

# Plant Performance of 30 Large Established Landscapes in Six Climate Zones in California

Janet Hartin  
Environmental Horticulture Advisor  
UC Cooperative Extension  
San Bernardino and Los Angeles Counties  
951.313.2023 jshartin@ucdavis.edu

**Background:** The California Model Water Efficient Landscape Ordinance became effective, January 1, 2010 and applies to the following landscape projects:

- (1) new construction and rehabilitated landscapes for public agency projects and private development projects with a landscape area equal to or greater than 2,500 square feet requiring a building or landscape permit, plan check or design review;
  - (2) new construction and rehabilitated landscapes which are developer-installed in single-family and multi-family projects with a landscape area equal to or greater than 2,500 square feet requiring a building or landscape permit, plan check, or design review;
  - (3) new construction landscapes which are homeowner-provided and/or homeowner-hired in single-family and multi-family residential projects with a total project landscape area equal to or greater than 5,000 square feet requiring a building or landscape permit, plan check or design review;
  - (4) existing landscapes limited to Sections 493, 493.1 and 493.2; and
  - (5) cemeteries. Recognizing the special landscape management needs of cemeteries, new and rehabilitated cemeteries are limited to Sections 492.4, 492.11 and 492.12; and existing cemeteries are limited to Sections 493, 493.1 and 493.2.
- (b) This ordinance does not apply to:
- registered local, state or federal historical sites;
  - ecological restoration projects that do not require a permanent irrigation system;
  - mined-land reclamation projects that do not require a permanent irrigation system; or
  - plant collections, as part of botanical gardens and arboretums open to the public.

## Important Definitions:

“Establishment period of the plants” refers to the first year after installing the plant in the landscape or the first two years if irrigation will be terminated after establishment. .  
Estimated Total Water Use” (ETWU) means the total water used for the landscape as described in Section 492.4.

“ET adjustment factor” (ETAF) is 0.7, that, when applied to reference evapotranspiration, adjusts for plant factors and irrigation efficiency. 0.7 ETAF was selected to enable plantings with a plant mix site-wide average of 0.5 and an average irrigation efficiency is 0.71 to remain green and healthy. It is calculated by:  $(0.7)=(0.5/0.71)$ . ETAF for a “Special Landscape Area” shall not exceed 1.0. ETAF for existing non-rehabilitated landscapes is 0.8.

“Special Landscape Area” refers to an area of the landscape dedicated solely to edible plants, areas irrigated with recycled water, water features using recycled water and areas dedicated to active play such as parks, sports fields, golf courses, and where turf provides a playing surface.

**The Maximum Applied Water Allowance is calculated using the equation:**

$$\text{MAWA} = (\text{ETo}) (0.62) [(0.7 \times \text{LA}) + (0.3 \times \text{SLA})]$$

**Example One:**

MAWA calculated for a hypothetical landscape project in Inland Southern CA with an irrigated landscape area of 50,000 square feet, an annual reference evapotranspiration value of 51 inches, no Special Landscape Area (SLA= 0, no edible plants, recreational areas, or use of recycled water).

$$\text{MAWA} = (\text{ETo}) (0.62) [(0.7 \times \text{LA}) + (0.3 \times \text{SLA})]$$

MAWA = Maximum Applied Water Allowance (gallons per year)

ETo = Reference Evapotranspiration (inches per year)

0.62 = Conversion Factor (to gallons)

0.7 = ET Adjustment Factor (ETAF)

LA = Landscape Area including SLA (square feet)

0.3 = Additional Water Allowance for SLA

SLA = Special Landscape Area (square feet)

$$\text{MAWA} = (51.1 \text{ inches}) (0.62) [(0.7 \times 50,000 \text{ square feet}) + (0.3 \times 0)]$$

$$= 1,108,870 \text{ gallons per year}$$

To convert from gallons per year to hundred-cubic-feet per year:

$$= 1,108,870/748 = 1,482 \text{ hundred-cubic-feet per year (100 cubic feet = 748 gallons)}$$

**Example Two (same scenario as above but includes edibles):**

MAWA calculated for a hypothetical landscape project in Inland Southern CA with the same ETo value of 51.1 inches and total landscape area of 50,000 square feet used in Example One. However, within the 50,000 square foot project, there is now a 2,000 square foot area planted with edible plants. This 2,000 square foot area is considered to be a Special Landscape Area.

$$\text{MAWA} = (\text{ETo}) (0.62) [(0.7 \times \text{LA}) + (0.3 \times \text{SLA})]$$

$$\text{MAWA} = (51.1 \text{ inches}) (0.62) [(0.7 \times 50,000 \text{ square feet}) + (0.3 \times 2,000 \text{ square feet})]$$

$$= 31.68 \times [35,000 + 600] \text{ gallons per year}$$

$$= 31.68 \times 35,600 \text{ gallons per year or } 1,127,808 \text{ gallons per year (1,508 hundred-cubic-feet/yr)}$$

**Our Project:** In May 2011, University of California Cooperative Extension (UCCE) academics David Fujino, Loren Oki and Janet Hartin received funding from the CA Dept. of Water Resources to work with UCCE colleagues across the state to measure plant performance at 30 sites throughout California representing a variety of evapotranspiration rates, plant densities, and microclimates over 18-months. William Baker and Associates LLC has been contracted to oversee the project due to their extensive experience and knowledge in this area. An overview of the project and its implications will be discussed.