



Water Use and Efficiency
Branch

The Model Water Efficient Landscape Ordinance

Landscape Graphic Courtesy of
Sonoma County Water Agency,
Ali Davidson Landscape Architect
David Bunnett Illustrator

What is different now?

- Population is 38+ million
- Infrastructure is maxed out in many places
- Delta conditions are declining
- Colorado River flows and conditions are declining
- Water quality issues
- High embedded energy costs in water treatment and pumping
- New infrastructure is expensive
- Over allocation and groundwater overdraft

Major provisions required by AB 1881

- **Minimize overspray and runoff**
- Group plants in hydrozones
- **Choose Well-adapted plants**
- Maximum Applied Water Allowance (MAWA) water budget
- **Increase opportunities for stormwater retention**
- **irrigation scheduling based on CIMIS or other reliable ETo data or soil moisture sensors**
- **Soil assessment and amendment (if amendment is indicated)**
- **Grading to promote healthy plant growth**
- **Mulch is required in most plantings**
- Require use of recycled water where available
- Education of water users
- Fire prevention
- **Sustainable landscape maintenance practices**

Model Ordinance with Many Objectives

- Water Conservation
- Healthy Landscapes
- Functional Landscapes

- Protect Water Quality
 - Stormwater
 - Prevent Dry Season Irrigation Runoff

Water Conservation

- Supply reliability
- Costs to user and suppliers
- Reduced Energy Use
- **Sense of place—what should be here***

Healthy and Functional

- Perform the desired function-why else have a landscape??
- Shade and Oxygen
- Wildlife values
- Healthy landscapes need less maintenance or a different kind of maintenance
- Healthy landscapes cost less to maintain

Dry Season Irrigation Runoff

- **No runoff, no overspray**
 - **Irrigation scheduling based on soil type**
 - **Irrigation equipment requirements**
 - **Stormwater retention**
 - **Erosion control**
 - Irrigation scheduling based on plant needs
 - Use of sensors
 - Irrigation scheduling based on time of day
 - **Sustainable landscape maintenance practices**

Let's talk issues

- LEED/MWELO/Cal Green
- Dedicated metering/ sub-metering
- WUCOLS plant factors
- IE and the ETAF
- MAWA calculator
- MAWA for SLA

- How does LID fit in??

Stormwater Best Management Practices (BMP) encouraged as Landscape Design Features-meet both objectives

- **Less runoff**
- **Cleaner runoff**
- **Shorter irrigation season**
- **Retains pulse flows and flooding**
- **Increase Habitat**
- **Lower maintenance**
- **LEED point for Stormwater**



WE Credit 1: Water Efficient Landscaping

OPTION 1. Reduce by 50% (2 points)

Reduce potable water consumption for irrigation by 50% from a calculated midsummer baseline case or using the month with the highest irrigation demand.

Reductions must be attributed to any combination of the following items:

- Plant species, density and microclimate factor

- Irrigation efficiency

- Use of captured rainwater

- Use of recycled wastewater

- Use of water treated and conveyed by a public agency specifically for non-potable uses

Groundwater seepage that is pumped away from the immediate vicinity of building slabs and foundations may be used for landscape irrigation to meet the intent of this credit. However, the project team must demonstrate that doing so does not affect site stormwater management systems.

OR

OPTION 2. No Potable Water Use or Irrigation¹ (4 points)

AND

PAT H 1

Use only captured rainwater, recycled wastewater, recycled graywater or water treated and conveyed by a public agency specifically for nonpotable uses for irrigation.

OR

PAT H 2

Install landscaping that does not require permanent irrigation systems.

Temporary irrigation systems used

for plant establishment are allowed only if removed within a period not to exceed 18 months of installation.

Potential Technologies & Strategies

Perform a **soil/climate analysis** to determine appropriate plant material and design the landscape with native or **adapted plants** to reduce or eliminate irrigation requirements.

Where irrigation is required, use **high-efficiency equipment and/or climate-based controllers**.

Cal Green

California Green Building Code

- Follows Model Water Efficient Landscape Ordinance
 - Non-Residential
- Residential—Some requirements-
 - Controllers

Dedicated Landscape Meters

- Water Code section 535
- In AB 1881, **separate from the Model Water Efficient Landscape Ordinance**
- Beginning January 1, 2008
- New water service on connections with 5000 square feet of irrigated landscape except:
 - SFH
 - Agricultural users

MWELO

- Recommends dedicated meters or submeters at sites under 2500 sq ft.
- -----WC 535 at 5000 sq ft

Cal Green

- Submeters to dedicated meters at 1000 sq ft up to 5000 sq ft

Cal Green –2011

Non-Residential Mandatory

- Model Water Efficient Landscape Ordinance
- Dedicated water meters 1000' sq ft landscape area
- Weather based irrigation controllers with rain sensing technology
 - Or
- Soil Moisture sensing irrigation controllers

Cal Green –2011

Non-Residential Voluntary

- 60%, 55% or 50% of ETo
- No potable water use
- Restore or protect native vegetation
- Graywater systems
- Rainwater collection
- Green roofs



Water Budget

- MAWA-Maximum Applied Water Allowance
 - Local climate, area, **ETAF**
- ETWU-Estimated Total Water Use
 - Local climate, area, **plants**



1/3 1/3/1/3

- **Plant Factor in the Water budget is based on 1/3 high, 1/3 moderate and 1/3 low water using plants—as compared to ETo**
- Most desert climate plants are low water using.
- Cool season turf-high-water use
- Warm season turf –Bermuda, buffalo-moderate to low
- *Use WUCOLS, if the plant is on the list-*
- *if not, obtain the plant factor from the grower or other source*

- Plants that are not adapted needs lots of water—why bother with them??

Plant Selection

- **Any plants may be used as long as the MAWA is not exceeded**
- **Adapted to climate and local conditions**
- **Grouped in hydrozones**
- **Highly Recommended**
 - Natives plants and natural vegetation
 - Water conserving species
 - Pest and disease resistant

AB1061

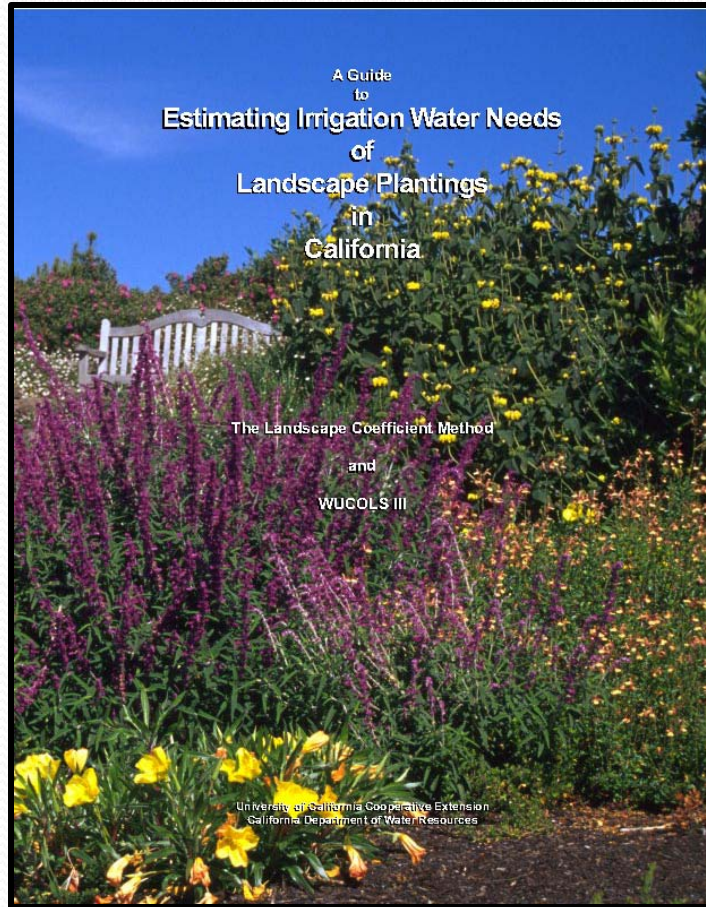


492.4(b)(1) The plant factor used shall be from WUCOLS.....

- Not intended to limit to plants listed in WUCOLS
- If a selected plant is not in WUCOLS a plant factor from another source may be used.

WUCOLS

Water Use Classification of Landscape Species



Used to estimate
the water needs
of landscape plants

Irrigation Efficiency and the ETAF

- IE is part of ETAF
- DU is not all of IE
- 0.71 site wide average
- Overhead may be less than 0.71
- drip is higher 80%-90%
- ETAF white paper

Water Budget Spreadsheets

Maximum Applied Water Allowance (MAWA) Calculations

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

Evapotranspiration Rate Landscape Area Special Landscape Area

Estimated Total Water Use (ETWU) Calculations

$$\text{ETWU} = (\text{ET}_o) \times (0.62) \times [(\text{PF} \times \text{HA}/\text{IE}) + \text{SLA}]$$

Evapotranspiration Rate Plant Factor Hydrozone Area Irrigation Efficiency Special Landscape Area

MAWA

A1	A	B	C	D
1	Instructions	Maximum Applied Water Allowance Calculations for New and Rehabilitated Landscapes		
2				
3	Cells with pale blue background are for entering data	Enter value in Pale Blue Cells		
4	Results show in cells with tan background	Tan Cells Show Results		
5	Messages and warnings are displayed in cells with yellow background	Messages and Warnings		
6	1) Select city by clicking on pale blue cell and			
7	choosing a city from the drop down menu	Click on the blue cell on right to Pick City Name	Fresno	Name of City
8	ET _o appears in the tan cell below the name of the city	ET _o of City from Appendix A	51.10	ET _o (inches/year)
9	2) Enter total landscape area, including Special			
10	Landscape Area (SLA)	Enter total landscape including SLA	50,000.00	LA (ft ²)
11	SLA means 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.			
12	3) Enter square footage of SLA, if any	Enter Special Landscape Area	2,000.00	SLA (ft ²)
13	Required for additional water for SLA (0.3 ETAF accounts for the additional water)			
14	4) MAWA results appear in the tan cells	Results:		
15		MAWA = (ET _o) x (0.62) x [(0.7 x LA)+(0.3 x SLA)]	1,127,808.00	Gallons
16			150,766.50	Cubic Feet
17			1,507.67	HCF
18			3.46	Acre-feet
19			1.13	Millions of Gallons
20				
21		MAWA calculation incorporating Effective Precipitation (Optional)		
22				
23		ET _o of City from Appendix A	51.10	ET _o (inches/year)
24		Landscape Area	50,000.00	LA (ft ²)
25		Special Landscape Area	2,000.00	SLA (ft ²)
26	5) If you are considering effective precipitation (Eppt),			
27	enter the value . Eppt is 25% of total annual precipitation	Enter Effective Precipitation	0.00	Eppt (in/yr)
28	6) For comparison, MAWA without effective			
29	precipitation is displayed below			



MAWA for a 100% SLA

B	C	D
Maximum Applied Water Allowance Calculations for New and Rehabilitated Landscapes		
Enter value in Pale Blue Cells Tan Cells Show Results		
Messages and Warnings		
Click on the blue cell on right to Pick City Name	Fresno	Name of City
ET _o of City from Appendix A	51.10	ET _o (inches/year)
Enter total landscape including SLA	50,000.00	LA (ft ²)
Enter Special Landscape Area	50,000.00	SLA (ft ²)
Results:		
MAWA = (ET _o) x (0.62) x [(0.7 x LA)+(0.3 x SLA)]	1,584,000.00	Gallons
	211,750.70	Cubic Feet
	2,117.51	HCF
	4.86	Acre-feet
	1.58	Millions of Gallons
MAWA calculation incorporating Effective Precipitation (Optional)		
ET _o of City from Appendix A	51.10	ET _o (inches/year)
Landscape Area	50,000.00	LA (ft ²)
Special Landscape Area	50,000.00	SLA (ft ²)
Enter Effective Precipitation	0.00	Eppt (in/yr)











Grading Design Plan

LID!



Minimize
soil erosion, runoff and
water waste
compaction



Maximize
infiltration and **retention**

Certified Landscape Irrigation Auditor

- “certified landscape irrigation auditor” means a person certified to perform landscape irrigation audits by an accredited academic institution, a professional trade organization or other program such as the **US Environmental Protection Agency’s WaterSense** irrigation auditor certification program and Irrigation Association’s Certified Landscape Irrigation Auditor program.
- CLIA (Irrigation Association)
- CLCA Water Manager Certification Program
- QWEL (Marin, Sonoma, Contra Costa, Stockton)
- Rain Bird Certified Residential & Light Commercial Installer



One last thought....



Dry streambeds, Dry wells



LID

Water Waste Prevention

- California Constitution Section 2 Article X—the right to use water does not extend to waste or unreasonable use or unreasonable method of use
- All landscapes prohibited from wasting water



Sticky Points

- ETAF
- Aggregation of developer installed SF landscapes for applicability
- Size thresholds
- 24” set back
- Water features
- permits/ design review
- Slopes
- Personal choice and creativity



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Resources

- CIMIS
- Aerial Imagery
- Water Budget Calculator
- Possibly fund auditor training
- Current outreach and training

