The New California Landscape

Planning for Low Water Use

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A note about today

- This presentation is an introduction to many topics
- If you're interested in something here, think of this as a starting point to delve into a topic you enjoy: become the expert
- If you like technology (esp. controllers) be aware that it will change quickly
- This Powerpoint is posted on line at: http://ucanr.edu/NorthBayWater

Three main players

HARDSCAPE

Driveway
Pathways
Patios
Dry river beds
Sandbox/ Play areas
(Structures: Houses/barns)

IRRIGATION SYSTEMS

Controller
Stations/Valves
Delivery type
- •Drip
- •Bubblers
- •Sprays

PLANTS

Trees
Shrubs
Perennials
Groundcovers
SERVICES
Shade/cooling
Decoration
Play surface
Food for wildlife

HARDSCAPE

- **Reduce planted area: reduce water use!**
- **SIDE EFFECTS:**
  - **In sun: raised temps**
  - **If impervious- rain runoff (capture it?)**

HARDSCAPE

- Use permeable material
  - Pervious concrete
  - Pavers with sand between
  - Rock (crushed like DG)
  - Walk-on bark
- Use permeable landscape fabric base

Pervious/permeable concrete

HARDSCAPE

For IMPERMEABLE surfaces:

- **Grade for drainage to planted areas**
- **Cut slots to slow sheet runoff**

Retain water on your property in wet season –

•increase soil reserve for later

•allow for deep percolation to replenish water table

RAINWATER COLLECTION

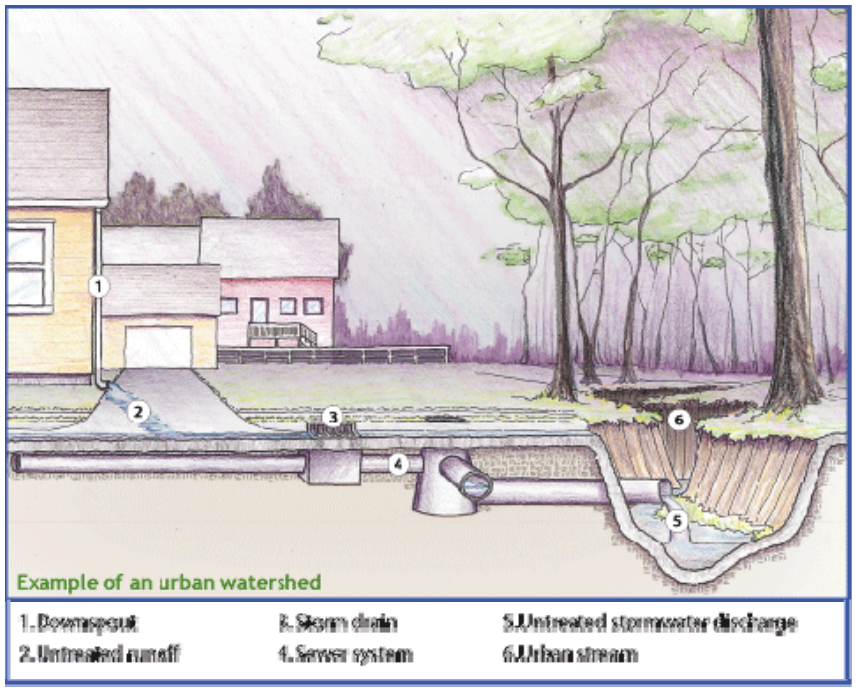
- **Not a total solution in CA climates**
- **May defer spring irrigation**
- **Some creative solutions are available; e.g. pools to cisterns**

8 Principles of Successful Rainwater Harvesting

borrowed from Brad Lancaster

Rainwater Harvesting for Drylands and Beyond Vol. 1

1. **Thoughtful observation**
2. **Start at the top of your watershed and work your way down**
3. **Start small & simple**
4. **Spread and infiltrate the flow of water**



Example of an urban watershed

1. Downspout
2. Untreated runoff
3. Storm drain
4. Sewer system
5. Untreated stormwater discharge
6. Urban stream

8 Principles of Successful Rainwater Harvesting

borrowed from Brad Lancaster

Rainwater Harvesting for Drylands and Beyond

5. **Plan an overflow & manage as a resource**
6. **Maximize living and organic groundcover**
7. **“Stack functions” e.g. berms as paths, veg as cooling, drive as catchment**
8. **Continually reassess**

Downspout to flower garden

Downspout to Barrel

Vegetated Swales

- **DEFINITION:**
  shallow landscaped areas designed to capture, convey, and potentially infiltrate stormwater runoff as it moves downstream.

IRRIGATION SYSTEMS

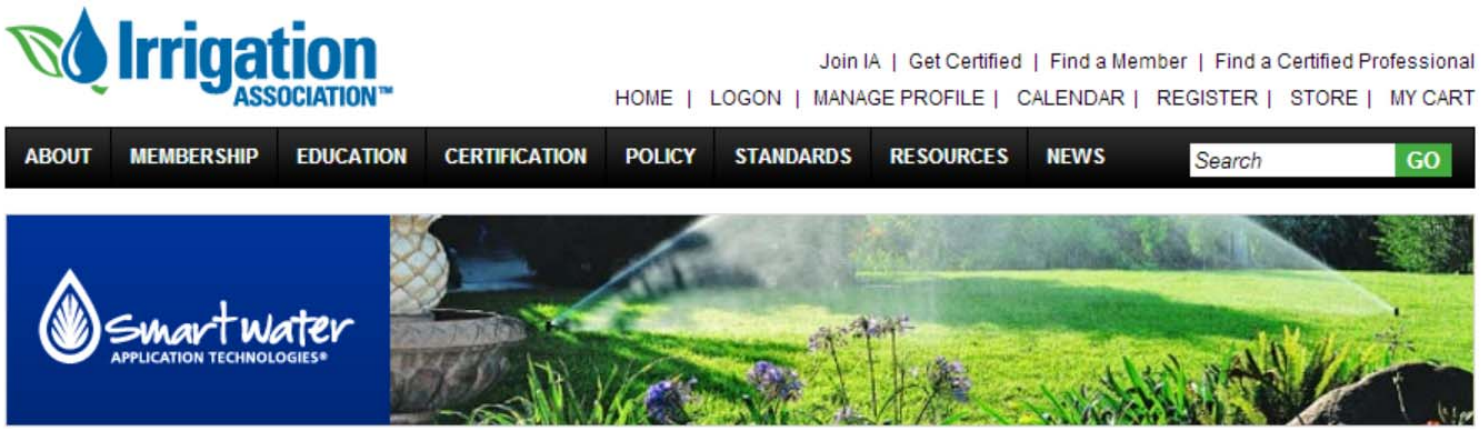
- **Start with CONTROLLERS**
  - **Learn to program it!**
  - **Utilize multiple start times**
  - **Install rain shut-off**

Controller Types

- Time
- Weather (ET)
  - Uses weather information to estimate landscape water use (CIMIS/local)
  - Adjusts irrigation program to replace water used by landscape

Controller Types

- Time
- Weather (ET)
- Soil moisture
  - Uses sensors to measure water content of the soil
  - Allows irrigation when soil is dry



http://www.irrigation.org/SWAT/swat.aspx?id=298

Tree Ring Irrigation Contraption (TRIC)

- **Developed to irrigate trees during drought conditions, mainly where other landscape irrigation is turned off.**
- **Designed for applying water to significant depths.**

http://ccuh.ucdavis.edu/public/drought/tree-ring-irrigation-contraption-tric-1/tree-ring-irrigation-contraption-tric

Know your soil! Know your system!

- **Don’t apply faster than your soil can absorb**
- **Even drip systems can produce runoff if**

  APPLICATION RATE > INFILTRATION RATE

IRRIGATION SYSTEMS

Use the most efficient delivery system for each zone

- **DRIP**
  - **Shrubs**
  - **Trees**
  - **Perennial beds/borders**
  - **Vegetables**
  - **Groundcovers**

IRRIGATION SYSTEMS

- **ROTARY STREAMS**
  - **Turf**
  - **Some groundcovers**
  - **Some dense shrubs**

IRRIGATION SCHEDULING

- **Use available resources and create a monthly schedule**
- **Differ by valves**
  - **Plants**
  - **Delivery rate of system**
- **Post by controller**

You may have to adjust for drought

Sample Schedule

VALVE	April	May	June	July	Aug	Sept	Oct
1	12	15	20	22	20	15	11
2	5	7	10	11	9	8	4
3	10	11	12	13	12	11	9
4	30	45	60	75	70	45	30

Long run times may mean multiple start times!

A Word about Graywater

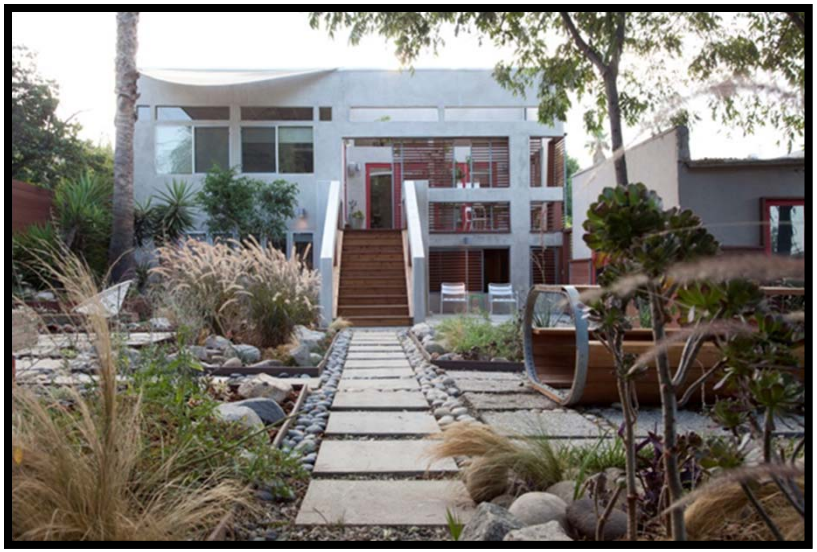
- **Health and Safety Code § 17922.12, "untreated wastewater that has not been contaminated by any toilet discharge, has not been affected by infectious, contaminated, or unhealthy bodily wastes, and does not present a threat from contamination by unhealthful processing, manufacturing, or operating wastes. ..includes, but is not limited to, wastewater from *bathtubs, showers, bathroom washbasins, clothes washing machines, and laundry tubs*, but *does not include wastewater from kitchen sinks or dishwashers*."**

GRAYWATER

Emerging as part of the landscape solution

Complex systems – high volume (>250G/day)

- **Multiple drains, plumbed from inside**
- **Multiple houses or units**
- **Require building permits**

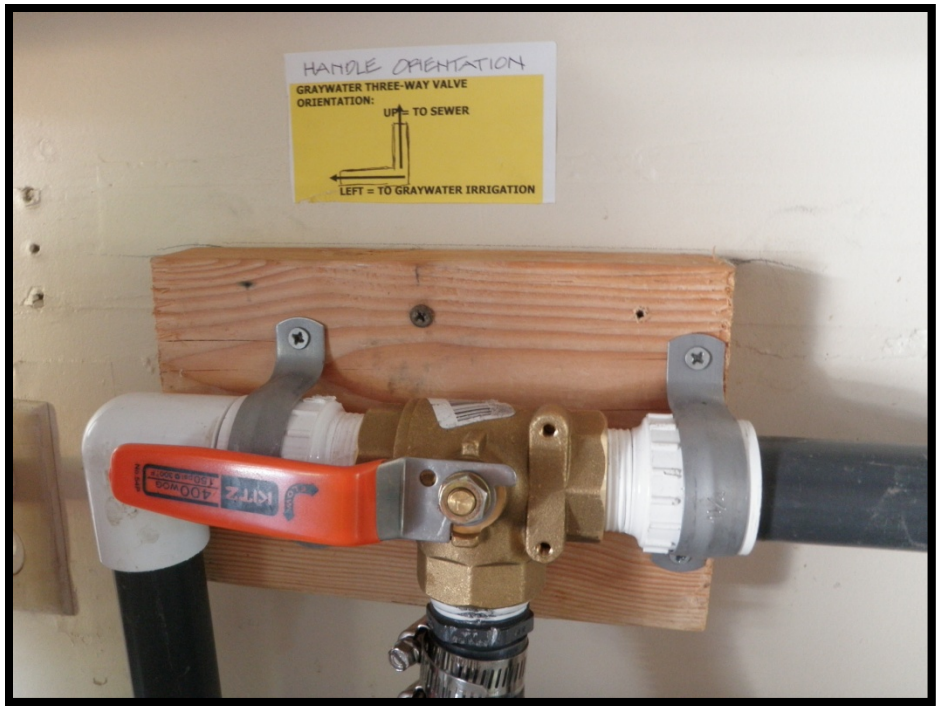


Source: Sunset.com

GRAYWATER

Simple systems – low volume (<250G/day)

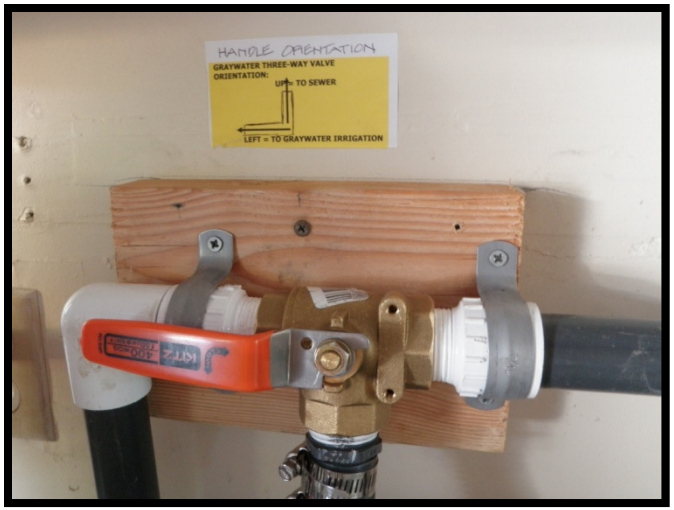
- **Single or 2/family units**
- **Retrofitted from laundry to landscape**
- **May not require permits**



3-way valve for laundry waste water

GRAYWATER

SOME BENEFITS



- reduced potable water to landscapes
- reduced energy load required for pumping and treating potable water
- a sustainable, steady, and reliable water source in areas of the state with low rainfall

GRAYWATER

SOME RISKS

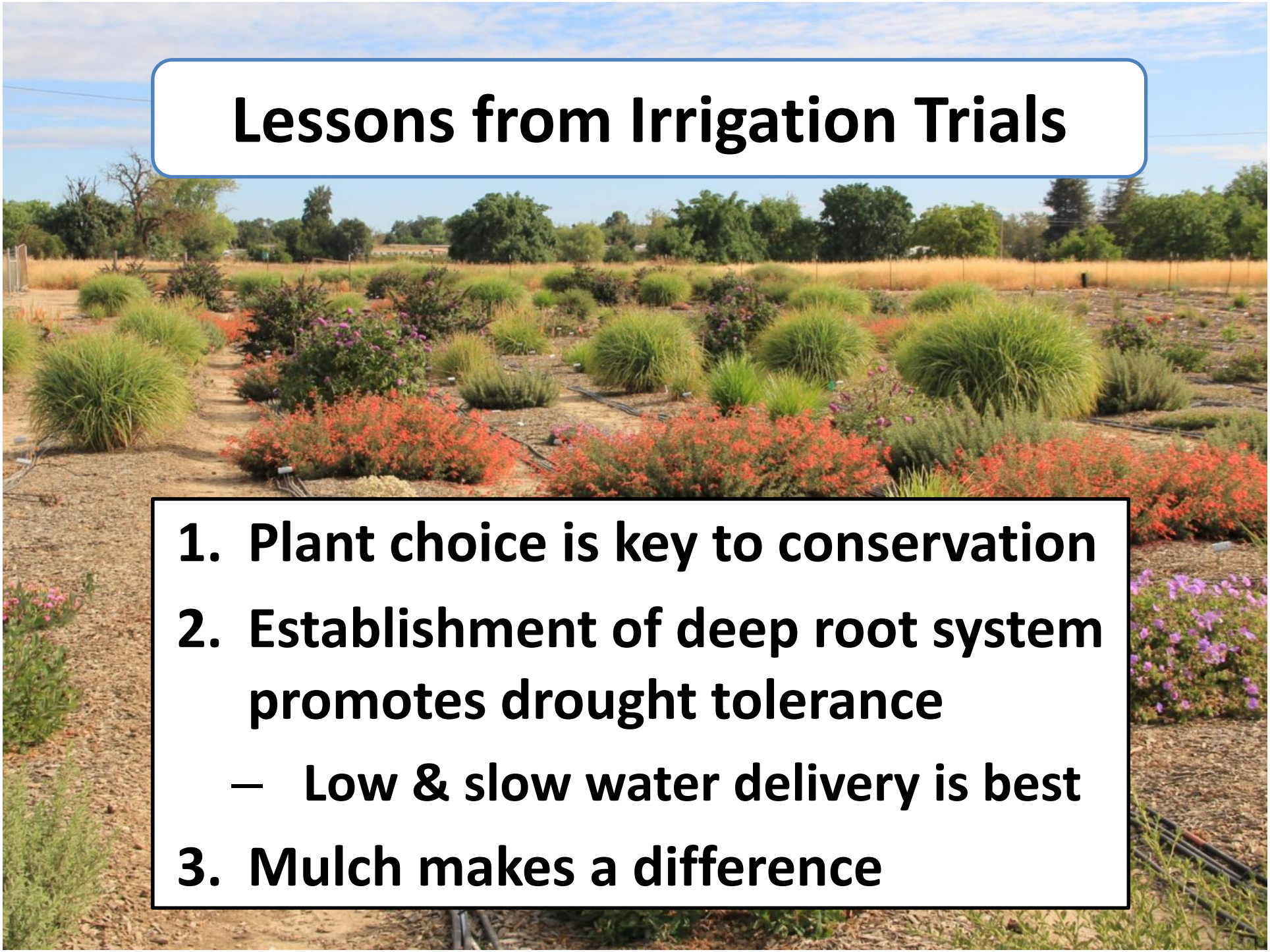
- **May cause salt build-up and plant damage**
  - *special cleaning products must be used*
- **if used with drip, filtration will be *required***
- **may not be used for food plants**
- **should not be used on lawns or groundcovers**
- **direct human/animal contact poses health risks**

GRAYWATER

Do your homework!

- **For workshops:**
  - http://greywateraction.org/business-directory/
- **For design manual:**
  - http://sfwater.org/modules/showdocument.aspx?documentid=55
- **For design and install ideas and information:**
  - oasisdesign.net

Look up regulations for your area!

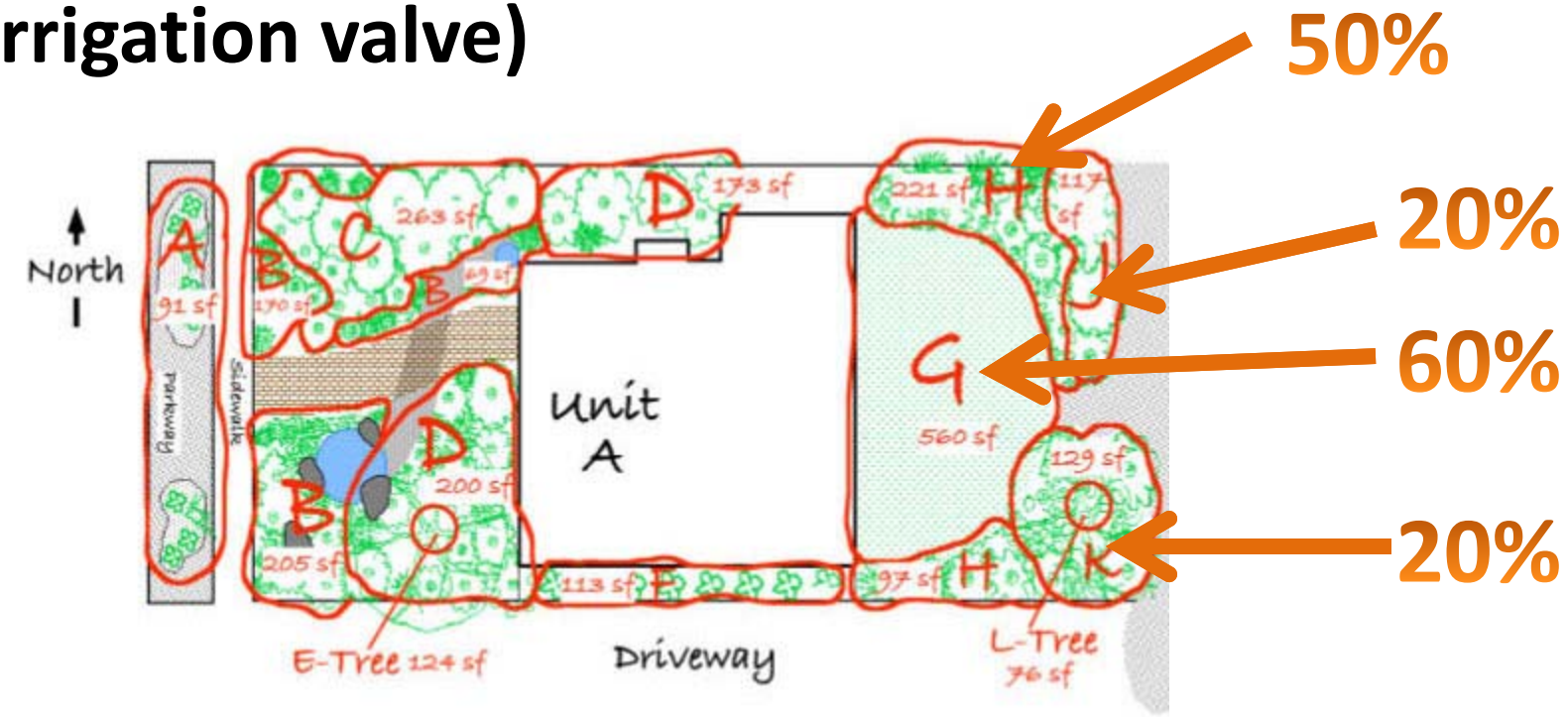


Lessons from Irrigation Trials

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

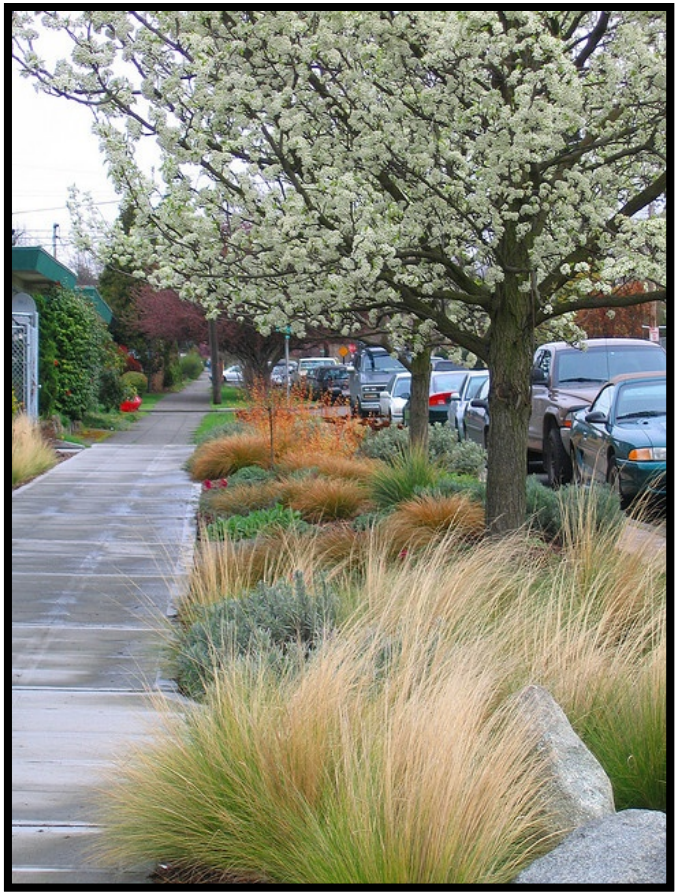
LOW-WATER PLANTING STEP 1

- **HYDROZONING**
  - **Placing plants with similar water needs and sun exposure together (on the same irrigation valve)**



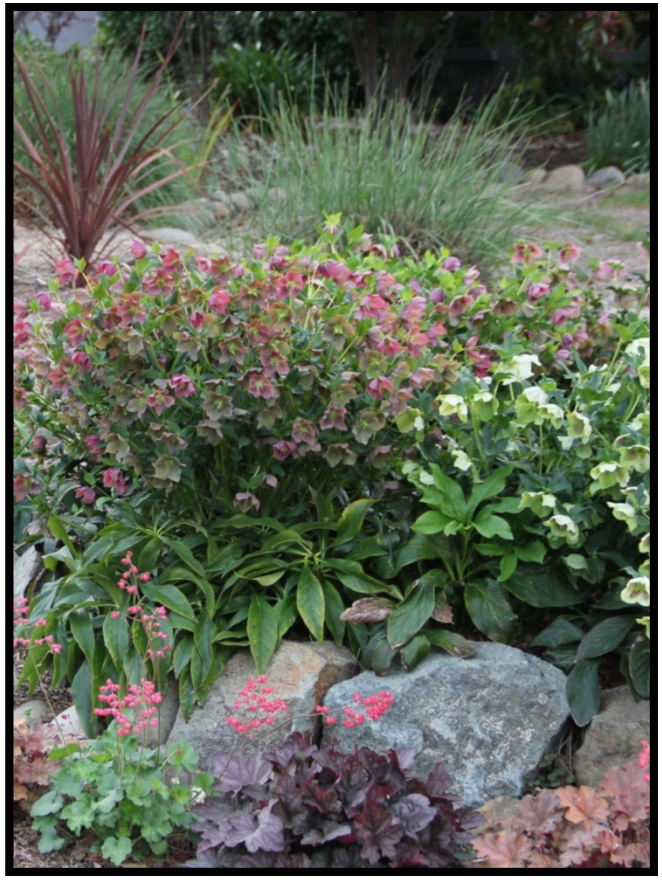
Steps to Converting to Low Water Use

1. Assess your plants
2. Assess your irrigation
3. Assess your soil
4. Make a plan
5. Remove unwanted hardscape & plants



Steps to Converting to Low Water Use

6. Amend soil with good compost if needed
7. Install/convert irrigation to most efficient for the space
8. Plant new material
9. Cover bare soil and lines with organic mulch



Assess existing 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 existing irrigation

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

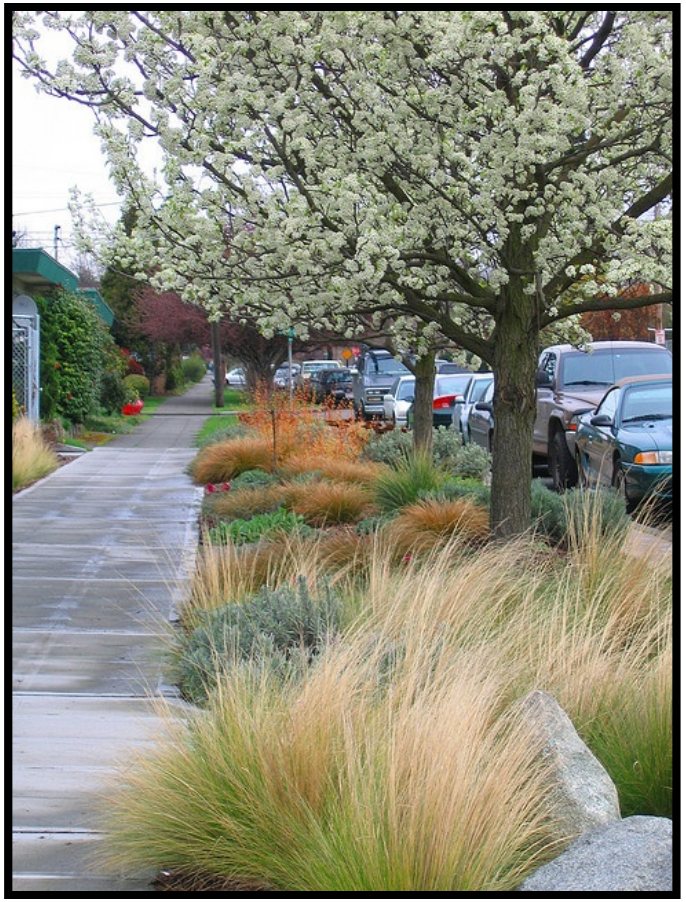
Using In-line Drip

WHERE?

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

WHY?

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



What is In-line Drip?

Total allowable line length is based on your water pressure- *CHECK IT!*

- **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”**

Plants in the New CA Landscape

Planning your Plants

Plan A

You know what you want

1. Make your list
2. Look up water needs on WUCOLS
3. Group plants by water needs
4. Shop and plant

Plan B

You want to find plants

1. Decide types of plants you need
2. Use WUCOLS to generate list by type and water need
3. Narrow the list down
4. Shop and plant

http://ucanr.edu/sites/WUCOLS/

The Water Use Classification of Landscape Species

(2-Minute Demo)

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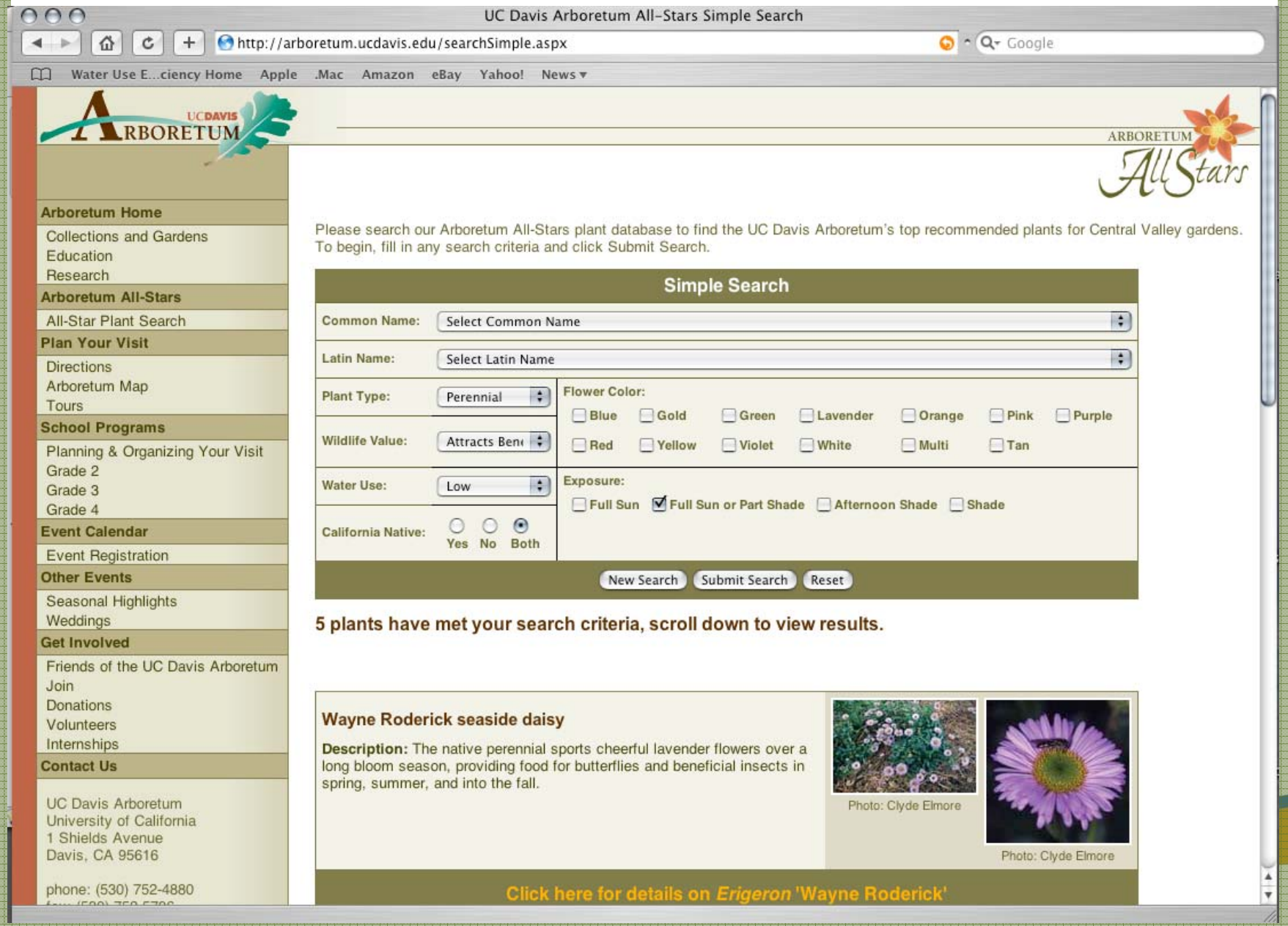
CCUH
CALIFORNIA CENTER FOR URBAN HORTICULTURE
UCDAVIS



UC DAVIS ARBORETUM *All Stars*

For more information, visit
http://arboretum.ucdavis.edu/

All-Stars Simple Search



Low and Moderate Water Plants

- Many (but not all) California natives
- Plants from other Mediterranean climates
- Some surprises from non-Mediterranean areas (especially in shade)
  - *Daphne odora* 'Aureomarginata'
  - *Camellia japonica*
  - *Pittosporum tobira & P. undulatum*

Drought Mechanisms

- **Avoidance**
  - Flood tolerant
  - Drought deciduous
  - Deep rooted
- **Tolerance**
  - Turgor maintenance
  - Protective tissues / enzymes
- **Efficiency (Xeriphytes, xerophytes)**
  - Maintain growth under dry conditions

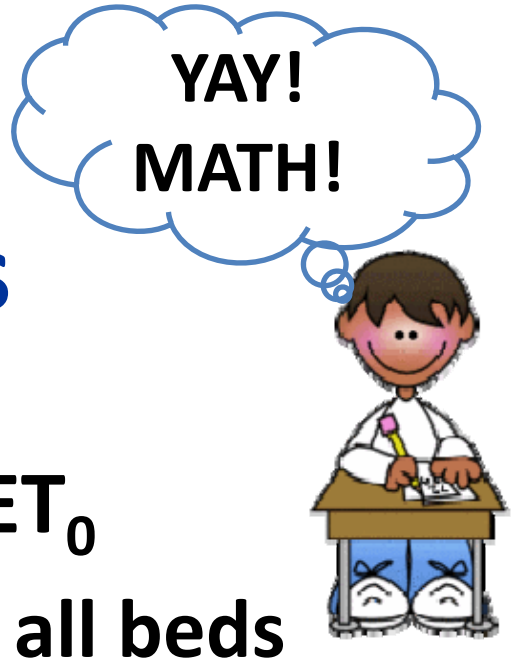
Low-water use vs. Drought-tolerant

Water-efficient characteristics

- **Leaves that are:**
  - **Thick and/or waxy**
  - **Pale, gray, or blue-green**
  - **Tough and/or small**
  - **Fuzzy**
  - **Highly textured**

Water-efficient characteristics

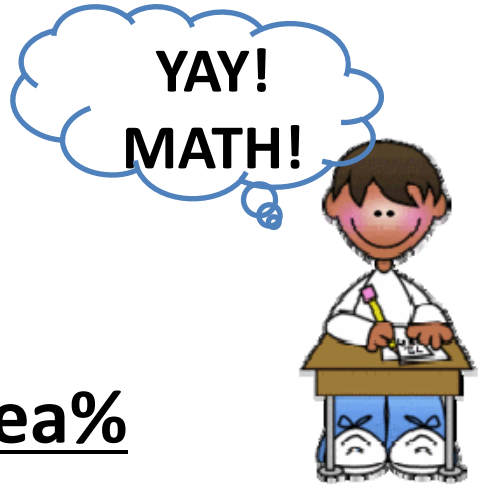
- **Winter/early spring bloomers**
- **Many bulbs**



Balance your Beds

- **Total landscape goal of 50% ET_0**
  1. **Measure square footage of all beds**
  2. **Divide ft^2 of each bed by total – Area%**
  3. **Multiply each Area% by its ET_0% - Use%**
  4. **Add up all Use% - equal to 50% or less**

Balance your Beds



		Area%	
• Bed A =	137 ft^2	• A =	.137
• Bed B =	53 ft^2	• B =	.053
• Lawn =	400 ft^2	• Lawn =	.400
• Vegetables =	160 ft^2	• Veg =	.160
• Bed C =	250 ft^2	• C =	.250
Total=	1000		

Balance your Beds

Area% x ET_0% - (cool season turf ex.)

- A = .137 x .10 = .014
- B = .053 x .10 = .005
- Lawn = .400 x 0.8 = .32 – 3/5 of my budget!
- Veg = .160 x 1.0 = .16
- C = .250 x .10 = .025

Target = .50

Actual: .524

Balance your Beds

Area% x ET_0%- (reduced turf/warm season)

- A = .137 x .50 = .0685
- B = .253 x .20 = .05
- Lawn = .200 x 0.6 = .12
- Veg = .160 x 1.0 = .16
- C = .250 x .40 = .100

Target = .50

Actual: .4985!

- Reduce the lawn by half- use warm season type
- Add the area to a LOW water area
- Balance with more moderate areas

The New California Landscape – Beyond Xeri-scaping

Lowering Your Water Needs

- **Reduce the amount of turf**
  - **Eliminate all non-amenity turf**
  - **Use low-water groundcovers for green swaths**

Turf Alternatives

- Evergreen groundcovers
- Planted pavers

Kurapia

The Meadow Look


Low Water Use

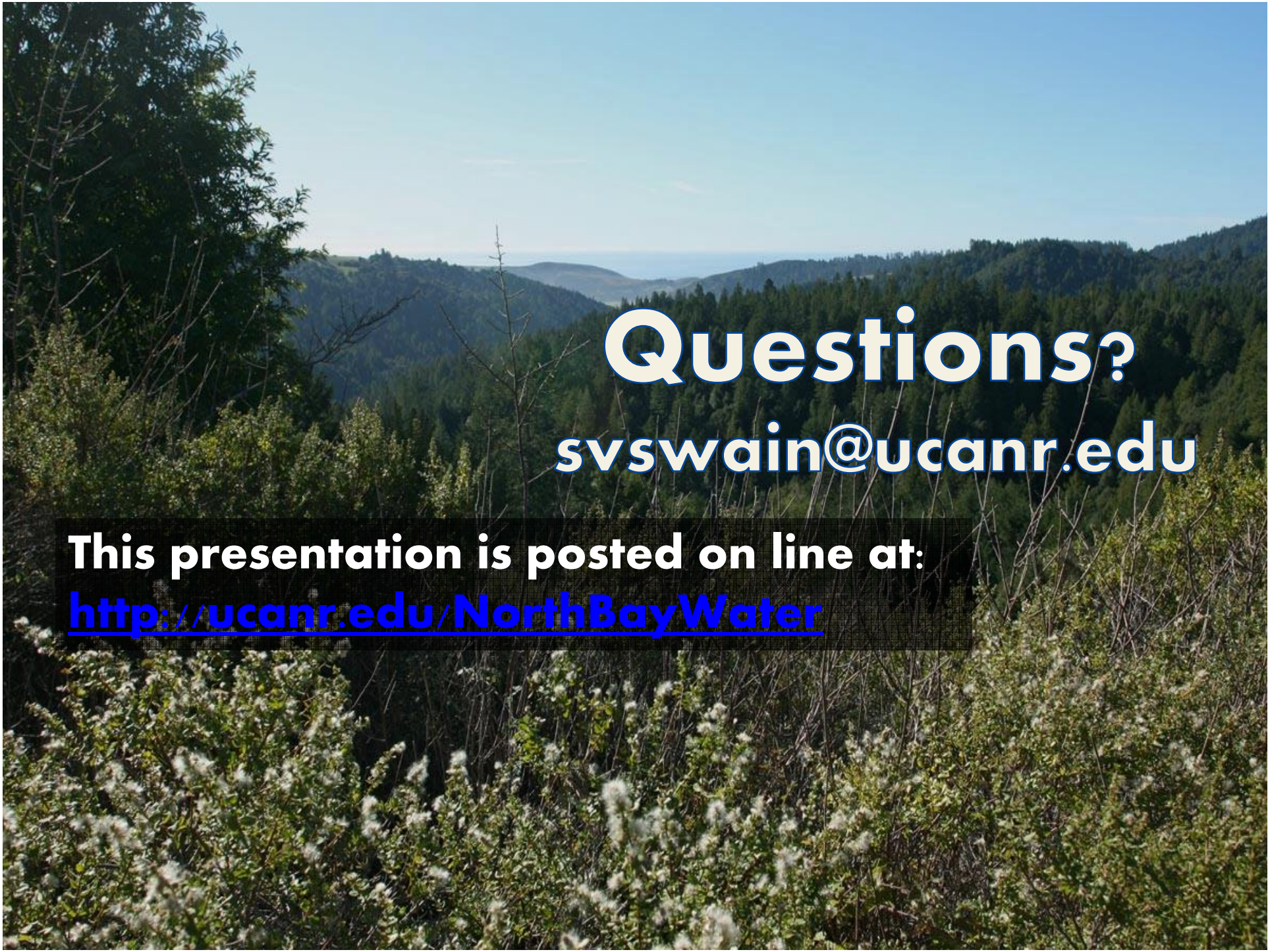

Low Water Use


Moderate Water Use


Low Water Use


Low Water Use

You don’t have to settle for rocks and cactus!


Questions?
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