



How much is too much water for your yard?

Justin Black

Water Conservation Worker II
Water Efficiency Department

Why are we here?

- **Improve our Landscapes**
- **Learn new things**
- **Save Water**
- **Save Money**
- **Explore Irrigation Technology**
- **Learn about Plant Water Requirements**

About Me

Justin Black

- Roseville Water Dept. since 2013
- 20 years Irrigation, Landscape and Agriculture
- Certified Irrigation Auditor CLIA and QWEL
- C-27 Landscape Contractor
- B.S. Agricultural Sciences CSU Chico
- Former CA DWR CIMIS Rep.
- Micro Farmer



Irrigation scheduling is the science and/or art of applying the proper amount of water at the proper time to provide the maximum useable soil moisture in a plant's root zone without causing harmful stress. Irrigation scheduling is a balancing act between applying too much water or not enough to meet plant needs at a particular stage of growth.

Irrigation Considerations

What: Plant type, root depth, ET factor, frequency

How: Irrigation method, precipitation rate

Where: Soil type, infiltration rate, holding capacity

All plants come from some place





Inches of water annually by plant type

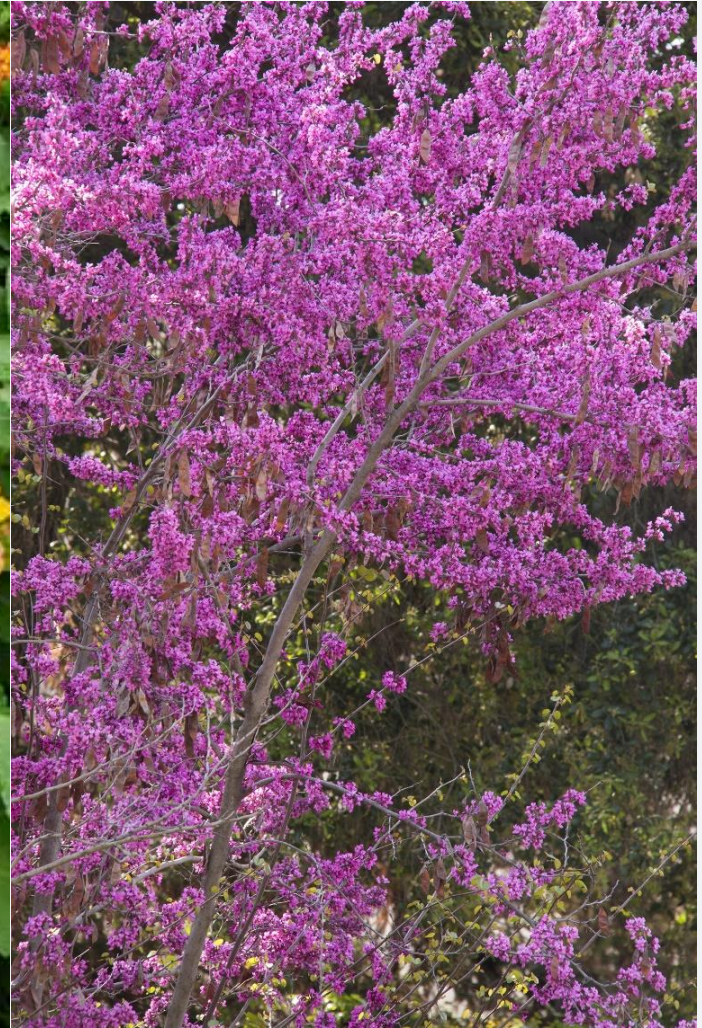
High Water Use



Medium Water Use



Low Water Use



Succulents



Where can I find a plants water use?

WUCOLS IV Water Use Classification of Landscape

Plant Search Database

If you know exactly which plant you are interested in, you may search for it by name (partial names are OK, too). Otherwise, consider searching by plant type and/or water use.

City

Search for a city: — or —

Plant Name

Water Use

- Very Low
- Low
- Moderate / Medium
- High
- Unknown
- Not Appropriate for this Region

Plant Type

- Gc (Ground Cover)
- P (Perennial)
- S (Shrub)
- T (Tree)
- V (Vine)
- Ba (Bamboo)
- Bu (Bulb)
- G (Ornamental Grass)
- Pm (Palm and Cycad)
- Su (Succulent)
- N (California Native)
- A (Arboretum All-star)

Front

- Sun Exposure:** 3 hours Direct Sun / 3 horas de sol directo. Full Sun / Pleno sol.
- Common Name:** AFRICAN MARIGOLD / Clavelón africano.
- Scientific Name:** Tagetes erecta.
- Bloom Season:** Spring to Fall / Primavera a Otoño.

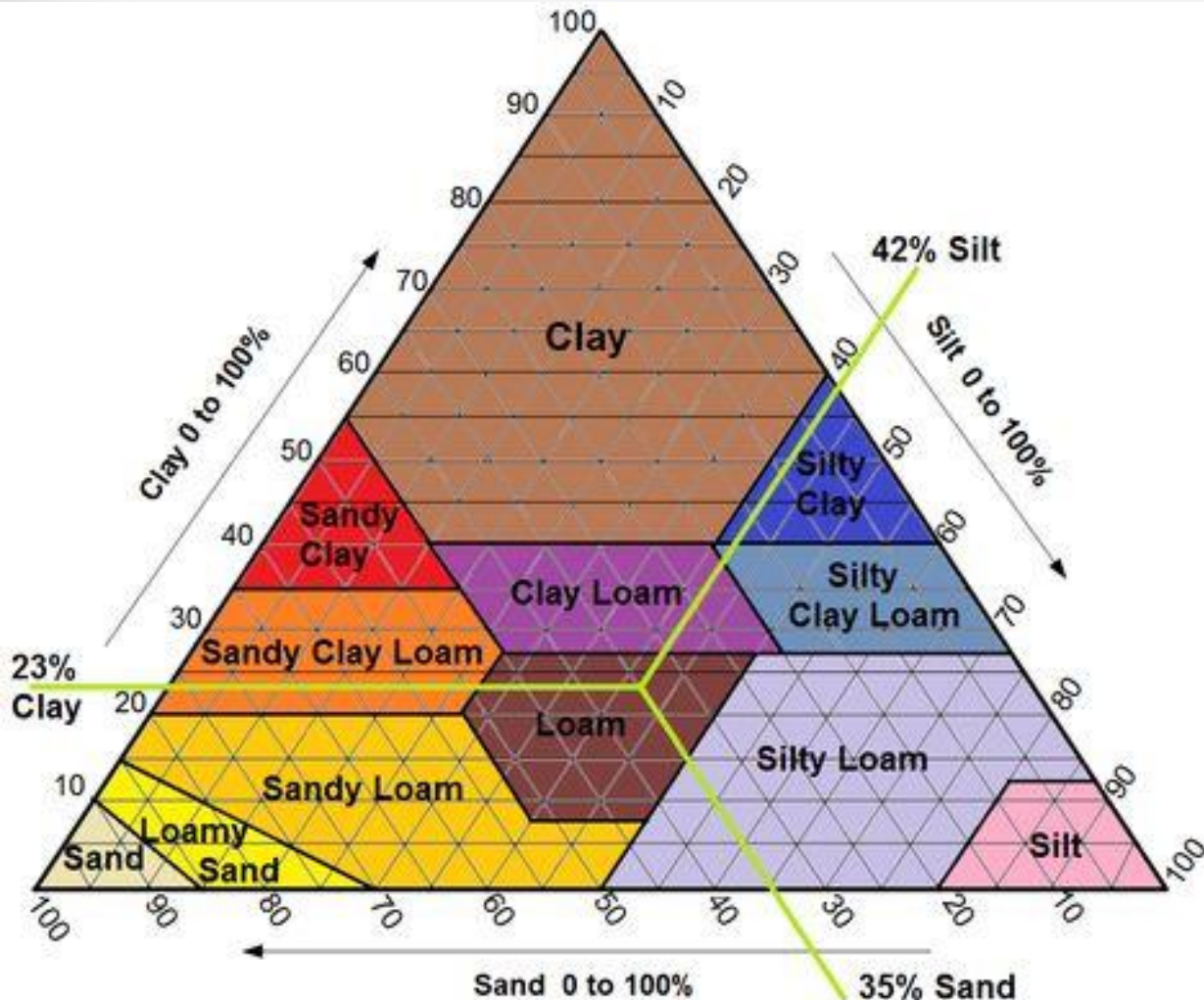
Back

- Water:** 2x per week, more often when dry. / 2 veces por semana, con mayor frecuencia si está seco.
- Fertilization:** Monthly / Mensualmente.
- Planting Steps:**
 - Big hole two times width of pot. / Cava un hoyo de doble anchura de la maceta.
 - Plant 1" above ground level. / Planta 1" above ground level.
 - Water 2-3 days after 1st watering. / Riega 2-3 días después del primer riego.
 - Build water table. / Construye la tabla de agua.
 - Water thoroughly every 1-2 days. / Riega a fondo cada 1-2 días.

Legend:

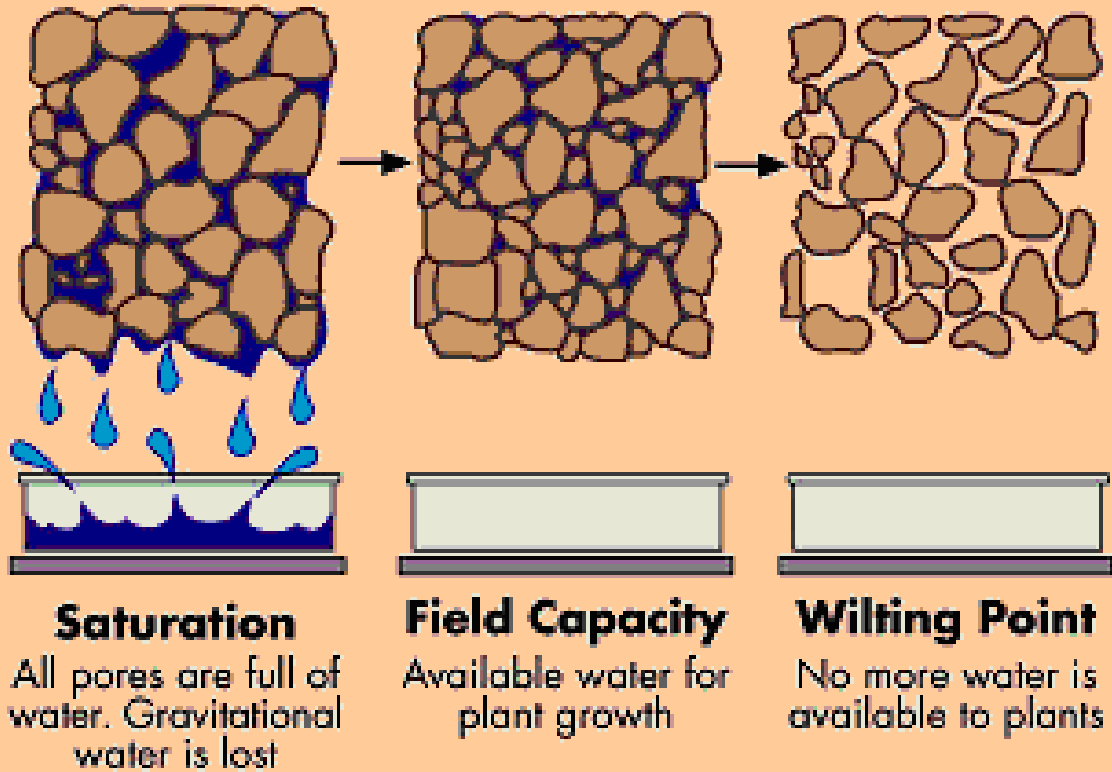
- Water:**
 - 1: Let the soil dry out in between waterings.
 - 2: Let the soil dry an inch below the surface between waterings.
 - 3: Keep the soil moist constantly.
- Average Size:** Maximum height and width when fully grown.
- Spacing:** How much space to leave in between plants in a garden.
- Hardiness:** Ability to withstand adverse growing conditions.
- Zone:** Area of the country where the plant grows best.
- Fertilization:** How often to fertilize.
- Bee Hazard Warning:** Remember to check for warning labels on pesticides before application.
- Mounding Growth:** How the plant grows, either vertically, horizontally or both.
- Animal Resistance:** Certain animals (deer, rabbits) prefer other plants.

Soil Texture Triangle

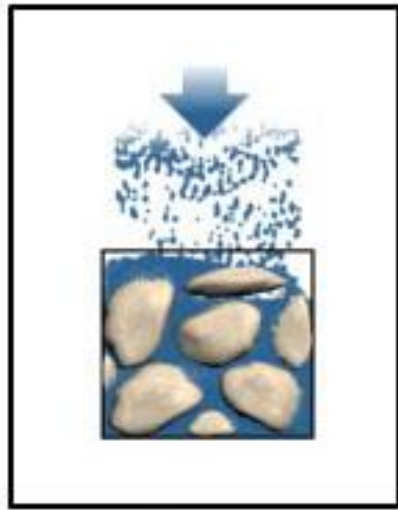


- Guide to Texture by Feel
https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=nrcs142p2_054311
- Soil Ribbon
https://www.dpi.nsw.gov.au/_data/assets/pdf_file/0005/164615/determining_soil_texture_using_ribboning_technique.pdf
- Jar Test
<https://hgic.clemson.edu/factsheet/soil-texture-analysis-the-jar-test/>

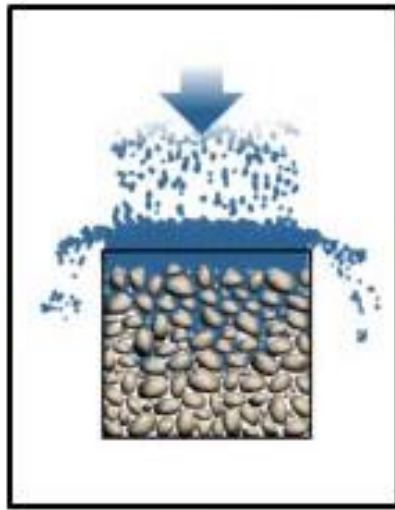
Soil Saturation



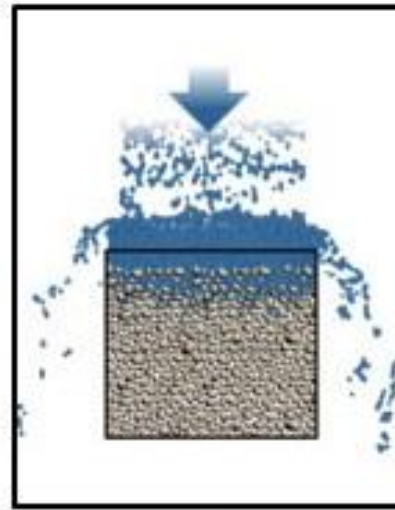
- Soil is saturated, when pores are filled with water and nearly all of the air in the soil has been displaced by water.
- Field capacity is defined as the level of soil moisture left in the soil after drainage of the gravitational water.
- The wilting point is when soil moisture content is so low that plants cannot exert enough force to remove water from the soil.
- The water between field capacity and wilting point is plant available water



Sand

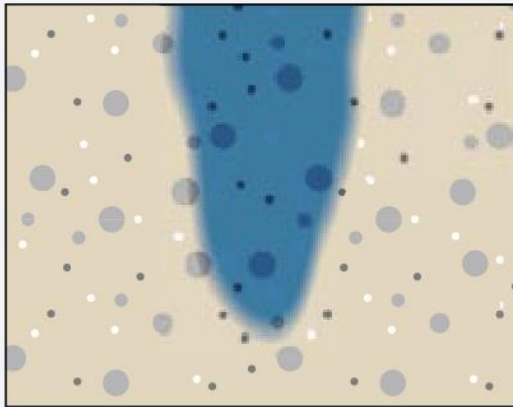


Silt

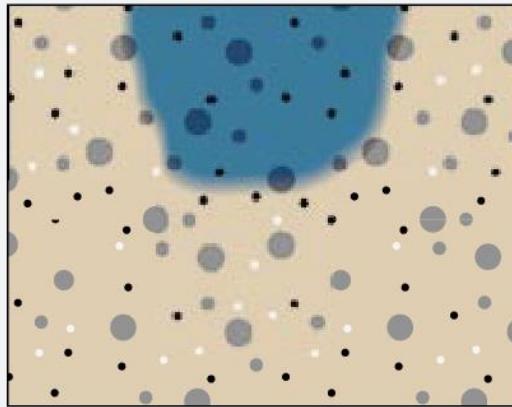


Clay

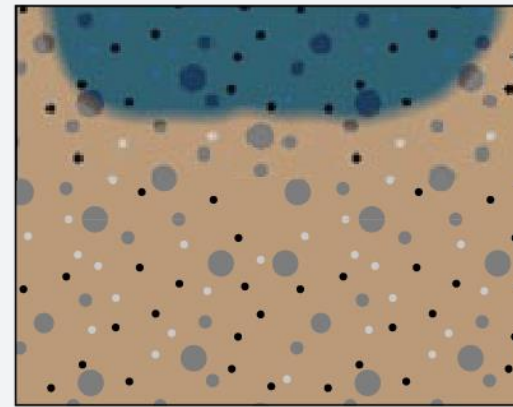
Sand



Loam



Clay



Infiltration vs Percolation

Soil Infiltration Rates Based On Slope

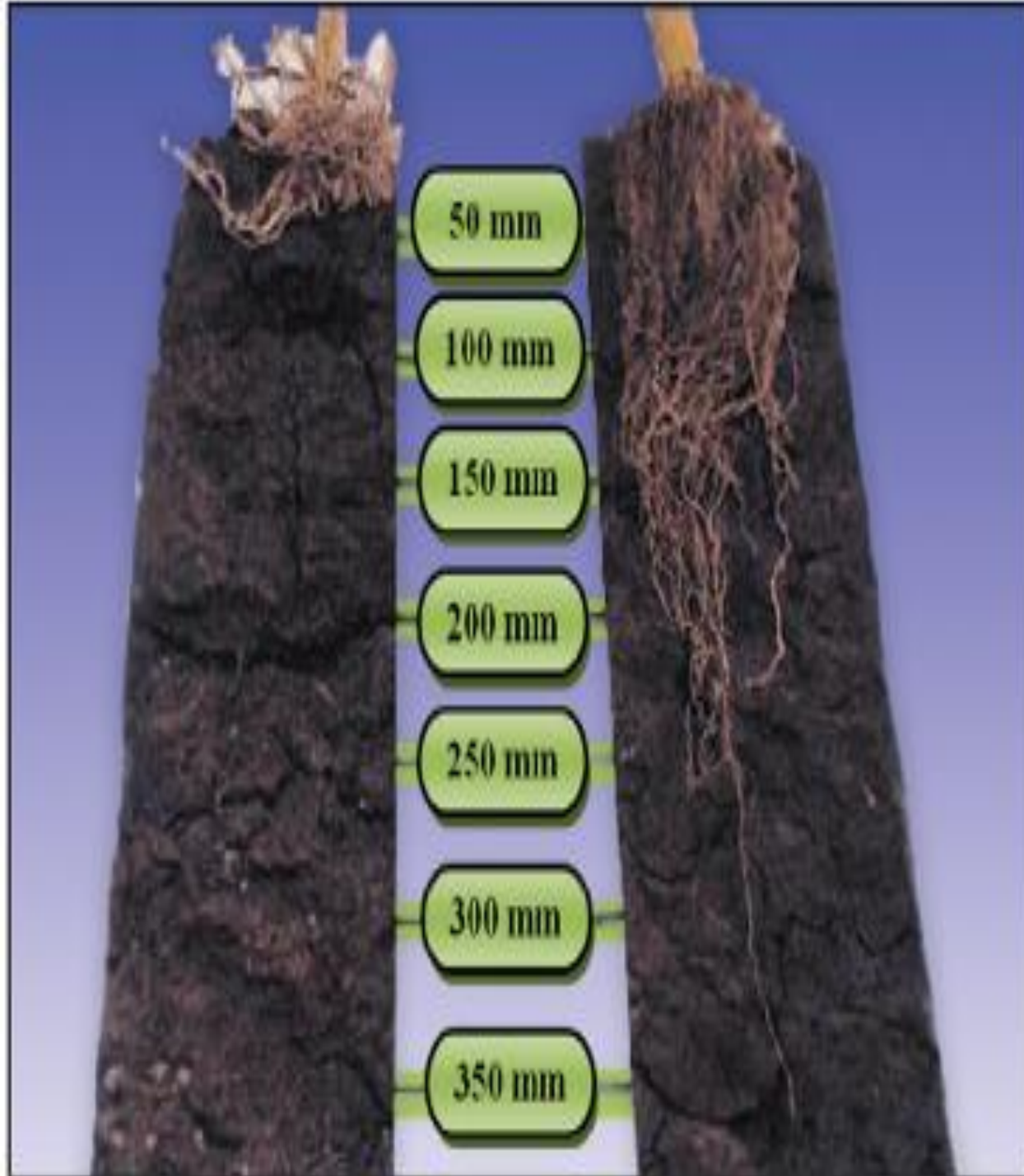
Soil Texture, Type	Percent of Slope				
	0-4%	5-8%	8-12%	12-16%	Over 16%
Coarse Sand	1.25	1.00	.75	.50	.31
Medium Sand	1.06	.85	.64	.42	.27
Fine Sand	.94	.75	.56	.38	.24
Loamy Sand	.88	.70	.53	.35	.22
Sandy Loam	.75	.60	.45	.30	.19
Fine Sandy Loam	.63	.50	.38	.25	.16
V. Fine Sandy Loam	.59	.47	.35	.24	.15
Loam	.54	.43	.33	.22	.14
Silt Loam	.50	.40	.30	.20	.13
Silt	.44	.35	.26	.18	.11
Sandy Clay	.31	.25	.19	.12	.08
Clay Loam	.25	.20	.15	.10	.06
Silty Clay	.19	.15	.11	.08	.05
Clay	.13	.10	.08	.05	.03

Note: Rates based on full cover. These figures decrease with time and percent of cover. Derived from USDA information.
(SCC 0812 § 1, 1990.)

Water Holding Ability by Soil Type

Table 3. Available soil moisture holding capacity for various soil textures.

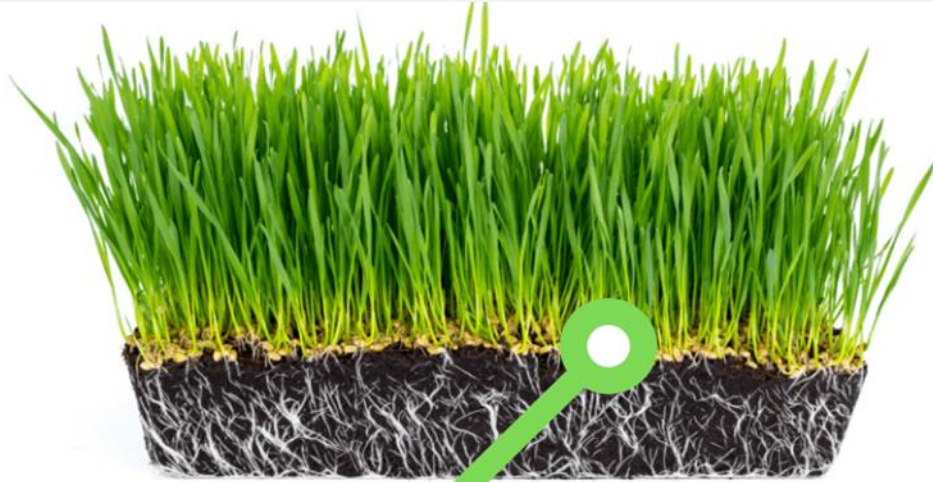
Soil Texture	Available Soil Moisture	
	inches/inch	inches/foot
Coarse sand and gravel	0.02 to 0.06	0.2 to 0.7
Sands	0.04 to 0.09	0.5 to 1.1
Loamy sands	0.06 to 0.12	0.7 to 1.4
Sandy loams	0.11 to 0.15	1.3 to 1.8
Fine sandy loams	0.14 to 0.18	1.7 to 2.2
Loams and silt loams	0.17 to 0.23	2.0 to 2.8
Clay loams and silty clay loams	0.14 to 0.21	1.7 to 2.5
Silty clays and clays	0.13 to 0.18	1.6 to 2.2



Root Depth

- What are you teaching your plants?
- Frequent shallow watering = shallow roots
- Infrequent deep watering encourages deeper roots, greater access to stored water and nutrients

Top Matches Roots



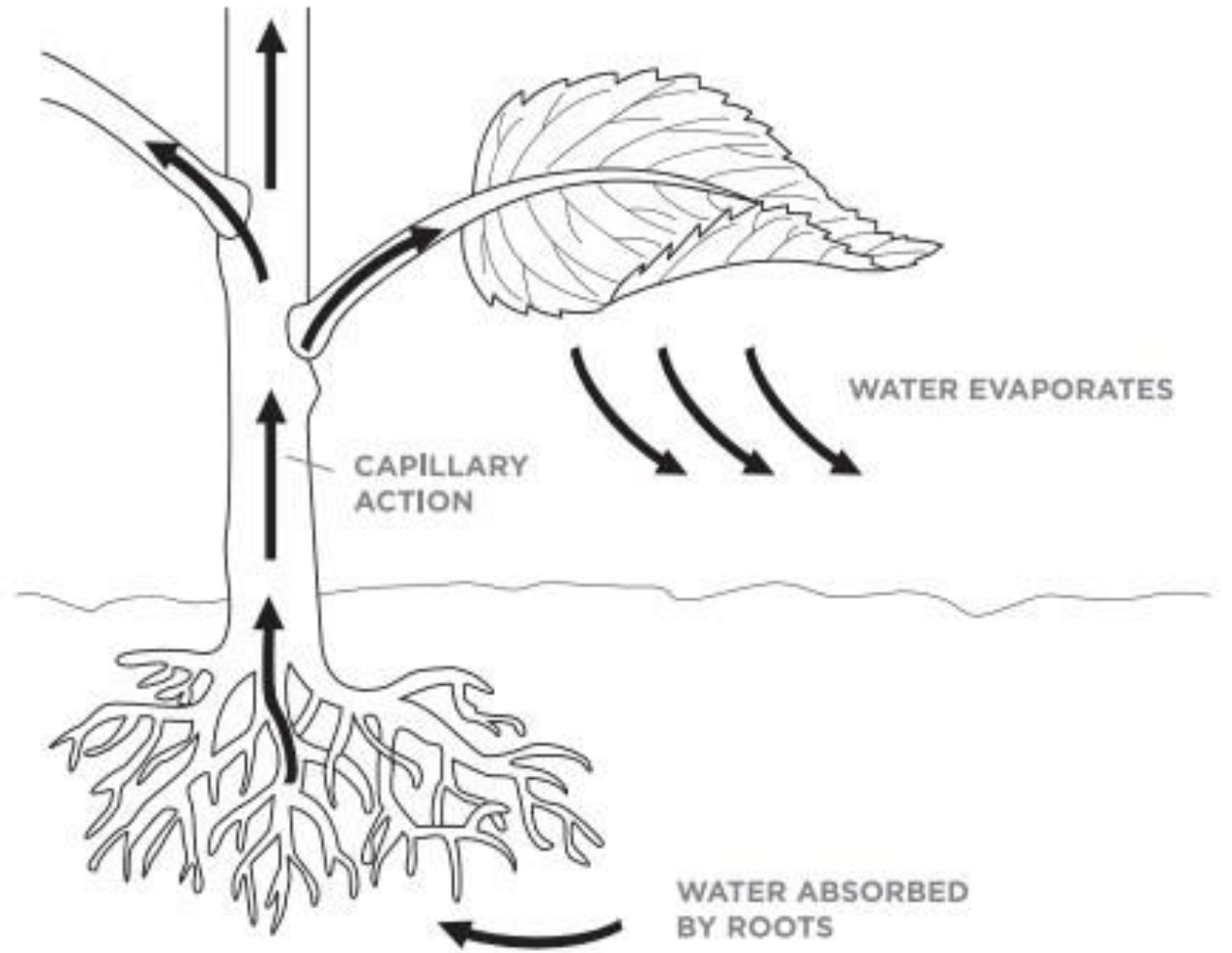
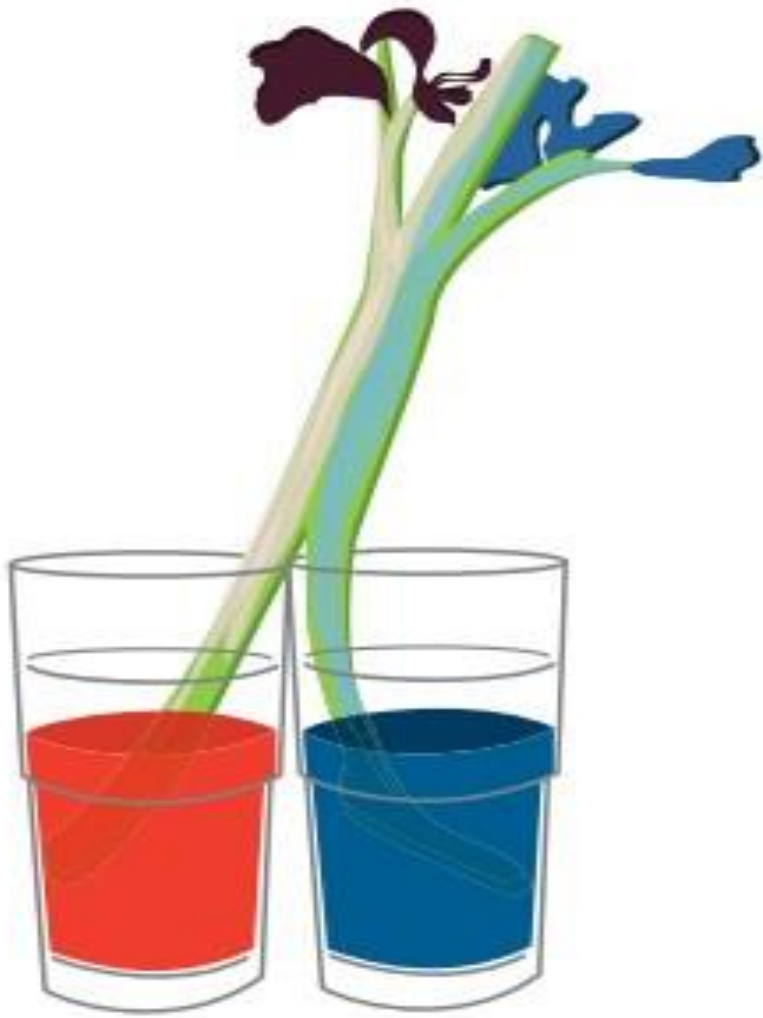
LONG GRASS = BETTER ROOT SYSTEM

Cutting grass too short results in shallow roots.

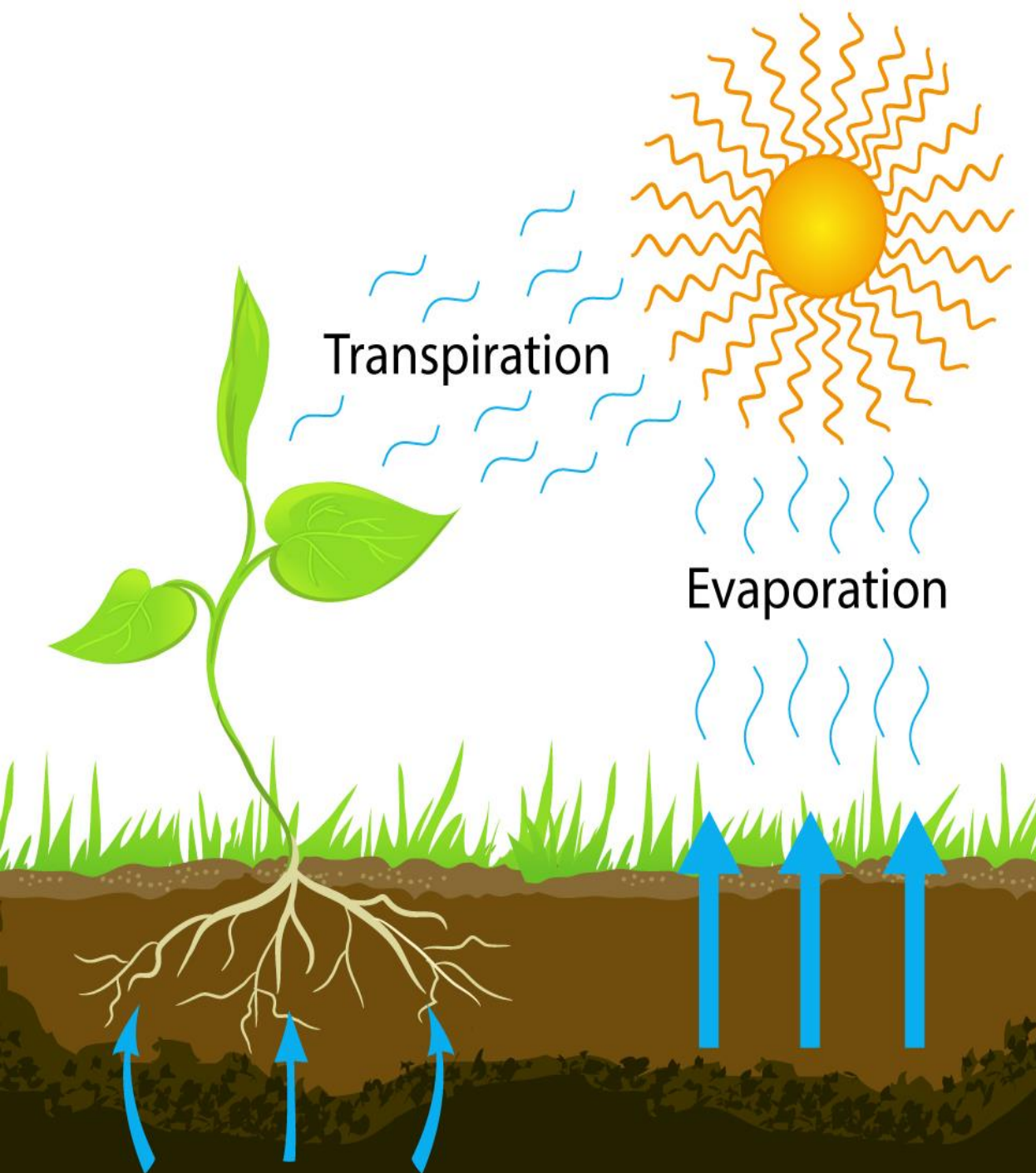
Longer grass is more drought-resistant & disease resistant

Frequency and depth of watering





Capillary Action



ET - Evapotranspiration

The combined water use from both evaporation and transpiration of a particular plant (or crop) during a period of time.

CA Irrigation Management Information System

Login | Register



HOME STATIONS DATA SPATIAL RESOURCES

NOTICES

To get access to all of the CIMIS data and features, register as a user.

The link to register is at the upper right-hand corner of the CIMIS web page.

Overview Getting Started CIMIS Staff System News FAQs

[printer friendly version](#)

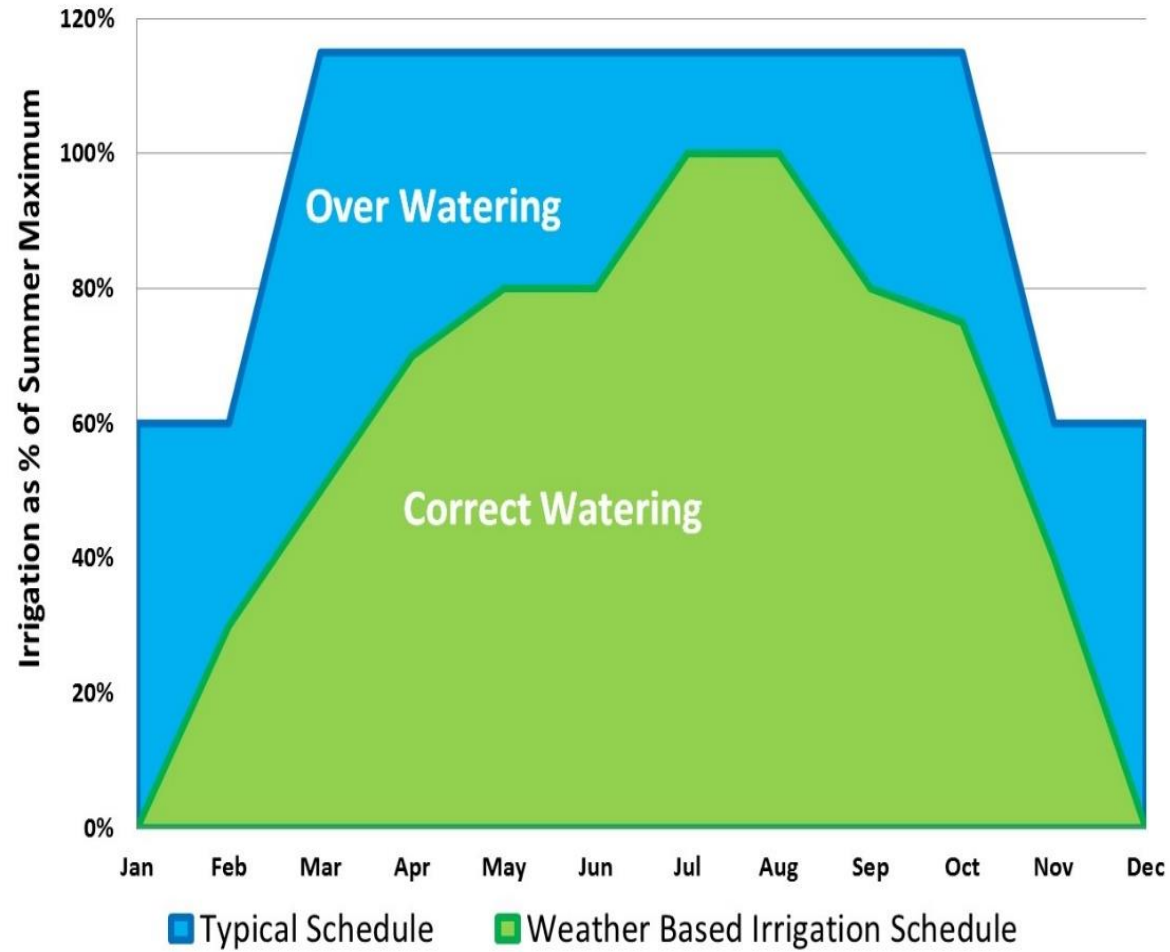
CIMIS Overview

The following sections give a brief overview of CIMIS. Sections include the following: Introduction; Data Collection, Transmission, and Processing; Data Retrieval by Users; ETo Maps (Spatial CIMIS); and Trends in CIMIS Data Use. Please click on the arrow to the right of each title below to access the section.

Introduction 
The California Irrigation Management Information System (CIMIS) is a program unit in the Water Use and Efficiency Branch, Division of Statewide Integrated Water Management, California Department of Water Resources (DWR) that manages a network of over 145 automated weather stations in California. CIMIS was developed in 1982 by DWR and the University of California, Davis (UC Davis). It was designed to assist irrigators in managing their water resources more efficiently. Efficient use of water resources benefits Californians by saving water, energy, and money.
Data Collection, Transmission, and Processing 
Data Retrieval by Users 
ETo Maps (Spatial CIMIS) 
Trends in CIMIS Data Users 



Typical vs. Weather Based Irrigation Schedule



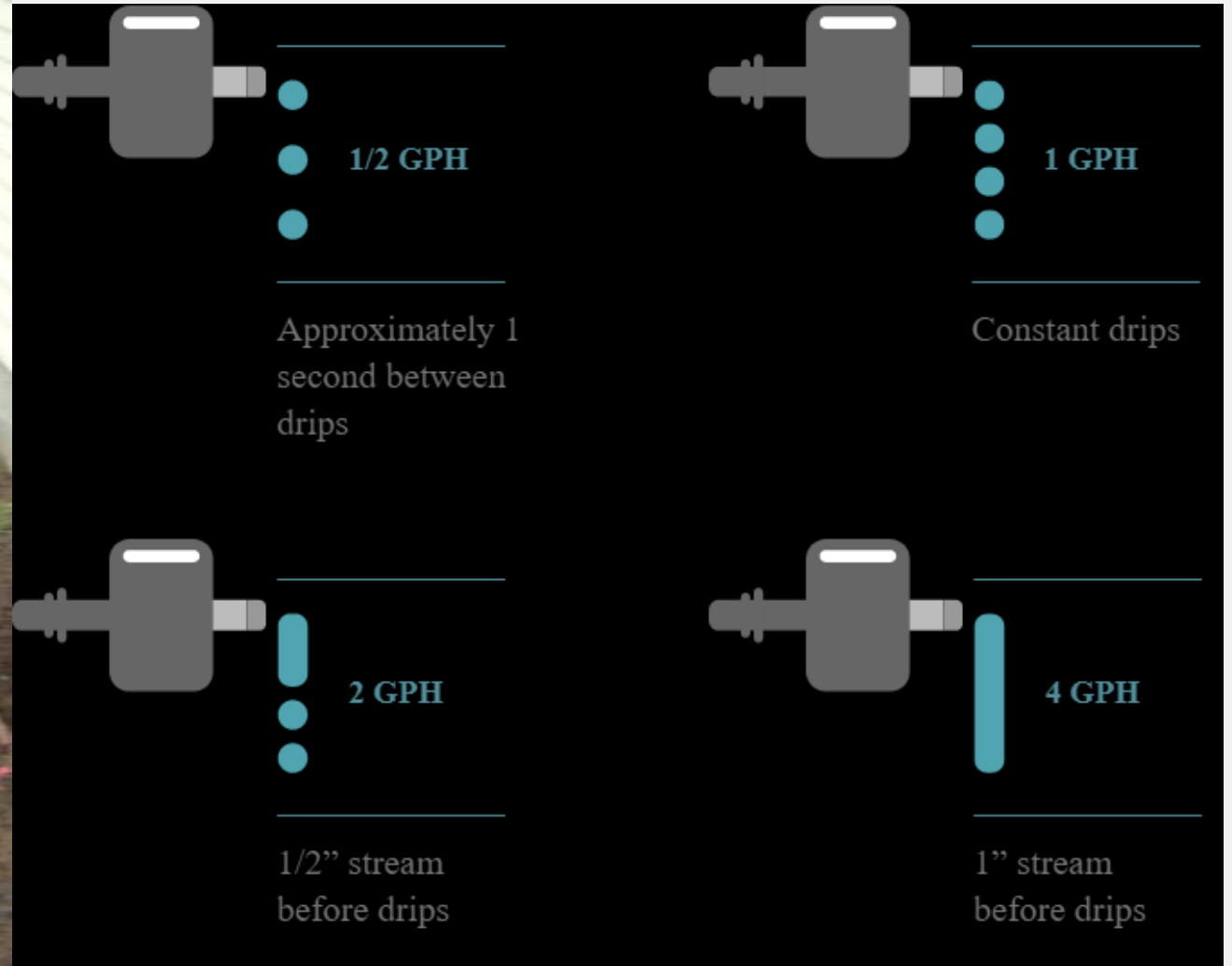
CIMIS Weather Station - ET

How much water is that?

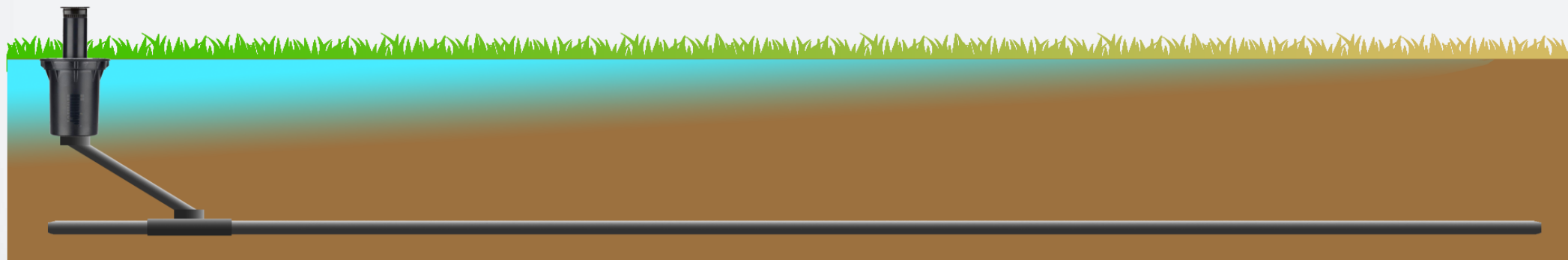
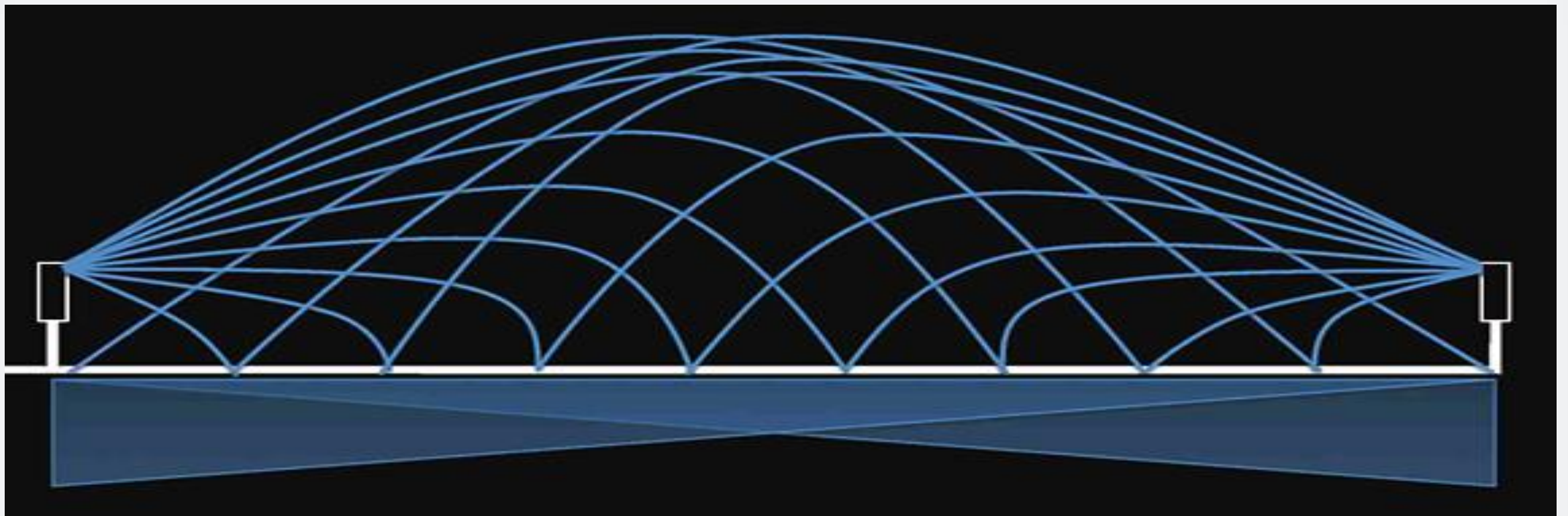
- **5 seconds** with a garden hose
- **10 minutes** with a 1-gallon per minute bubbler
- **600 minutes or 10 hours** with a 1-gallon per hour drip emitter



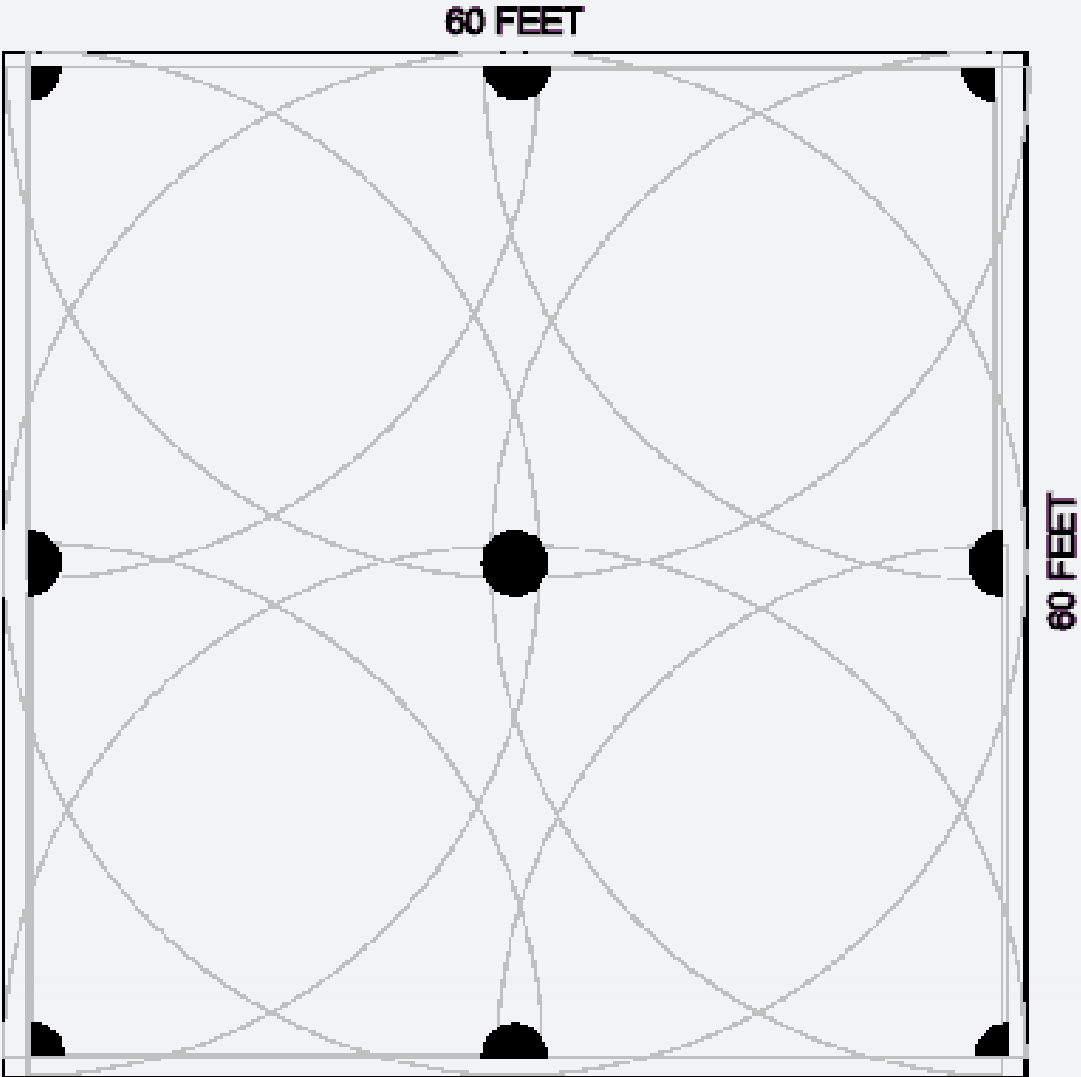
Drip



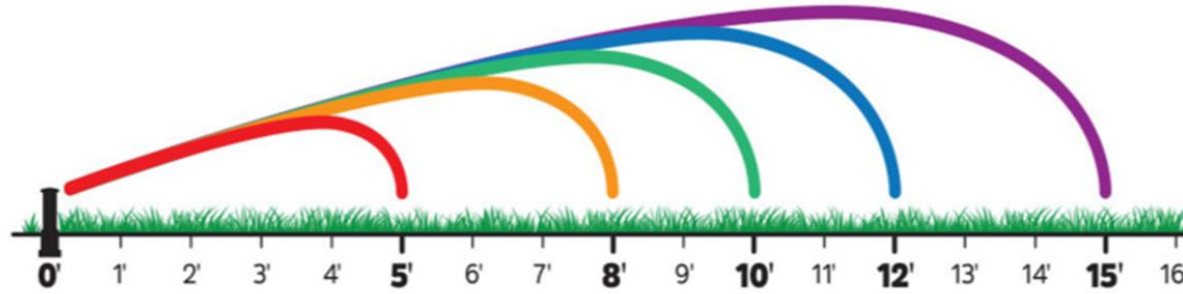
Distribution Uniformity



Optimal Head to Head Coverage









Spray Head Angles and Flow



Spray Head Angles and Flow

This chart shows water use in Gallons per Minute (GPM) for the different types of spray heads used:

SPRAY HEAD FLOW - Average Gallons Per Minute (GPM)						
SPRAY HEAD ARC COVERAGE	 1 Quarter (1/4) 90° Arc	 1 Third (1/3) 120° Arc	 1 Half (1/2) 180° Arc	 2 Thirds (2/3) 240° Arc	 3 Quarters (3/4) 270° Arc	 Full Circle 360° Arc
5' Radius	0.10	0.12	0.21	0.25	0.29	0.39
8' Radius	0.25	0.31	0.50	0.70	0.76	1.02
10' Radius	0.40	0.55	0.80	0.97	1.04	1.60
12' Radius	0.61	0.80	1.23	1.60	1.78	2.50
15' Radius	0.91	1.20	1.80	2.34	2.75	3.70

Numbers are based on an average of three top brand sprayheads and at an optimum water pressure of 30psi.
Variations will occur with various brands and at different water pressures.

Overwatering



**SIGNS YOU ARE
OVERWATERING
YOUR PLANTS**

Overwatering - Saturation - Yellowing



Frequency and / or duration too long

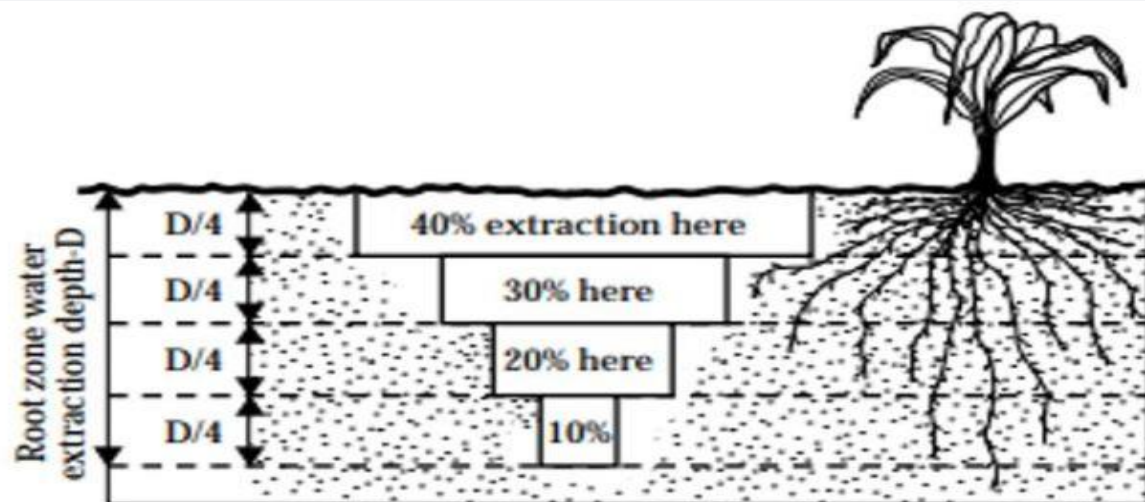
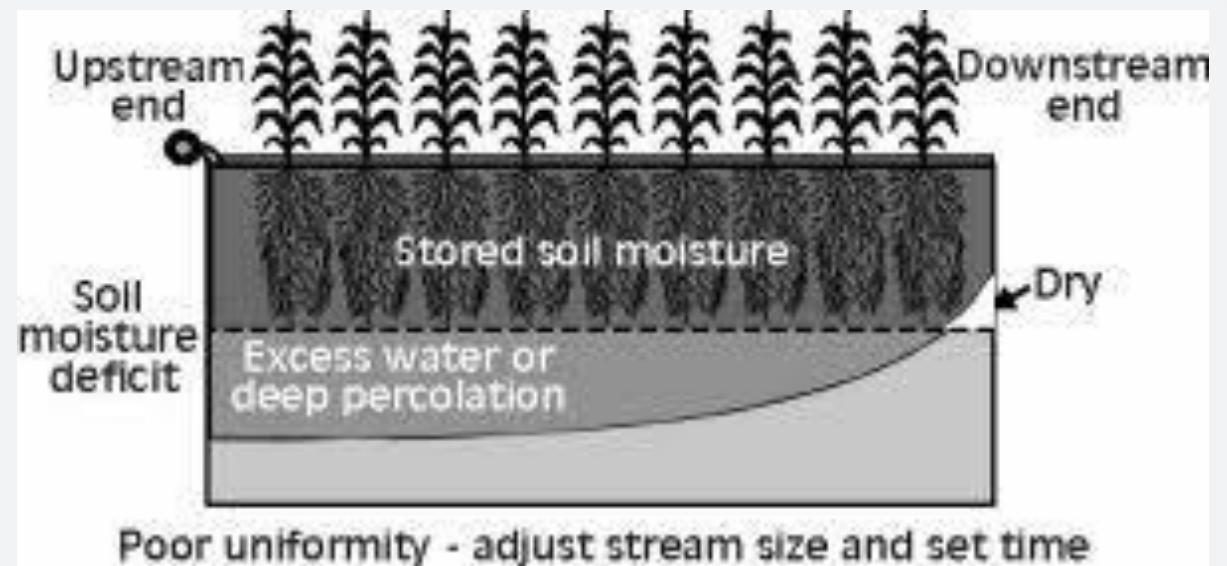
Root Rot - Phytophthora - Fungus



Excess water loss

If you never try to use less water, than you may never know if you are using too much.

More is not always better. Plants cannot look better than if they had the “right” amount of water.



Loss of Nutrients & Leaching

Roseville Watering Schedule



Irrigation Watering Schedule

Check your system regularly



Winter

	DECEMBER				JANUARY				FEBRUARY			
	Minutes per week	Days per week	# of cycles per day	Minutes per cycle	Minutes per week	Days per week	# of cycles per day	Minutes per cycle	Minutes per week	Days per week	# of cycles per day	Minutes per cycle
Turf/Fixed Spray	8	1	4	2	8	1	4	2	16	1	4	4
Shrub Spray Fixed	4	1	1	4	4	1	1	4	8	1	4	2
Drip System	12	1	1	12	12	1	1	12	20	1	1	20
Turf/Rotary Nozzle	36	1	4	9	40	1	4	10	58	1	4	17

Spring

	MARCH				APRIL				MAY			
	Minutes per week	Days per week	# of cycles per day	Minutes per cycle	Minutes per week	Days per week	# of cycles per day	Minutes per cycle	Minutes per week	Days per week	# of cycles per day	Minutes per cycle
Turf/Fixed Spray	24	2	4	3	40	2	4	5	48	3	4	4
Shrub Spray Fixed	16	1	4	4	24	1	4	6	32	2	4	4
Drip System	36	1	2	18	56	1	2	28	80	2	2	40
Turf/Rotary Nozzle	112	2	4	14	176	2	4	22	216	3	4	18

Summer

	JUNE				JULY				AUGUST			
	Minutes per week	Days per week	# of cycles per day	Minutes per cycle	Minutes per week	Days per week	# of cycles per day	Minutes per cycle	Minutes per week	Days per week	# of cycles per day	Minutes per cycle
Turf/Fixed Spray	64	4	4	4	64	4	4	4	60	3	4	5
Shrub Spray Fixed	40	2	4	5	40	2	4	5	40	2	4	5
Drip System	120	2	2	60	200	2	2	100	160	2	2	80
Turf/Rotary Nozzle	288	3	4	16	304	4	4	19	252	3	4	21

Fall

	SEPTEMBER				OCTOBER				NOVEMBER			
	Minutes per week	Days per week	# of cycles per day	Minutes per cycle	Minutes per week	Days per week	# of cycles per day	Minutes per cycle	Minutes per week	Days per week	# of cycles per day	Minutes per cycle
Turf/Fixed Spray	48	3	4	4	32	2	4	4	16	1	4	4
Shrub Spray Fixed	24	2	4	3	20	1	4	5	8	1	4	2
Drip System	64	2	2	32	40	1	2	20	20	1	2	10
Turf/Rotary Nozzle	192	3	4	16	128	2	4	16	64	1	4	16

Roseville Watering Schedule - Details

Quick sprinkler tips

- Check your system regularly for leaks or missing drip emitters and broken components.
- Straighten stilted sprinklers and adjust overspray on all hardscape, sidewalks and driveways.
- Install check valves for low head drainage where water drains out onto hardscape.
- City of Roseville recommends cycle and soak irrigation programs with a minimum of 1 hour between cycles.
- No person shall use, or cause to be used, any city water for landscape irrigation between the hours of 10:00 a.m. and 8:00 p.m. due to evaporation.
- Operation of an irrigation system that applies water to an impervious surface or that is in disrepair is a violation of the Roseville Municipal code.
- No person shall use, or cause to be used, irrigation of landscaping during rainfall or 48 hours after a measurable rain event. Shut off irrigation system during winter or rain events.

Precipitation Rate Range



Turf Fixed Spray Range: 1.83" in/hr

Shrub Fixed Spray Range: 1.58" in/hr

Drip System: 1.5 gph (gallons per hour)

(Micro-sprays not included due to > rates)

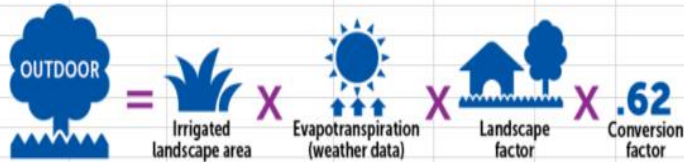
Rotary Nozzle: .60" in/hr

Note: This irrigation schedule is a general guideline, site conditions vary, and run times may need to be adjusted accordingly.

**Call us at (916) 774-5761
to schedule a Water Wise House Call
or if you have questions.**

Roseville Irrigation Budget Calculator

Outdoor Landscape Irrigation Budget



Select Month Performing Test



ETo Calculator

Month	Irrigated landscape area	Evapotranspiration (weather data) ETo	Landscape Factor	Conversion Factor	Gallons of Water	Cubic Feet of Water
Jan	3,000	1.55	0.8	0.62	2,306	308
Feb	3,000	2.24	0.8	0.62	3,333	446
Mar	3,000	3.72	0.8	0.62	5,535	740
Apr	3,000	5.10	0.8	0.62	7,589	1,015
May	3,000	6.82	0.8	0.62	10,148	1,357
Jun	3,000	7.80	0.8	0.62	11,606	1,552
Jul	3,000	8.68	0.8	0.62	12,916	1,727
Aug	3,000	7.75	0.8	0.62	11,532	1,542
Sep	3,000	5.70	0.8	0.62	8,482	1,134
Oct	3,000	4.03	0.8	0.62	5,997	802
Nov	3,000	2.10	0.8	0.62	3,125	418
Dec	3,000	1.55	0.8	0.62	2,306	308
Annual Totals					84,876	11,347

Monthly Flow Calculator

Month: Jul		Station	Location / Description	Test Run Time (Minutes)	Meter Read (Start) (CF)	Meter Read (End) (CF)	Flow Rate (CFM)	FLOW RATE (GPM)	Zone Run Time per Week (minutes)	Gallons per Station per Month	Cubic Feet per Month
1	Front Turf (spray)	1	233567.00	233572.00	5	37.4	5	748	100		
2	Side Turf (spray)	1	233572.00	233579.00	7	52.36	5	1,047	140		
3	Front Shrubs (Drip)	1	233579.00	233585.00	6	44.88	5	898	120		
4	Front Trees (Drip)	1	233585.00	233596.00	11	82.28	5	1,646	220		
5	Back Turf near Spa (Sprays)	1	233596.00	233601.00	5	37.4	5	748	100		
6	Back Turf near Fence (Sprays)	1	233601.00	233614.00	13	97.24	5	1,945	260		
7	Back Turf near BBQ (Sprays)	1	233614.00	233620.00	6	44.88	5	898	120		
8	Back Shrubs near Fence (Drip)	1	233620.00	233629.00	9	67.32	1	269	36		
9	Back Shrubs near BBQ (Drip)	1	233629.00	233635.00	6	44.88	1	180	24		
10	Back Trees (Drip)	1	233635.00	233643.00	8	59.84	1	239	32		
Total Gallons / Month										8,617	
Total CF / Month											1,152

Compare your water use to the ETo numbers

	Amount Used Gallons/Cubic Ft	Monthly ETo Calculator Gallons/Cubic Ft	Percent Difference	Over or Under Budget Gal/Cubic Ft	
Gallons	8,617	12,916	-33%	-4,299	Gallons
Cubic Feet	1,152	1,727	-33%	-575	Cubic Feet

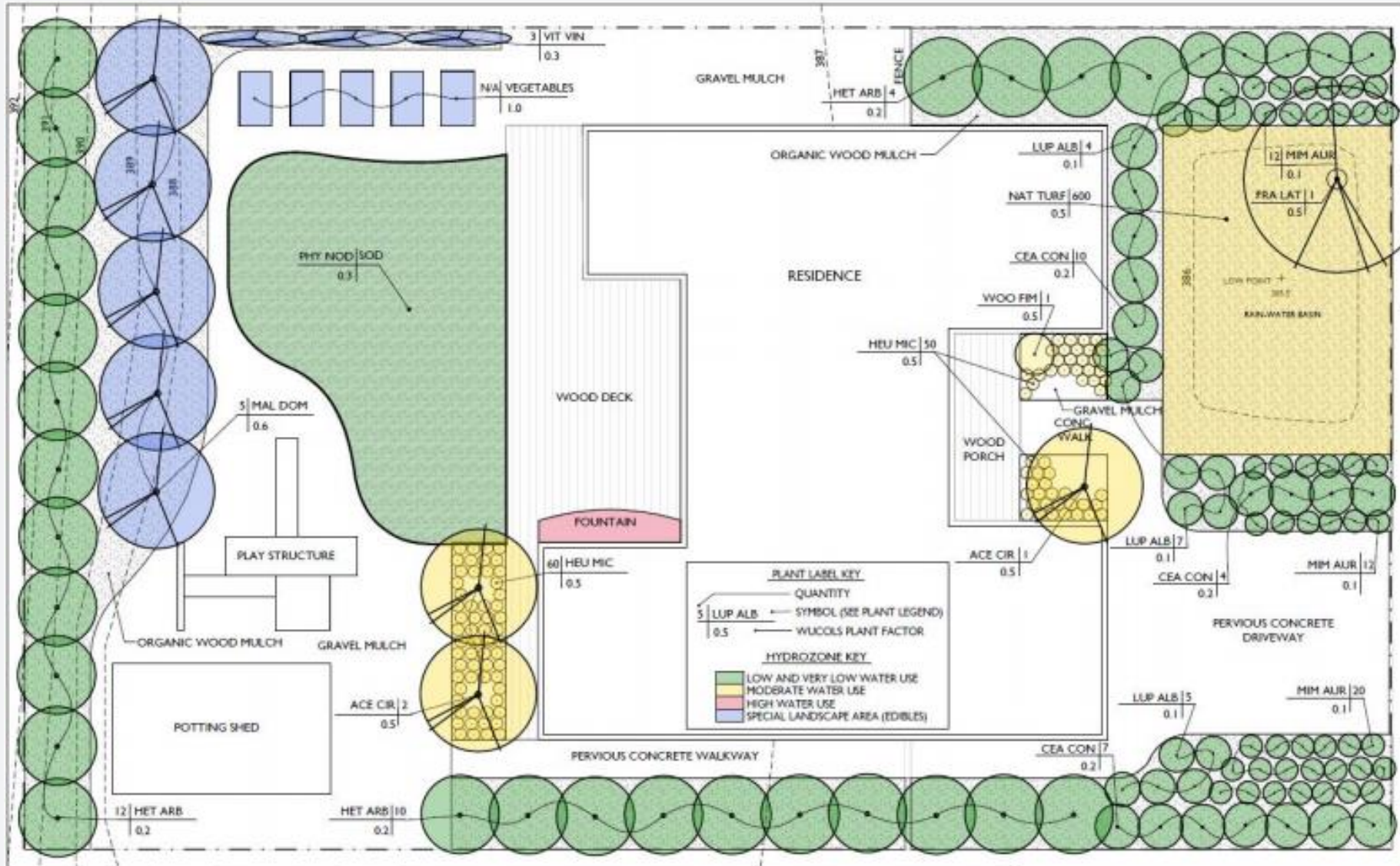
This chart represents evapotranspiration for Zone 14 which is accurate for Roseville, CA and described as:

Mid-Central Valley, southern Sierra Nevada, Tehachapi & High Desert Mountains, by DWR CIMIS

<https://cimis.water.ca.gov/>



Hydrozones



Ways to monitor soil moisture



Rachio Controller

- <https://youtu.be/qwYOxToNePM>
- <https://rwa.rachio.com/>

RWA Smart Sprinkler Controller Program

For a limited time only, qualified local water utility customers in the Sacramento region can receive a Rachio 3 Smart Sprinkler Controller (up to a \$270 retail value) for only \$74.99 + tax!

Water only when needed

Rachio owners typically save 20-30% on their water bill every month.

- ✓ **Smart home meets smart lawn.**
Control your sprinklers from anywhere with your mobile device.
- ✓ **Set it and forget it.**
Calculates when and how long to run your sprinklers.
- ✓ **Never water in the rain.**
Predictive schedules adjust to local weather conditions.
- ✓ **Effortless monthly savings.**
Potentially see big savings on water bills.
- ✓ **Plays well with others.**
Easily connect to Amazon Alexa, Google Assistant, Apple HomeKit, Nest, and more.



#1 Rated and Reviewed

On Amazon, Home Depot, Lowes, and other consumer rating websites and publications.

Questions?

[FAQ for Program](#)

Program sponsored by
RWA

Smart Sprinkler Controller
Rachio 3

Starting at
\$229.99



Information

<http://www.roseville.ca.us/rebates>

<http://www.beyondthedrought.com/info.php>

<https://ucanr.edu/sites/WUCOLS/>

<https://www.irrigationtutorials.com/>

<https://bewatersmart.info/>

<http://www.saveourwaterrebates.com/turf-replacement-rebates.html>

Local Irrigation Supply Centers

Horizon Distributors 861 Galleria Blvd, Roseville

Ewing Irrigation & Landscape Supply 500 Berry St b, Roseville

Site One 1675 Nichols Dr Rocklin

Roseville Water Wise House Calls

Why struggle with your irrigation?

Call us!

- Call us to schedule an appointment. Our water-use specialists can come to your home and analyze your indoor and outdoor water use, including checking your sprinklers.
- House Calls are free to Roseville residents and are available weekdays to suit your schedule.
- Call **(916) 774-5761** to schedule your appointment today.

H2OGUY

CITY OF
ROSEVILLE
CALIFORNIA
Be in the know.

