and safety of the work environment for this segment of the profession.

A group of UC and external industry partners developed and provided educational services to over 400 Spanish-speaking landscapers at 13 workshops throughout Southern California that included hands-on as well as classroom training. Specific curriculum and activities used in the training was based on the results of focus groups and individual interviews that assessed the specific needs of this large clientele.

Subject matter for the workshops included peer-reviewed materials from UC and other sources.

Specific practices taught included:

- Proper plant selection (based on climate and microclimate conditions)

- Proper planting techniques (planting depth, planting density to prevent poor air circulation etc.)

- Proper irrigation system design and installation

- Use of recommended maintenance practices to prevent pest outbreaks such as

    - irrigation scheduling based on plant water needs (as estimated by plant symptoms/health; weather-based measurements measured by CIMIS (temperature, solar radiation, relative humidity, and wind speed)

- fertilization (correct rate, method, timing)

- recommended pruning practices

- other (turf mowing, aeration, verticutting)

- Regular monitoring for pest outbreaks/Early pest detection and identification

- Use of chemical pesticides as a last resort in a safe and effective manner (this module will include laws and regulations regarding safe pesticide handling and use)

The project includes strong evaluation elements that will measure its impact. Specific tools include measuring change in subject matter expertise 'pre' and 'post' training and an assessment of pesticide use three months post-training which will be compared to benchmark data established before training occurred. The project was built on and greatly expanded work previously completed on a DPR Alliance grant to provide enhanced educational services to Spanish-speaking residential gardeners in San Luis Obispo County and is oriented more to public and private landscape clientele rather than residential gardeners.