Adapting to Drought: Water-wise Management of Home Gardens and Landscapes

June 6th/14th, 2015

UC Master Gardeners of Napa County

twenty 20 years

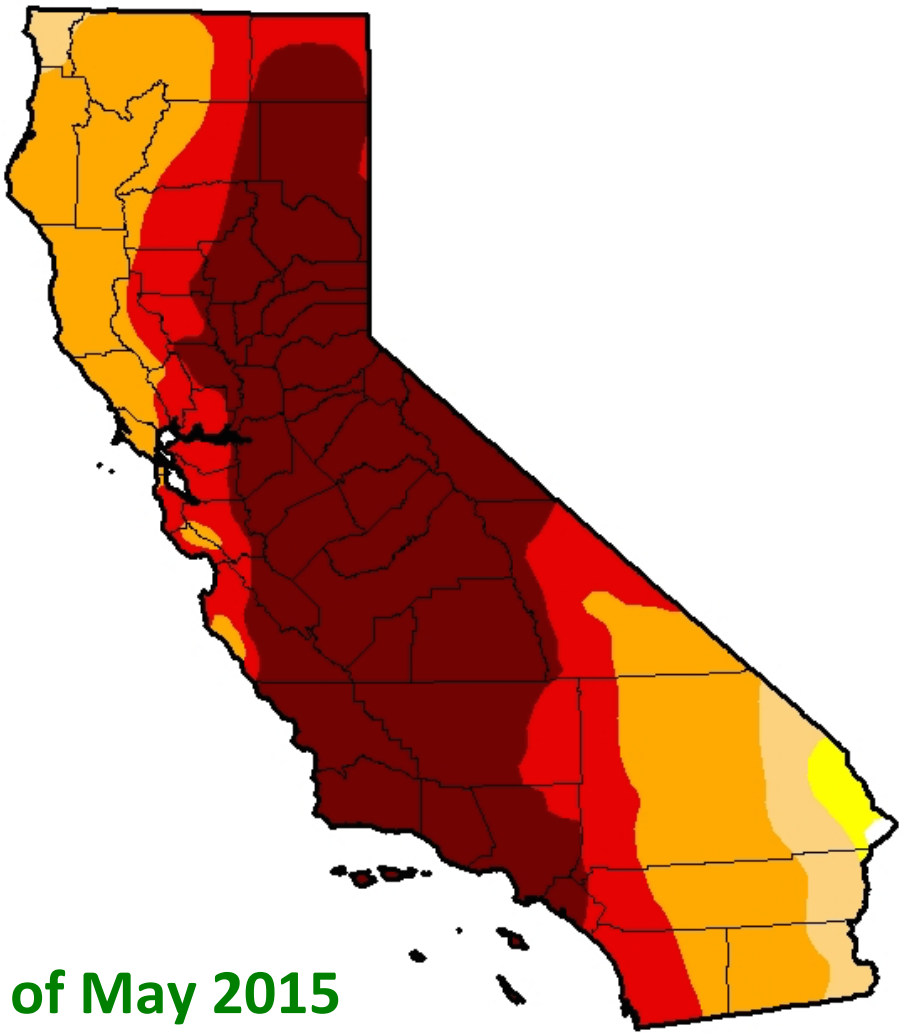
Our Continuing Mission…

The Master Gardener program is a volunteer organization associated with the University of California Cooperative Extension. *We provide educational and outreach programs to meet Napa County residents' horticultural, pest management and sustainable landscape needs, using research-based knowledge and information.*

Workshop Agenda

1. Current Drought Situation and Outlook
   - Water conservation ordinances in Napa County
2. Drought 101: Reducing water use in Existing Gardens and Landscapes
   - Eliminate waste
   - Set priorities, use only what you need.
   - Protect the trees in your landscape
   - Water cachement and recycling
3. The Next Step: restoring the native drought-adapted landscape.
   - Lawn Removal and Replacement
   - making water-wise plant (and planting) choices
   - Webiste demos: Napa Waterwise Plants and U.C.D. Arboretum Allstars
4. Conclusion
   - Positive outcomes of “the drought disaster?”
   - Stop worrying, garden where you are, and learn to love your beautiful Summer-dry landscape.

U.S. Drought Monitor - California



As of May 2015

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.14	99.86	98.71	93.91	66.60	46.73
Last Week *5/19/2015*	0.14	99.86	98.28	93.91	66.60	46.77
3 Months Ago *2/24/2015*	0.16	99.84	98.10	93.44	67.46	39.92
Start of Calendar Year *12/30/2014*	0.00	100.00	98.12	94.34	77.94	32.21
Start of Water Year *9/30/2014*	0.00	100.00	100.00	95.04	81.92	58.41
One Year Ago *5/27/2014*	0.00	100.00	100.00	100.00	76.68	24.77

Intensity:

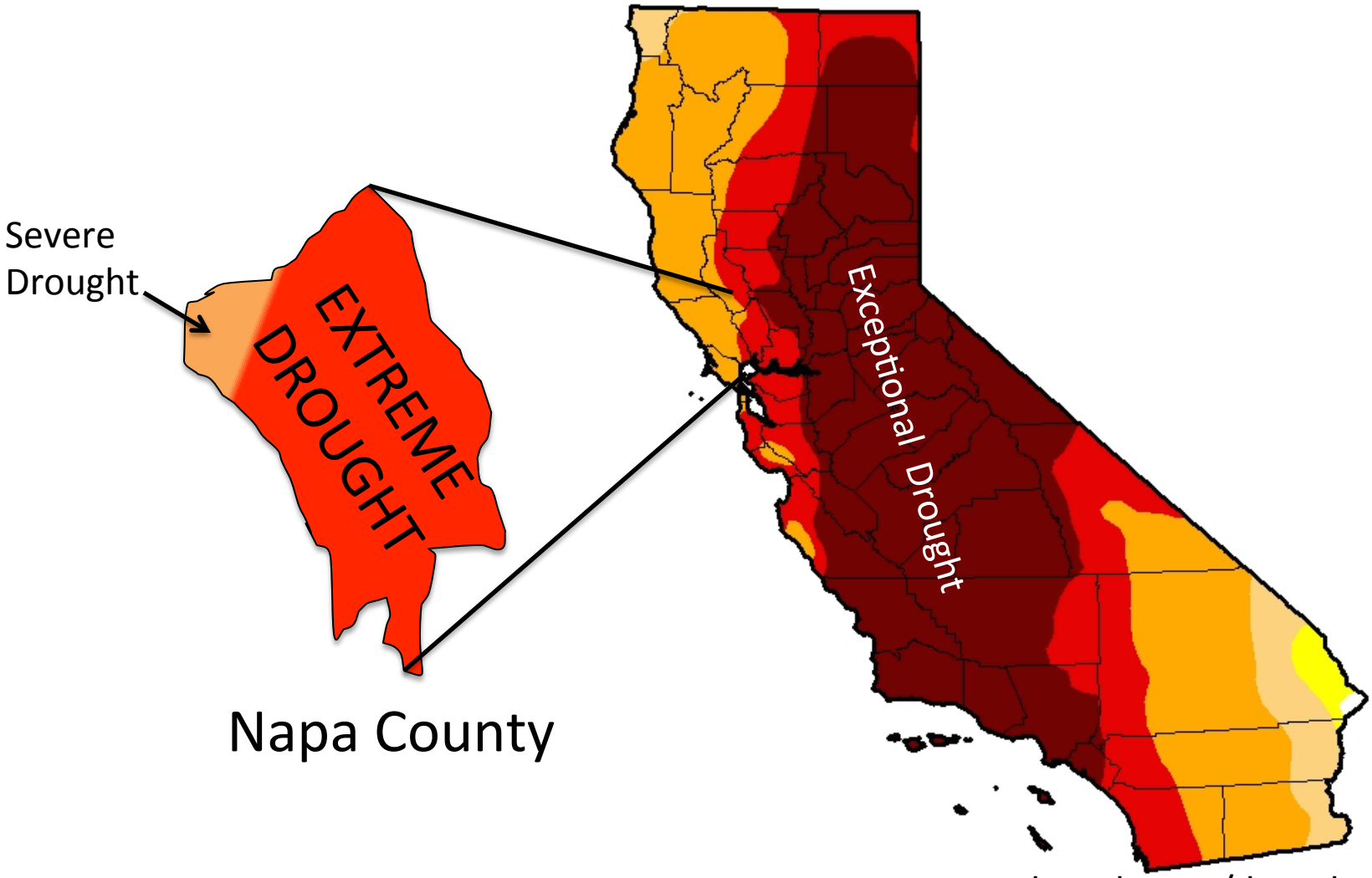
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
Brad Rippey
U.S. Department of Agriculture

www.drought.gov/drought

Current Drought Intensities



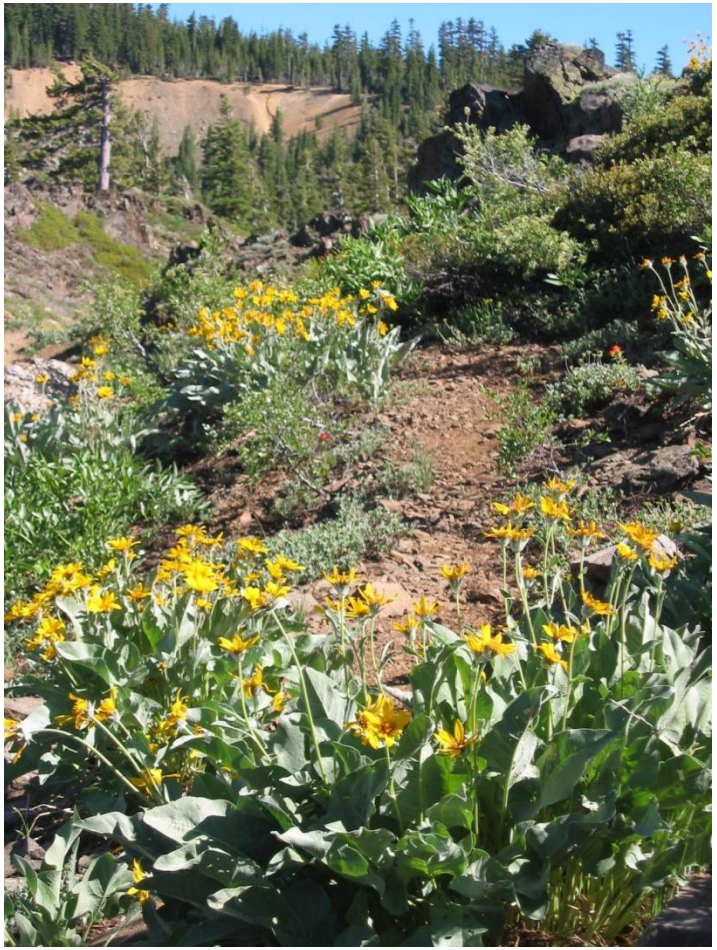
www.drought.gov/drought

Our Way Forward

“Landscapes are essential to the quality of life in California….”

- Challenge: to meet the water needs of a growing population with a limited supply of water.
- Landscape maintenance accounts for 50-60% of household water use.
- To meet the challenge, water use in landscapes must be reduced.
- There are many ways to accomplish this goal…

--DWR website



Low-hanging fruit: Free stuff!

Showerhead: 1.5 gallon-per-minute (gpm), (available in White or Chrome!)
Shower Timer: 5-minute Shorter Shower Timer helps change habits
Bathroom Faucet Aerators: 0.5, 1.0, or 1.5 gpm, residential and commercial
Kitchen Faucet Aerator: 1.5 gpm, dual-setting with swivel
Toilet Dye: for leak detection
Toilet Fill Cycle Diverter: Tankee Clipper may save up to a half gallon with each flush.
Rain Gauge: comes with Sprinkler Times promo
Garden Hose Nozzle: 6-position Water Miser
Hose Timer: automatic shutoff, minutes to 2-hours duration

Available from: Water Division headquarters,
1340 Clay Street, Downtown Napa
(intersection of Clay and Franklin Streets).

Water-Wise Home Survey

- Also FREE
- A city water conservation specialist will visit your home and:
  - Show you how to read your water meter
  - Check for leaks and recommend repairs
  - Check toilet flush volumes
  - Check showerhead and faucet flow rates
  - Provide free high-efficiency replacement fixtures if warranted
  - Inform you of applicable rebate programs
  - Inspect your irrigation system and recommend improvements
  - Provide an appropriate irrigation schedule

Call the Water Conservation Specialist at 707-257-9497 (Napa)

Drought 101: Basic Water Use Reduction

- **20th century… Reduce waste! Don't flush unless you must!**

- **21st century: Having eliminated waste… work on using only what you need (oh, and btw, minimize your needs).**

  - **What are your priorities? What is really important enough to spend water on?**
  - **What plants or other landscape features are vital to *your* habitat garden/landscape?**
  - **Protect your trees.**
  - **When the drought is "over"…. Don't fall back! The drought is never over.**

Tips for the Edible Garden

- Be selective.
  - Plant an appropriate size garden for your household.
  - Plant short-season varieties (e.g. 'Early Girl" @ 60 dtm vs. 'Paul Robeson' @ 90 dtm)
  - Plant drought-resistant crops or varieties
  - Select high-yielding crops (beans, tomatoes, squash, quinoa, amaranth, chard) instead of low-yielding crops (watermelon?)
- Know critical watering periods – when can irrigation be reduced?
  - Establishment – many plants are drought tolerant once established with a deep, well-developed root system. Provide deep watering durng this phase.
  - Many crops need consistent moisture during flowering and fruit-set. Drying may result in blossom drop, reduced yield.
  - Tomatoes do well with reduced water after fruit are set; squashes and melons do not.

Tips for the Edible Garden

- Apply a 3” to 4” layer of mulch to keep your water where you put it.
  - Keep mulch at least 2” away from base of stem to avoid
  - Don’t water the mulch (pull mulch back if hand-watering; apply drip irrigation below mulch layer.
- Apply judicious compost.
  - Organic matter helps soil retain moisture, improves root penetration, provides nutrition without promoting rapid growth/ overgrowth.
- Remove weeds (water competitors).
- Install a water efficient drip irrigation system.
- Avoid drought stress (reduces yield, makes plants susceptible to disease and pests)

Why Mulch?

- Reduces water-loss to evaporation
- Moderates soil temperature reducing root stress & increasing biological activity
- Reduces runoff
- Increases infiltration by
  - Preventing soil crusting
  - Improving soil texture over time
- NOTE: Sprinklers will need to soak bark to reach soil (drip applied beneath mulch is best)

Don't Irrigate "Blindly"

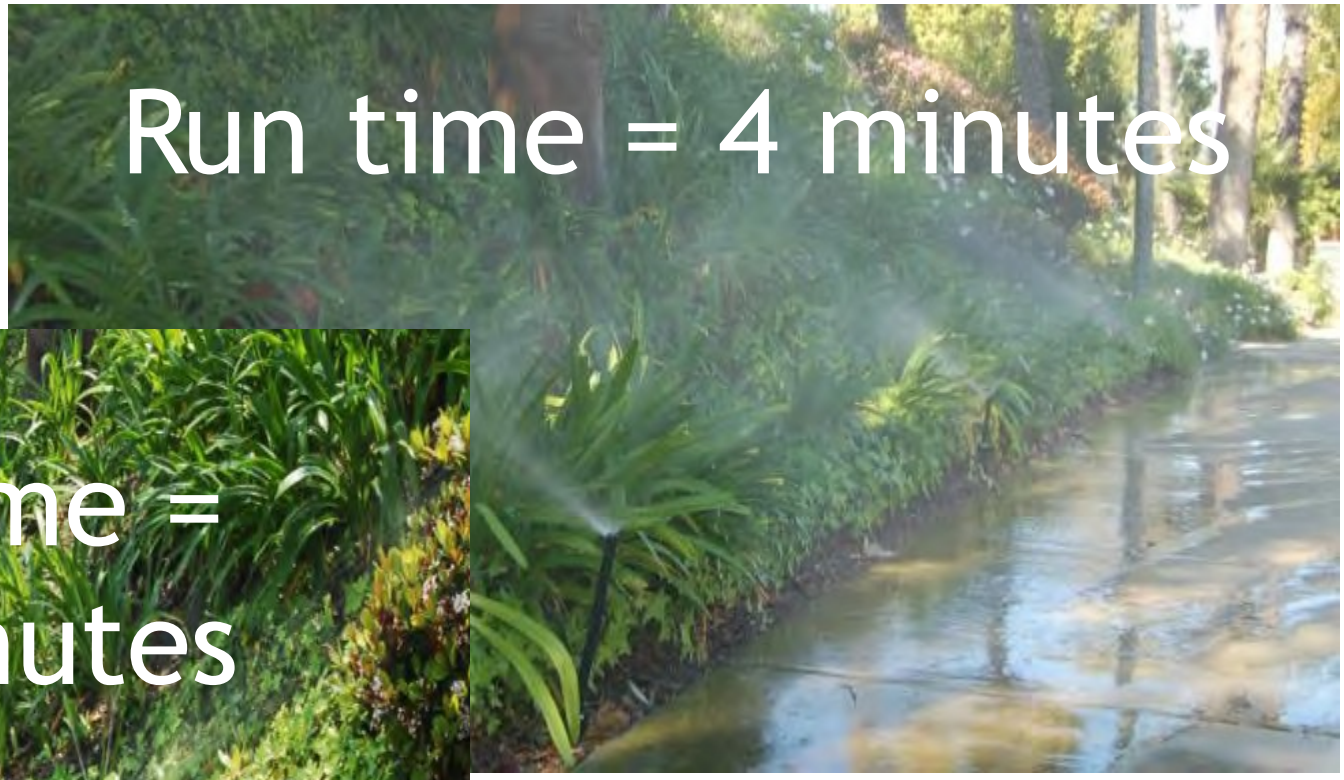
- Check the soil moisture first! Using your fingers, or a gadget.
  - Is the soil still moist 6" below the surface? Don't water yet.
  - Does soil stick together somewhat? = moist
  - Crumbly, dusty? = time to water

- Do plants look wilted (stressed), sometimes even when soil seems moist?
  - Try reducing water loss using *wind-breaks*, to help roots keep up with leaf demands.
  - Overwatering is unhealthy for plant roots, drought or no drought.

Saving Water while Saving your Lawn

- Ideally, use water-efficient varieties suited for your local climate
  - Warm-season grasses are preferred (bermudagrass, buffalograss)
  - Cool-season grasses discouraged (tall fescue, ryegrass)
- Replace nonessential turf with ground covers, mulches, decks, or other more useful features.
- Adjust irrigation schedule monthly - to reflect seasonal changes
- If it rains, take the amount into account and reduce your irrigation.
- Irrigate in the early morning hours (sunrise +/-), when air is still and evaporation rate lowest.
- Let the grass grow taller
  - Protects tender grass parts from sunburn
  - Reduces growth rate
  - Promotes deeper root growth
  - Shades soil, reduces evaporation rate and weeds
- Consider a dormancy period (like the surrounding hillsides…)

Lawns – Spray vs Rotary



Photos: D. Franklin

Lawns – Remove or Reduce

- There are five steps involved, four active and one inactive:
  - Cut your lawn as low as possible;
  - Cover it with cardboard (Thick or 2/3 layers)
  - Dampen the cardboard
  - Add 4 to 6 inches of mulch (Key Factor)
  - Wait until fall to plant

Resources:
ucanr.edu/sites/scmg/Lawn_Replacement/Grass_Removal_Methods

Napa Cash for Grass Program - www.cityofnapa.org

Lawns – Remove or Reduce

NextDoor Testimonial – Save Money

From: Nextdoor Browns Valley reply@rs.email.nextdoor.com
Subject: Getting rid of your grass and water sucking plants
Date: May 30, 2015 at 6:48 PM

For those who were interested we tore out our lawn and plants that need lots of water last year. A typical water bill for this cycle would be around $300. Got the water bill today and was rather thrilled to see $42.00. Just in case you're considering doing it I highly recommend.
May 30 in General to your neighborhood

More Tips for Reducing water use.

- Avoid crowding… increase spacing between plants so they don't compete for water.
- Avoid heavy pruning
- Avoid overuse of fertilizers, which increase growth and water demands
- Infrequent deep watering encourages deeper root growth, and results in plants with greater drought tolerance
- Use a drip irrigation system, grouping plants with similar water needs together on one drip irrigation line (Hydrozone)

Greywater

- **What is it?**
  - "Used" water… water already used in your household for another purpose.
  - **Untreated**; may be used for irrigation of ornamental/landscape plants
  - NOT RECOMMENDED for edible garden.
  - Acceptible sources:
    - Residential washing machines (but only if certain types of detergent/soap are used)
    - Bathtubs
    - Showers
    - Bathroom/outdoor/utility sinks
  - **Unacceptible**
    - Kitchen sink (food waste and food-borne microbes)
    - Dishwasher (food waste, detergents)
    - Toilet

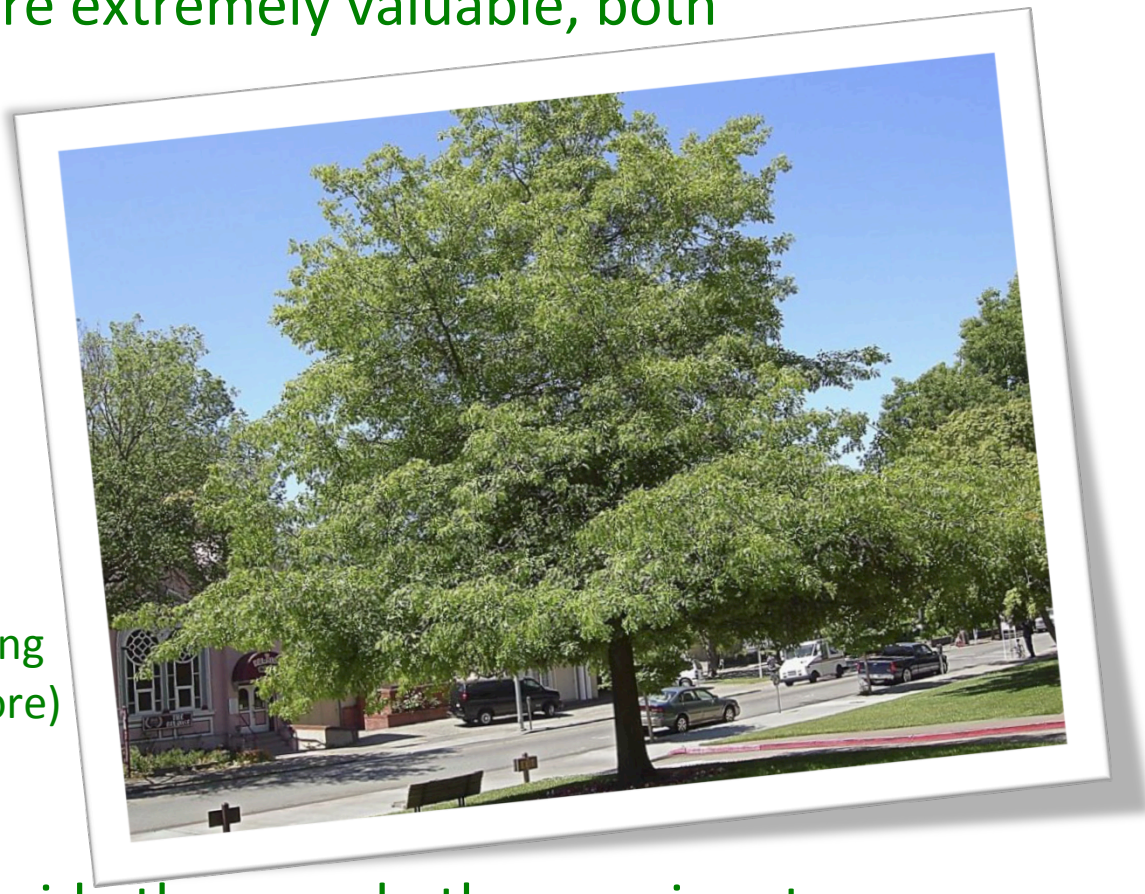
- Recycling water helps conserve water, electricity and reduces water bills.
- An estimated 30 to 50 percent of home water consumption results in greywater, which can be recycled into the landscape.
- Most homes can supply one-half to 3/4 of water-efficient landscape needs using greywater.
- Challenge: collection and delivery

www. cagardenweb.ucanr.edu/files/184699.pdf

Protect your Trees

Established, mature trees are extremely valuable, both monetarily
and for the services
they provide:

- Energy savings
  - Cooling shade in summer
  - Windbreak in winter
- Soil stabilization/water retention
- Reduced traffic speed/accidents
- Reduced air and water pollution
- Economic stimulus (trees in parking lot influence your spending in store)



Trees in your landscape provide these and other services to your entire community.

Protect your Trees

Trees are under stress!

- Deep water trees
- Established trees did not receive enough rain over the winter and may need some irrigation too.
- Don’t water established trees near the trunk
- New trees need regular water to establish
- Install drip irrigation or use a soaker hose or move the garden hose around the drip line and outwards.

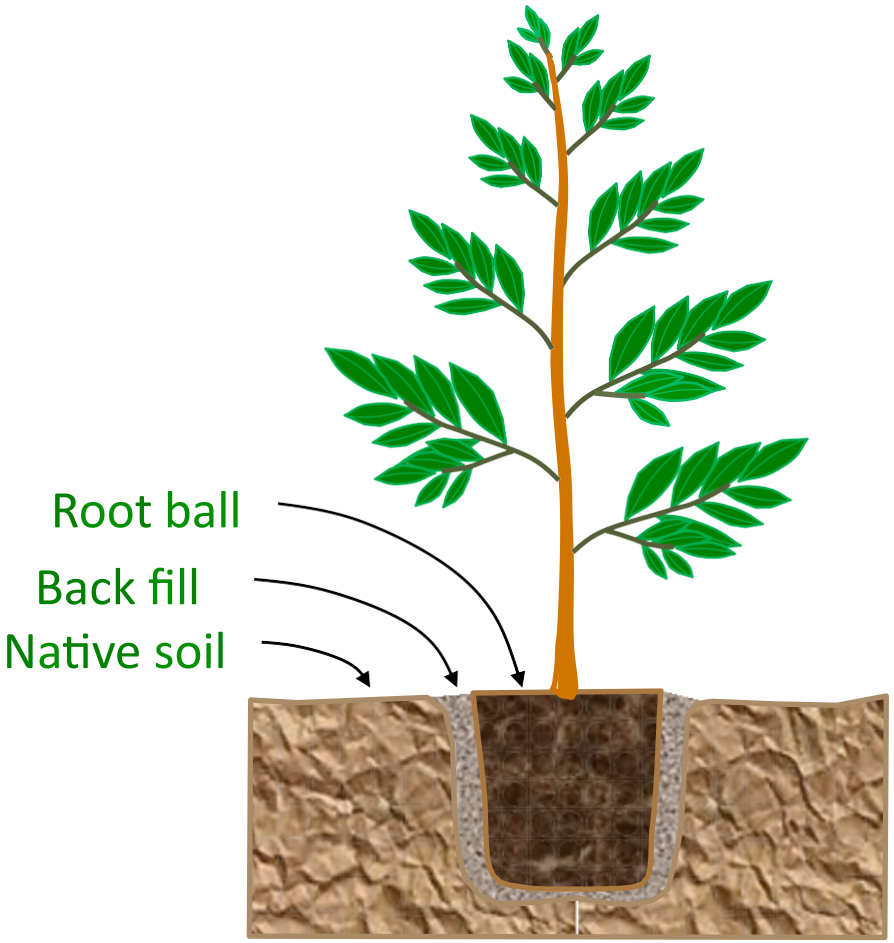
Trees in lawns

What's the problem?

- Improper tree selection
- Poor irrigation management
- Shallow roots

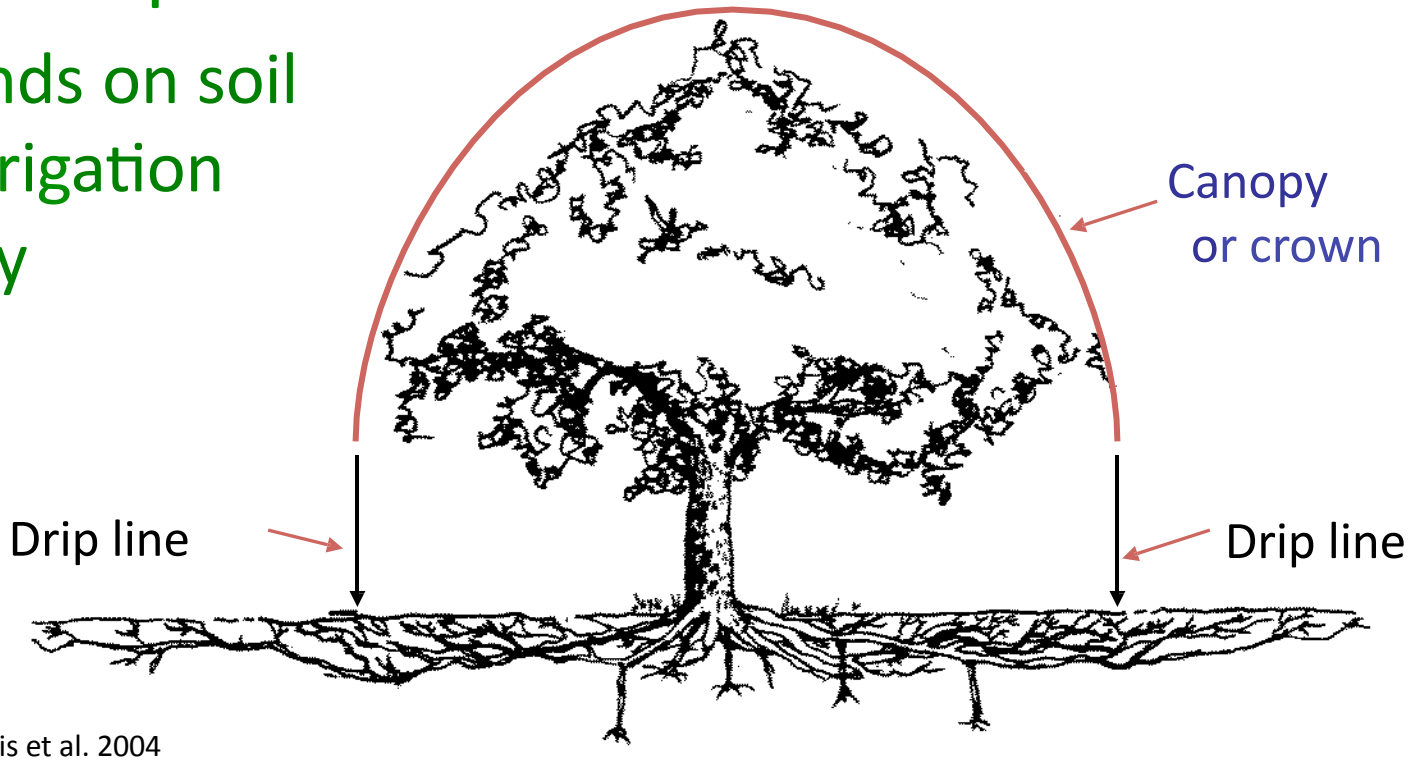
Tree roots

- Recently planted trees
  - Roots are mostly within the container soil ball
  - Roots may be just entering the native soil
  - Will take several years to fully establish



Tree roots

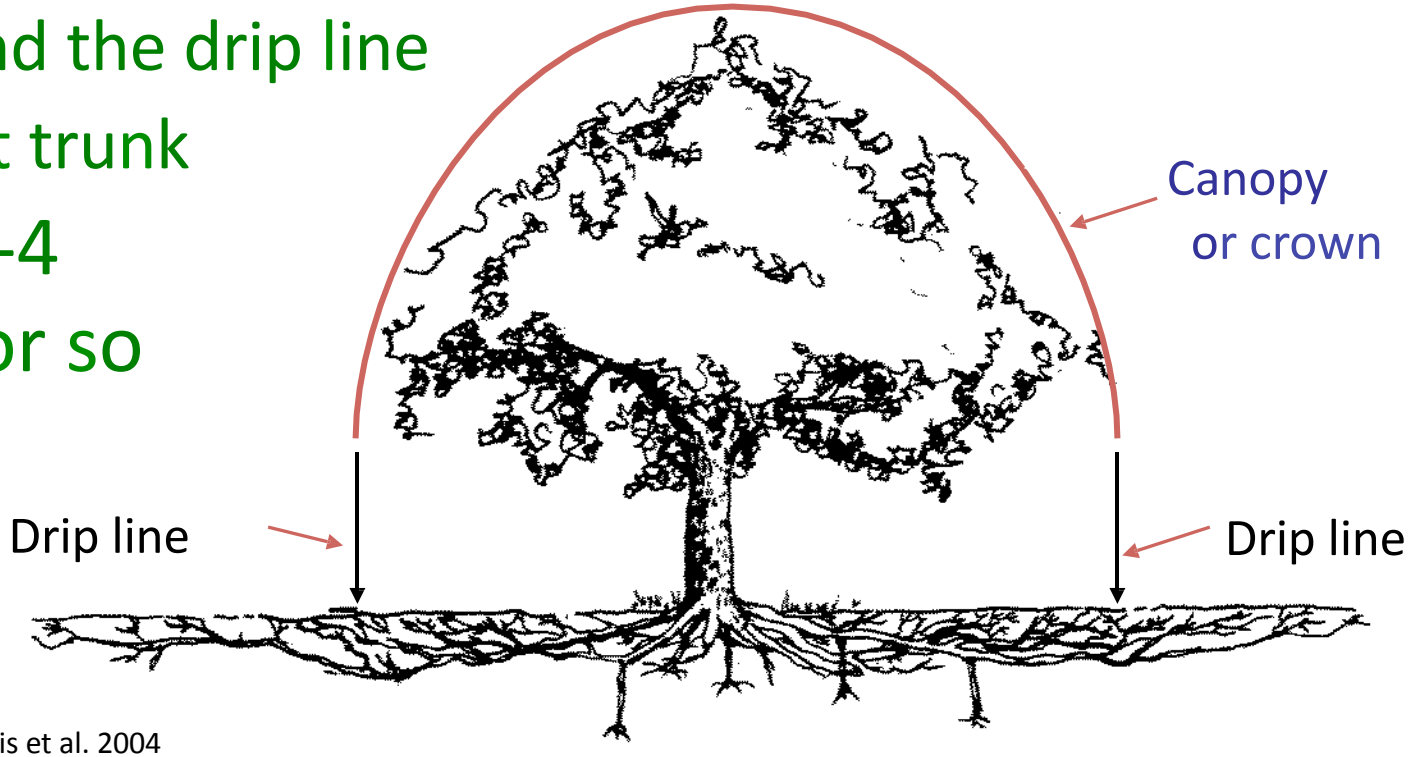
- Relationship to canopy
- May be deep
  - Depends on soil and irrigation history



Graphic adapted from Harris et al. 2004

Tree Irrigation

- Deep to 2 -3 feet
- Beneath the canopy
  - Beyond the drip line
  - Not at trunk
- Every 2-4 weeks or so



Graphic adapted from Harris et al. 2004

Tree **R**ing **I**rrigation **C**ontraption (TRIC):

a simple tool for efficiently irrigating a landscape tree

Loren Oki, Ph.D.
University of California
Cooperative Extension
lroki@ucdavis.edu

Dave Fujino, Ph.D.
California Center for Urban
Horticulture
dwfujino@ucdavis.edu

UCDAVIS
UNIVERSITY OF CALIFORNIA

University of California
Agriculture and Natural Resources

EWING

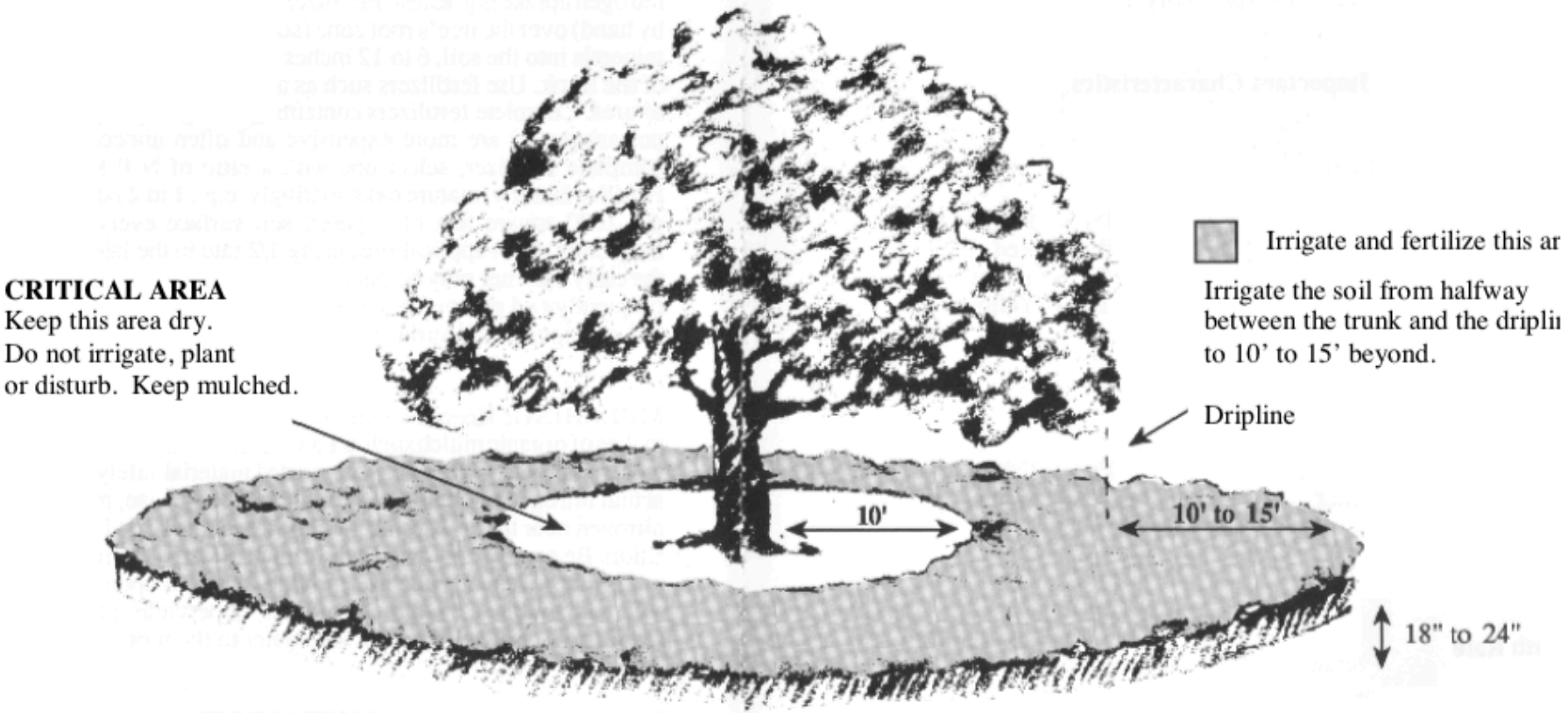
Example

Drip lines with approximate 12” spacing between lines.

What's the TRIC?

- Calculate irrigation run time to wet a tree "drip line" area to a depth of 36"
- Netafim drip is pressure compensating with a manufacturers precipitation table
- Input your info for 1' spacing:
  - Radius of tree "drip line"
  - Soil type
  - Number of 100' drip lengths (Netafim)

Native Oaks are Different



- Summer irrigation near the trunk can cause trouble.
- Don't plant irrigation-needing understory plants in that area. Mulch/leaf litter only.
- Don't transplant young oaks now; wait until rains start.
- Remove turf from within dripline, replace with mulch/sheetmulch

Converting to a Low-water Landscape: A "How-to"

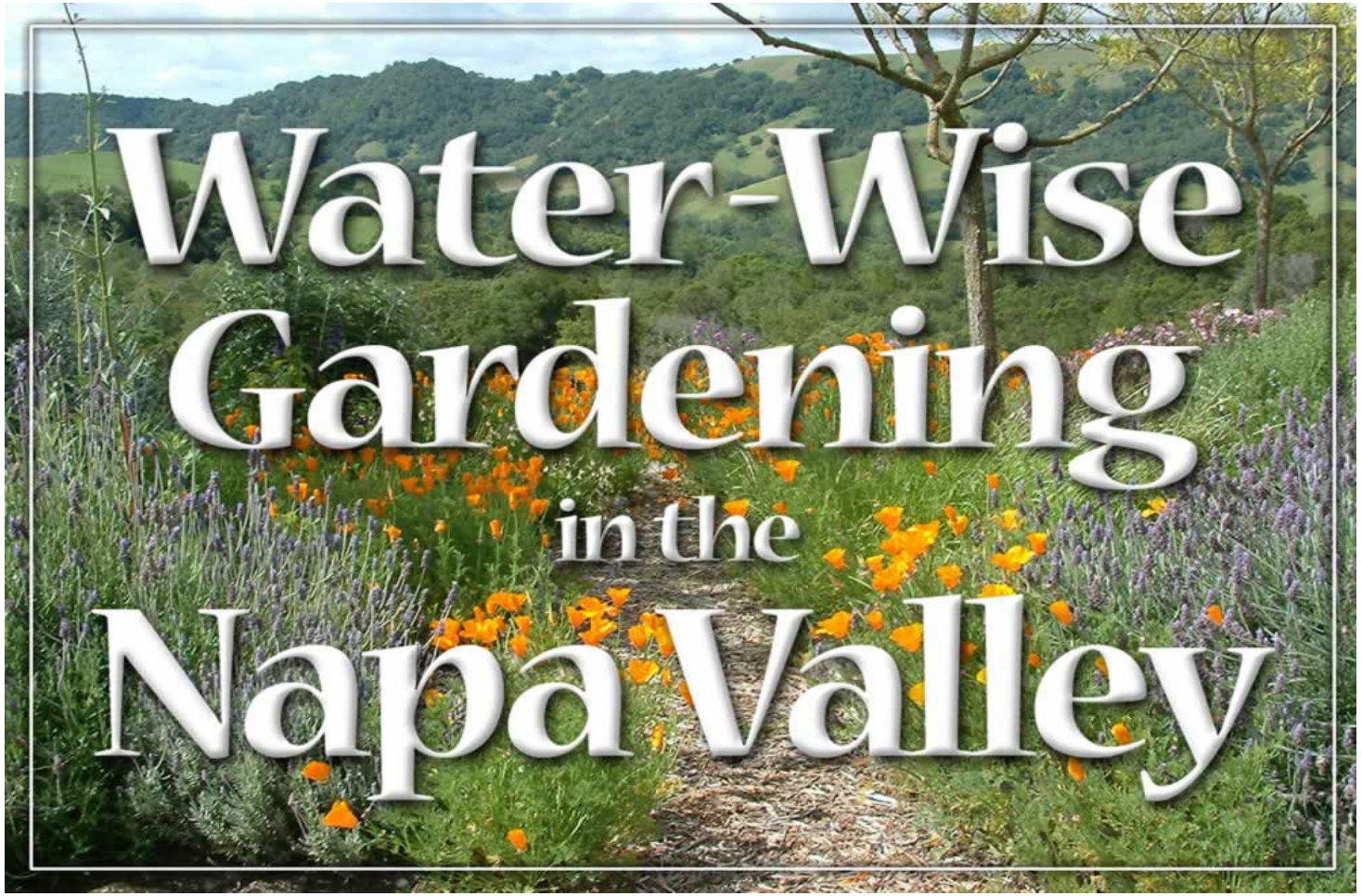
Source:
Karrie Reid
Environmental Horticulture Advisor
San Joaquin County

Landscape Revolution?

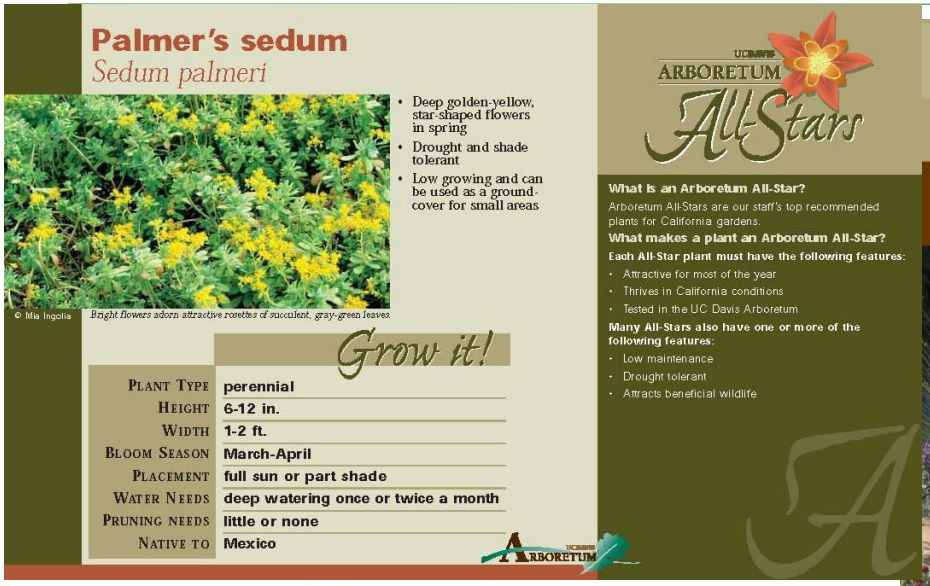
- Some call it natural gardening. Others describe it as sustainable, ecological, regional, or bioregional. Whatever it's called, the approach to landscaping outlined here is attuned to local climate, microclimate, topography, and soils, and responsive to the reality of limited resources. The natural approach to landscape design and maintenance conserves water and energy, protects wildlands, limits green waste, and provides habitat for wildlife. At the same time, it requires less upkeep than traditional landscapes, and it connects the gardener—and those who live, work, or play in the garden—to the rhythms of life: the seasons, the weather, the daily miracles of the natural world.

Website Demo

www.napa.watersavingplants.com



UC Davis Arboretum All-Stars program:



They promote 100 of the best of our plants they knew could survive with less water

UC DAVIS ARBORETUM All Stars

Encouraging gardeners to choose and use top performing, water-conserving plants.

What makes a plant a UC Davis Arboretum All-Star?

Every All-Star plant must:

- Be attractive for most of the year
- Thrive in Central Valley conditions
- Be tested in the UC Davis Arboretum
- Be available at Plant Sales

All-Stars were also selected for:

- Low maintenance
- Drought tolerance
- Attracting beneficial wildlife
- Year-round interest

Website Demo

www.arboretum.ucdavis.edu/arboretum_all_stars.aspx

California Lilac

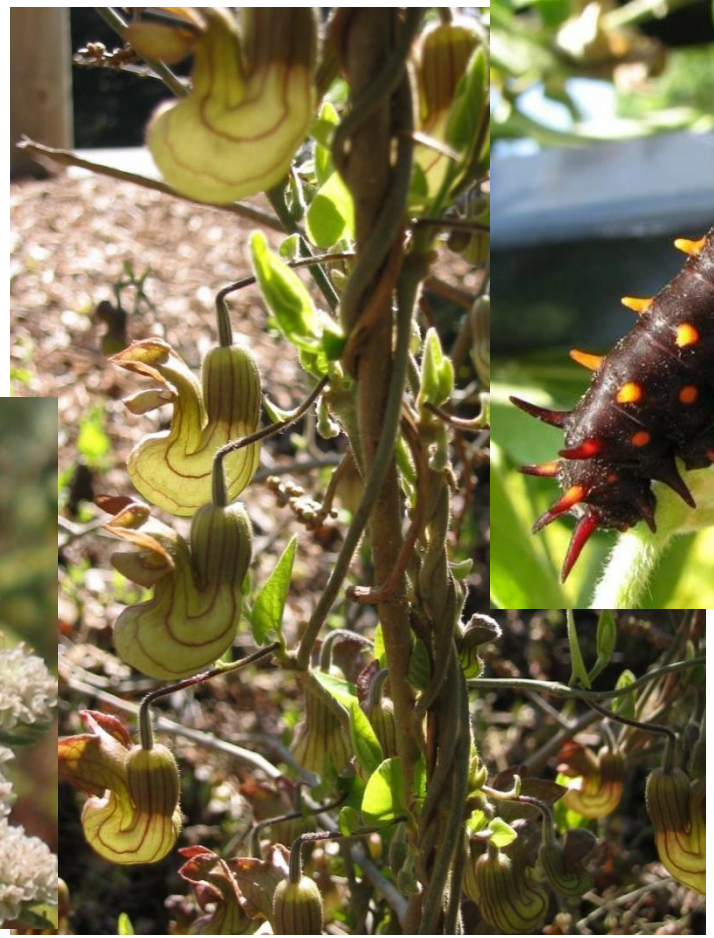
- *Ceanothus maritimus* 'Valley Violet' (low)
- *Ceanothus* 'Concha' (low)

Plants native to the Mediterranean are compatible with Arboretum All-Stars

Some All-Stars support pollinators and other insects

For **Insects they provide food**

- Larval food plants
- Nectar
- Pollen
- Attract other insects



All-Stars support diversity

Provide food for birds

- By attracting pollinators and other insects birds eat.
- Fruits and seeds birds eat
- Nectar for hummingbirds and butterflies

Phacelia

Epilobium canum

California Native Gardens

www.napavalleycnps.org

- Requires an appreciation of “golden” in summer
- Too much “golden" can be overcome by use of “hydrozones”
- Mixing evergreen and deciduous plants.

Why people don't use more natives?

- Some natives are prone to summer dormancy
- Others dislike heavy clay soils

But do California Native plants need less water? It depends…

Celebrate plants in Summer-dry gardens

California native plants are not drought-tolerant…
… they are normal.

They have adapted for maximum water use efficiency in California's variably dry climate, and have survived uncounted episodes of drought, acute and chronic, for over 5 million years…

Some native plants do live in wet areas

- Coastal fog
- Riparian corridors
- Shady forest understories
- Ponds and lakesides

- Such species are adapted to relatively constant water availability

Some plants are so well-adapted that they AVOID drought completely…

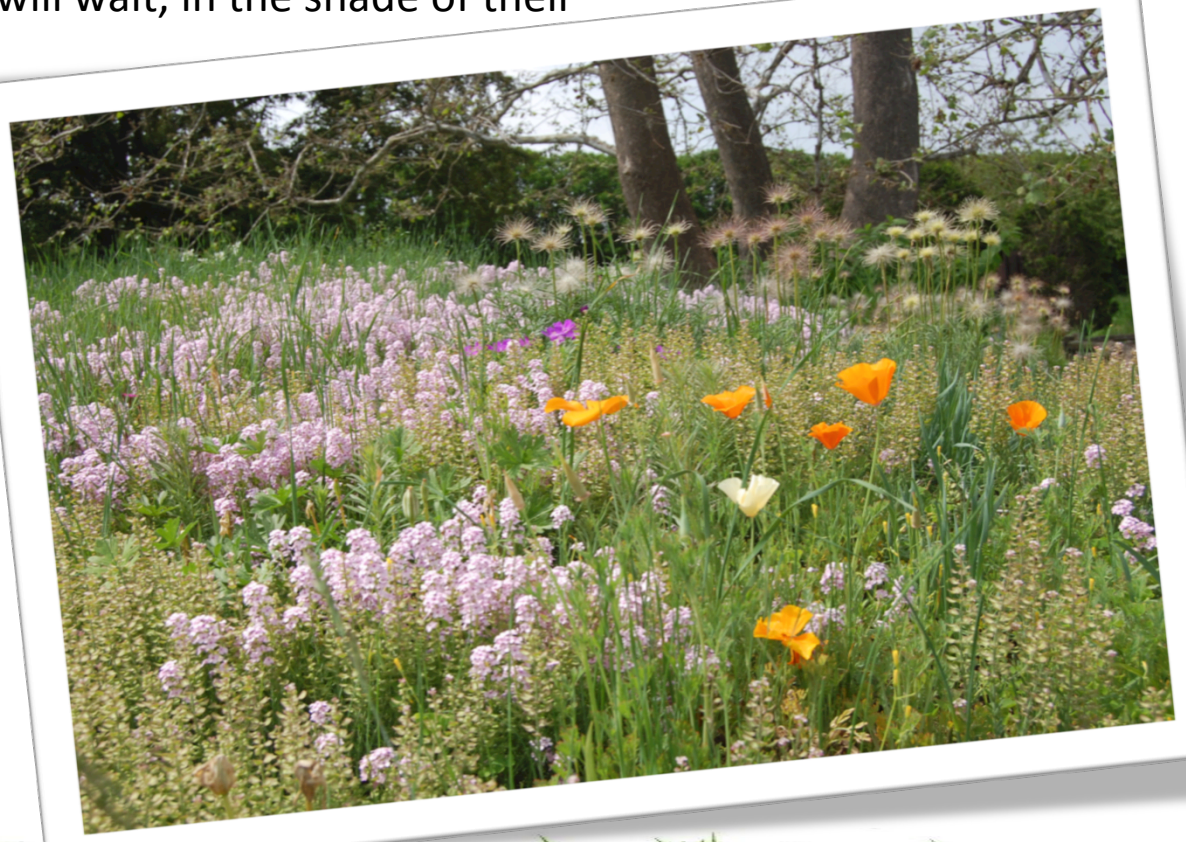
…by dieing!

They leave behind their offspring, dormant in the soil seed bank, to be resurrected by the next spring rains. This might happen the following year, or ten years later.

California is famous for its high diversity of endemic annuals and grasses.

The Native Meadow Garden

- Native annuals and perennial grass species.
- Common inhabitants of Oak Woodlands such as those in Napa County.
- Require no irrigation, soil preparation, fertilizer, or maintenance (maybe trim the bunch grasses every couple of years)
- If it doesn't rain … they will wait, in the shade of their dead, golden parents.



Year-round seasonality of mixed plantings: *Allium* bed April

Same bed in September

visit in person or online

http://arboretum.ucdavis.edu

Get ideas and see examples for creating a low water landscape

Converting to a Low-water Landscape: A "How-to"

Source:
Karrie Reid
Environmental Horticulture Advisor
San Joaquin County

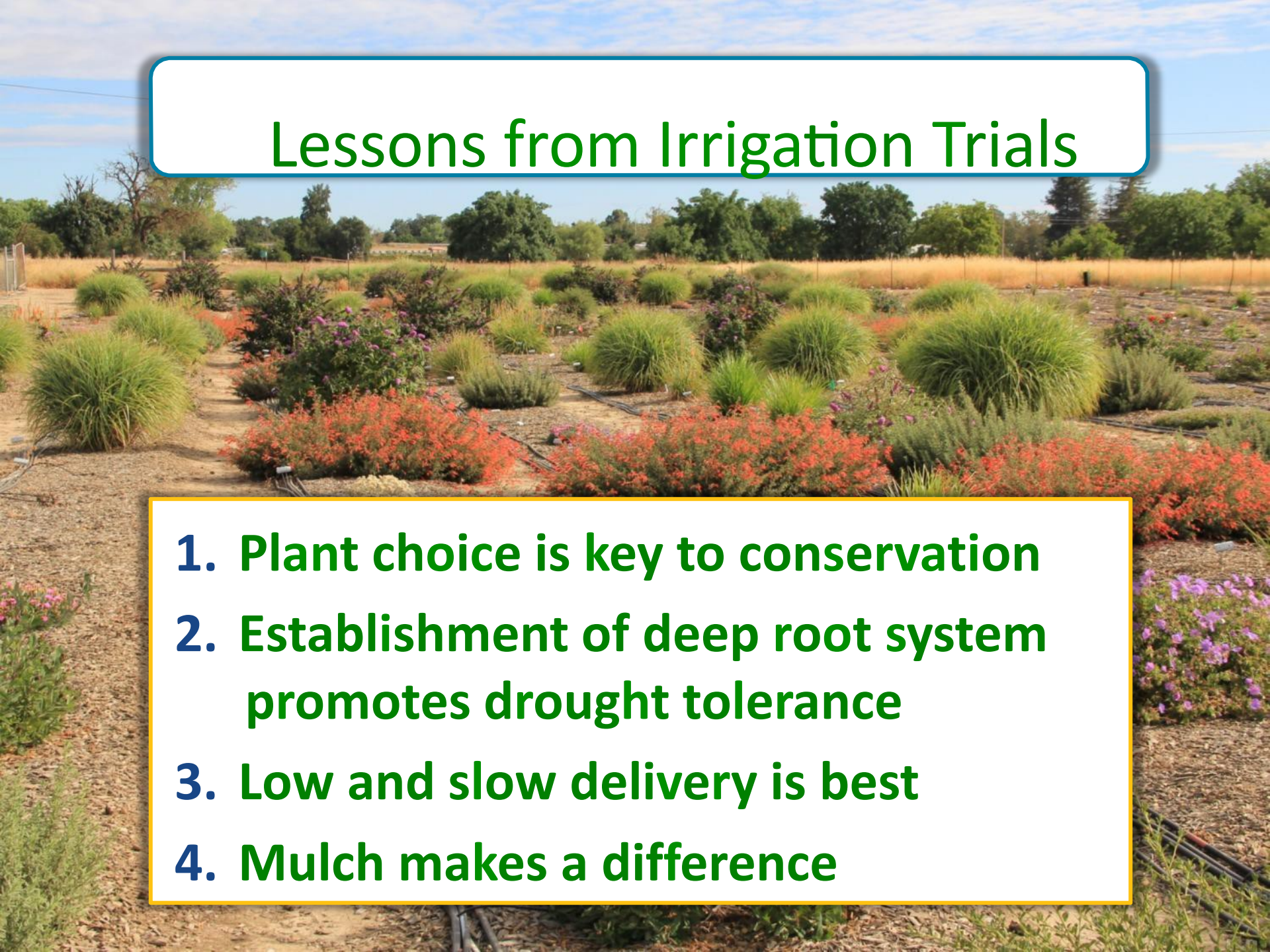
Factors in Landscape Water Use

Features

- Plant choices
- Climate /Microclimate/ Time of Year
- Delivery System

Practices

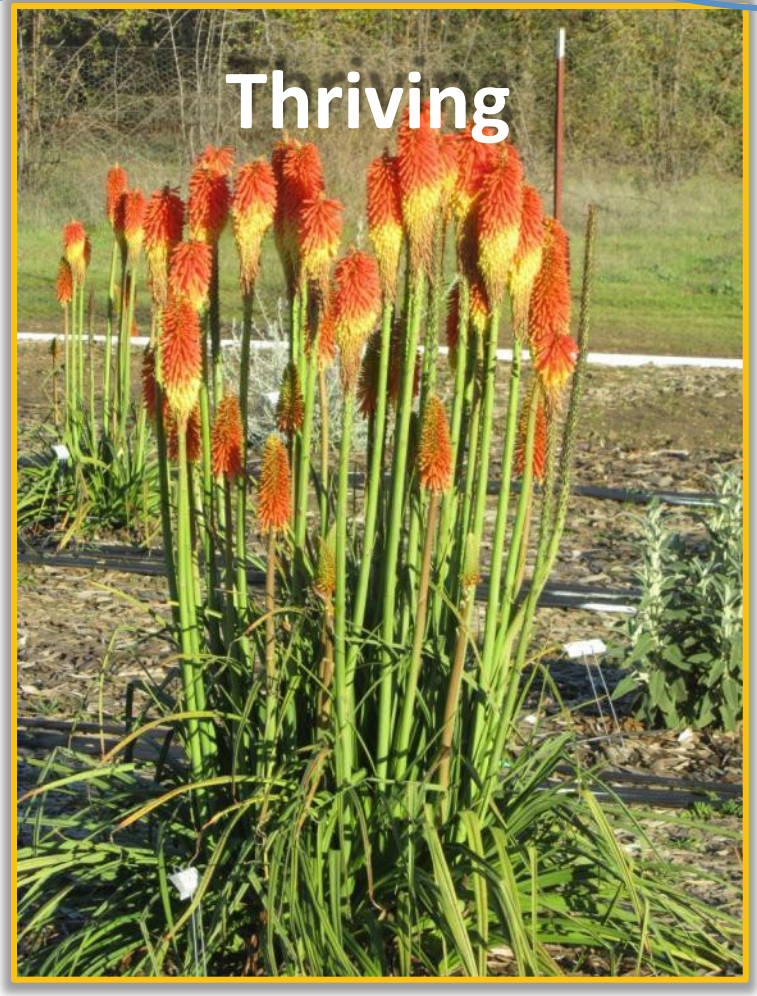
- Establishment
- Scheduling



Lessons from Irrigation Trials

1. **Plant choice is key to conservation**
2. **Establishment of deep root system promotes drought tolerance**
3. **Low and slow delivery is best**
4. **Mulch makes a difference**

Low-water use vs. Drought-tolerant



Steps to Converting Your Landscape

1. Assess your plants
2. Assess your irrigation
3. Make a plan
4. Change/ fix hardscape
5. Install/convert irrigation to most efficient for the space
6. Plant new material

Assess your plants and trees

- **Remove**
  - high maintenance plants
  - high water users
  - anything you don't like

Plants aren't children- it's okay to get rid of them if they don't perform!

- **Build around what you like/looks good**
- **Move plants together with similar water needs**
- ***Make a list of plants you'd like and your empty spaces***

Assess your irrigation

- **Find your valves- what do they water?**
- **Which stations on your controller are assigned to each valve?**
- **Find all sprinkler heads**
- **Find old drip heads**

Converting to In-line Drip

WHERE?

- **Shrub beds, borders, hell-strips**

WHY?

- **Avoid blockage by plants**
- **Most efficient if installed properly**

What is In-line Drip?

- Tubing with internal emitters
- Laid in grid patterns
- Different emitter rates
  - .24, 0.4, 0.6, 0.9 GPH
- Different emitter spacing
  - 12”, 18”, 24”

Planting for Success

- **HYDROZONE**
- **Plant in autumn to take advantage of cooler temps and rain**
- **Closely inspect plants in the nursery for**
  - **Pests/disease signs**
  - **Healthy root systems**
- **Buy small except for slow growers**

Hydrozone!

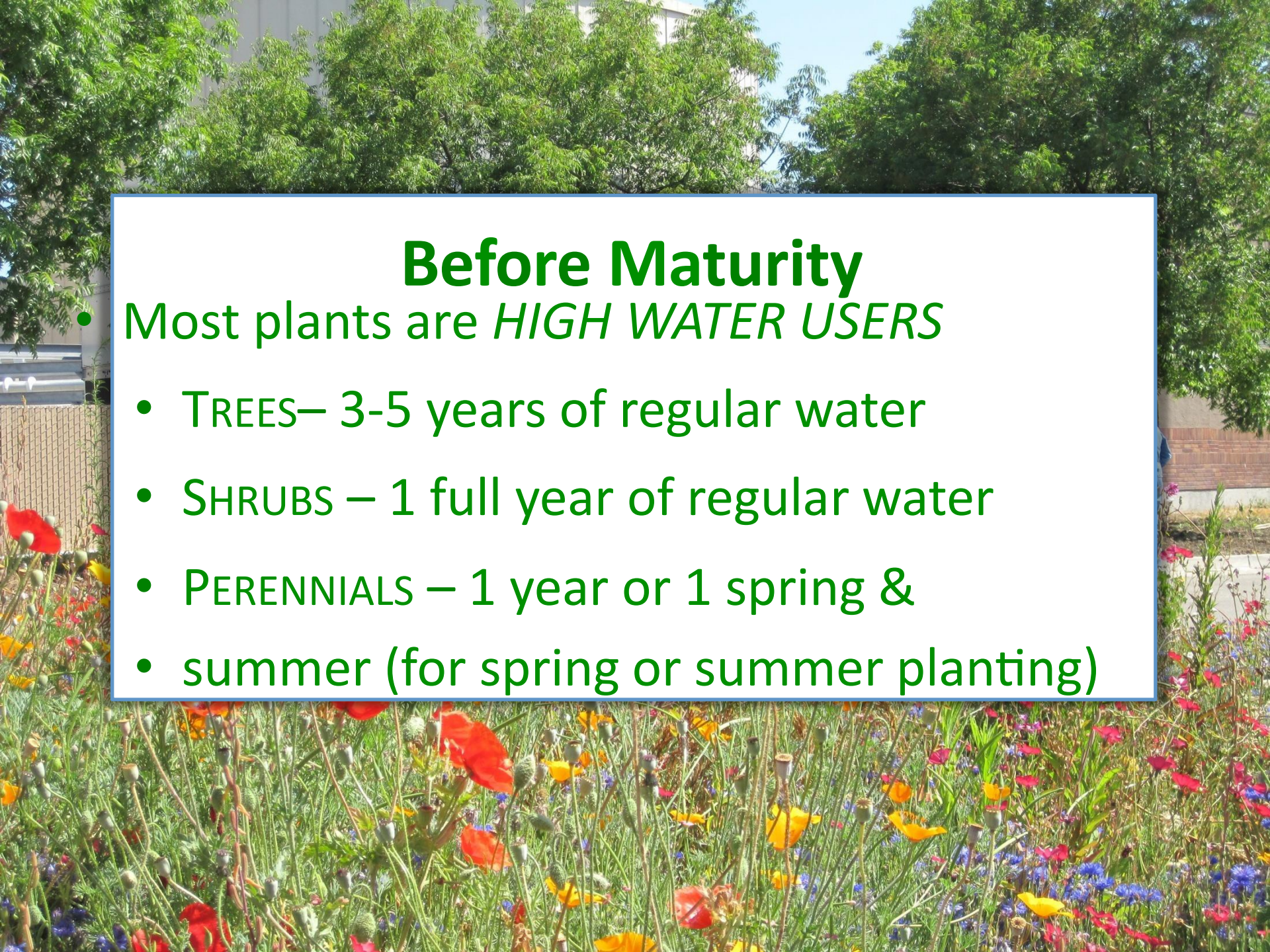
- **Group plants on valves by water needs**
- **Highest water user will always call the shots**

Why Mulch?

- Reduces water-loss to evaporation
- Moderates soil temperature reducing root stress & increasing biological activity
- Reduces runoff
- Increases infiltration by
  - Preventing soil crusting
  - Improving soil texture over time
- NOTE: Sprinklers will need to soak bark to reach soil

Mulch-side benefits

- **Reduces green waste if using own material**
- **Reduces weeds and makes them easier to manage**
- **Tidier landscape appearance**



Before Maturity

- Most plants are *HIGH WATER USERS*
  - TREES– 3-5 years of regular water
  - SHRUBS – 1 full year of regular water
  - PERENNIALS – 1 year or 1 spring &
  - summer (for spring or summer planting)

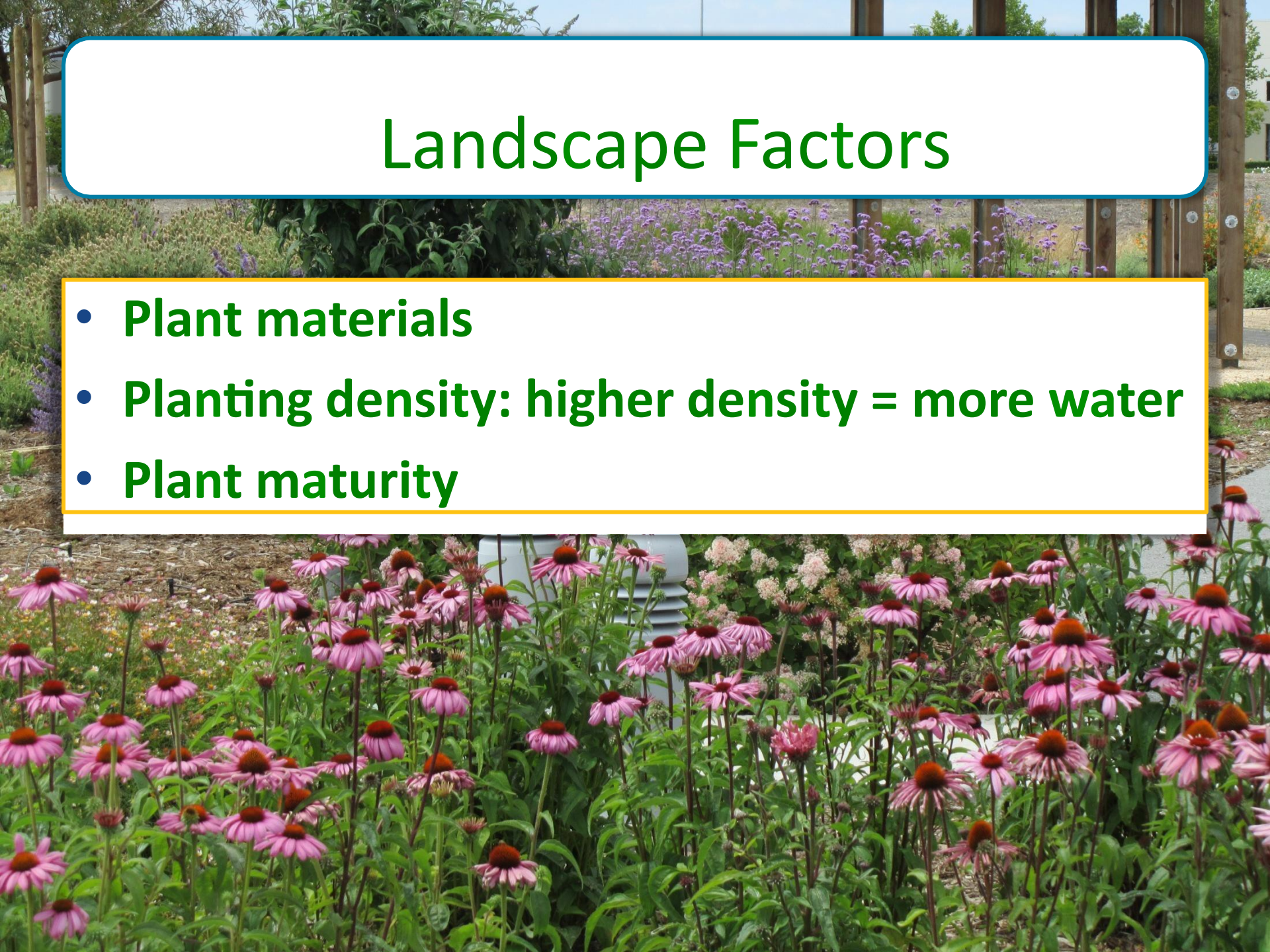
RULE OF THUMB

New plantings - *frequent water* until roots have grown into surrounding soil

- **SUMMER – every 2 or 3 days**
- **SPRING/FALL – 1X/wk (depending on rainfall)**

Landscape Factors

- **Plant materials**
- **Planting density: higher density = more water**
- **Plant maturity**




Questions?

University of California Cooperative Extension
UC MASTER GARDENERS OF NAPA COUNTY

Need more Information?

Call the **Help Desk**: 707-253-4143
Volunteers are standing by… (MWF 9am-12pm)

E-mail: mastergardeners@countyofnapa.org

Online: http://ucanr.edu/sites/ucmgnapa

Or visit the Master Gardeners at the Napa Farmers Markets

Upcoming Drought-related Workshops

June 13th, 9:30 am: **Irrigation Update for Drought** UCCE Meeting Room

June 14th, 2:00 pm: **Adapting to Drought (repeat of today)** Yountville

June 20th, 3:00 pm: Succulent Swap – Napa Library

July 11th, 2:00 pm: Growing Flowers during Drought – MidCity Nursery

1 August: Drought tolerant & native plants – Skyline Park

Other Future UCMGNC Events:

Trees of Napa Book Release – Napa Library – June 20th, 6:30pm

Garden Tour – September 13th