

The New California Landscape

Planning for Low Water Use



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A note about this presentation

- This 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 stream 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**

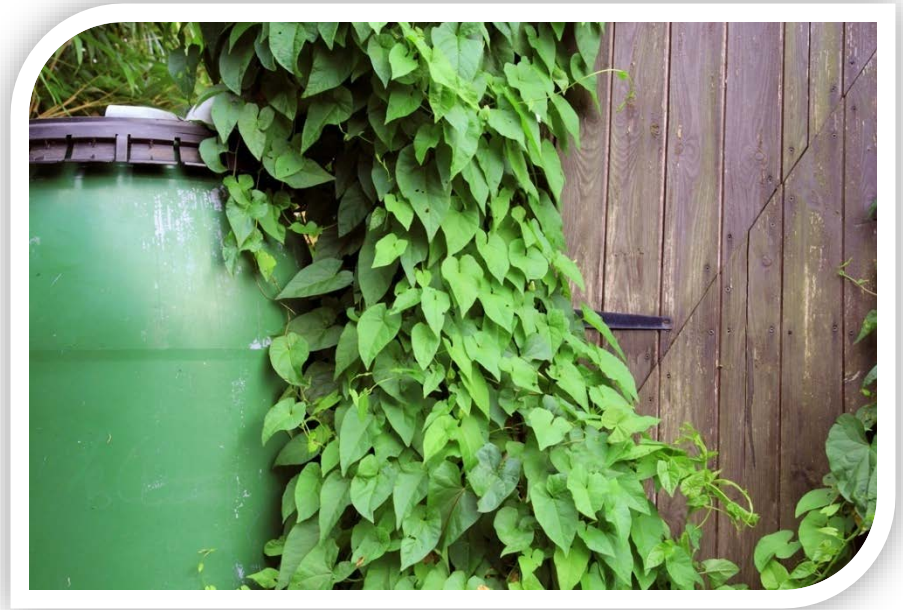


Retain water on your property in wet season –

- **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

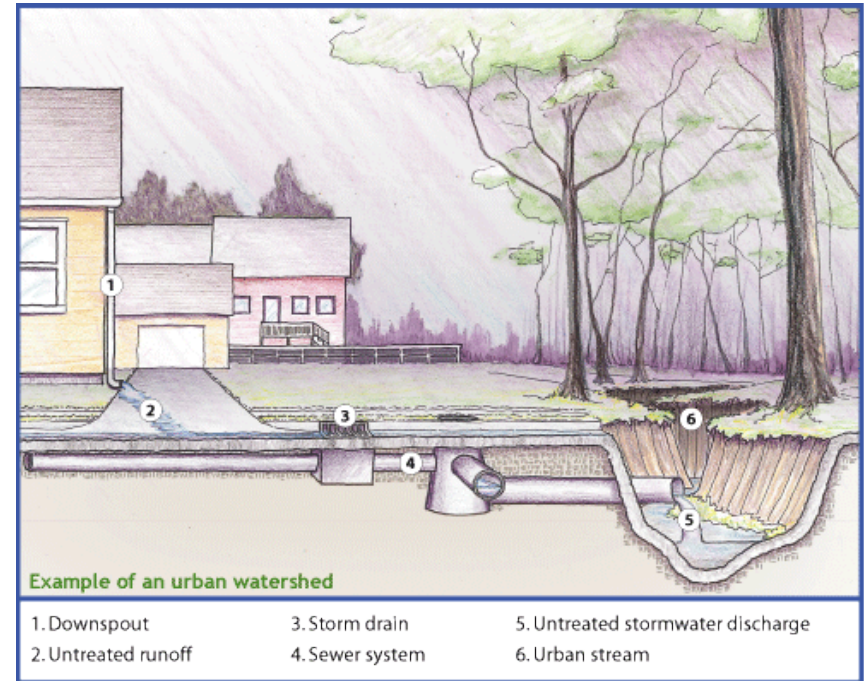


8 Principles of Successful Rainwater Harvesting

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



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





Home > SWAT > Tested Products

SWAT

Overview

About SWAT

Tested Products

Climate-Based
Controllers

Sensor-Based
Controllers

Rain Sensors

Testing Protocols

Case Studies

Stakeholders

Tested Products

Controllers, [Climate-Based](#)

Controllers, [Sensor-Based](#)

[Rain Sensors](#)

<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)

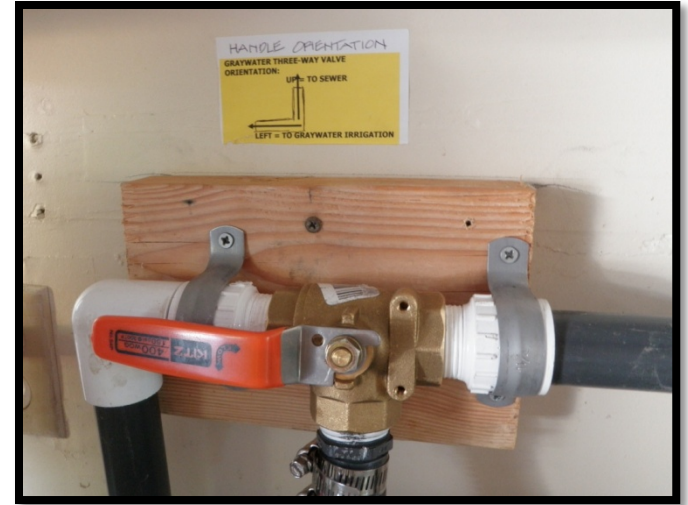
- **Single or 2/family units**
- **Retrofitted from laundry to landscape**
- **May not require permits**



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

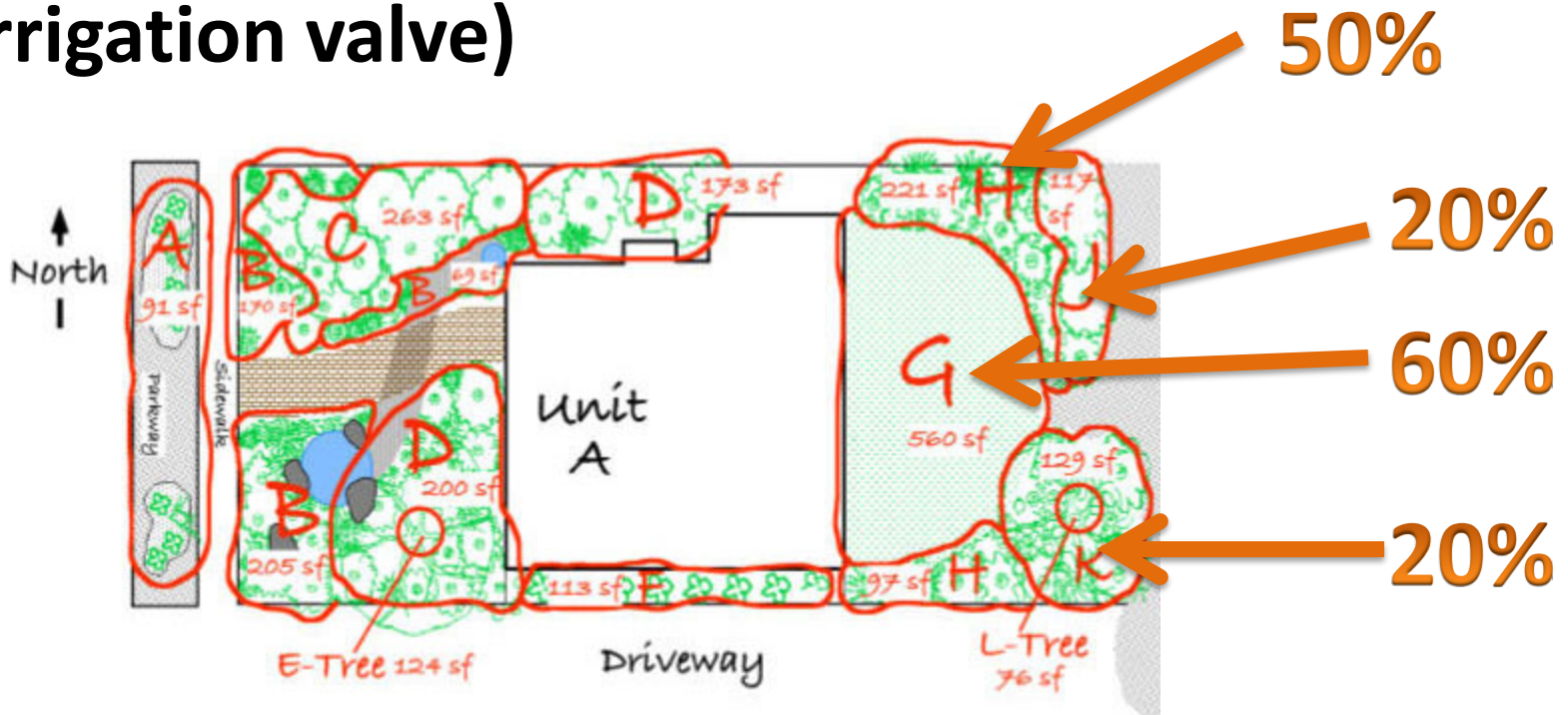
A photograph of an irrigation trial field. The field is filled with various plants, including clumps of tall green grasses, purple flowers, and orange flowers. Black drip irrigation lines are visible on the ground, running through the plants. The background shows a line of trees under a blue sky with light clouds.

- 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)



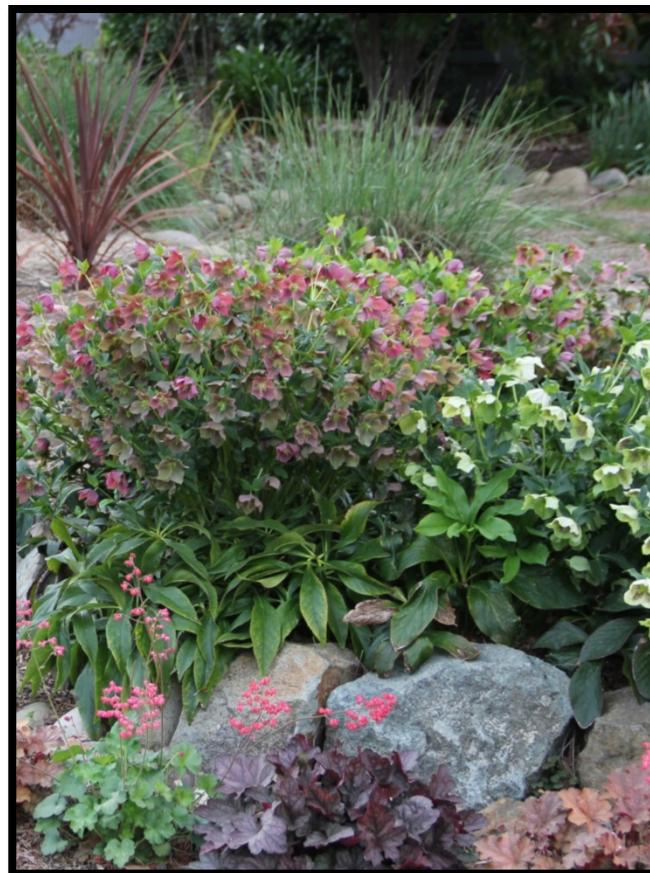
Steps to Converting to Low Water Use

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
- **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***

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

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

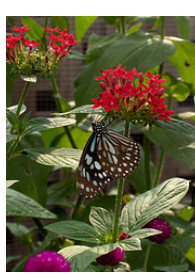
1. Decide types of plants you need
2. Use WUCOLS to generate list by type and water need
3. Narrow the list down
4. Shop and plant

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

The Water Use Classification of
Landscape Species
(2-Minute Demo)



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ARBORETUM



All Stars



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

All-Stars Simple Search

UC Davis Arboretum All-Stars Simple Search

http://arboretum.ucdavis.edu/searchSimple.aspx

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UC DAVIS ARBORETUM

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Event Registration

Other Events
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Contact Us
UC Davis Arboretum
University of California
1 Shields Avenue
Davis, CA 95616
phone: (530) 752-4880
fax: (530) 752-5300

Please search our Arboretum All-Stars plant database to find the UC Davis Arboretum's top recommended plants for Central Valley gardens. To begin, fill in any search criteria and click Submit Search.

Simple Search

Common Name:

Latin Name:

Plant Type:

Flower Color:
 Blue Gold Green Lavender Orange Pink Purple
 Red Yellow Violet White Multi Tan

Wildlife Value:

Water Use:

Exposure:
 Full Sun Full Sun or Part Shade Afternoon Shade Shade

California Native: Yes No Both

5 plants have met your search criteria, scroll down to view results.

Wayne Roderick seaside daisy

Description: The native perennial sports cheerful lavender flowers over a long bloom season, providing food for butterflies and beneficial insects in spring, summer, and into the fall.




Photo: Clyde Elmore




Photo: Clyde Elmore

[Click here for details on Erigeron 'Wayne Roderick'](#)

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



UC Statewide IPM Project
© 2000 Regents, University of California

Low-water use vs. Drought-tolerant

Thriving



Surviving



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



**YAY!
MATH!**

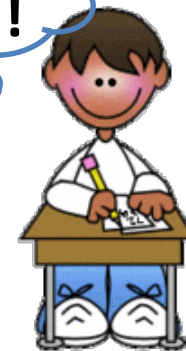
Balance your Beds



- **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

YAY!
MATH!



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 = | <u>250 ft²</u> | • C = | .250 |
| Total= | 1000 | | |

Balance your Beds

Area% x ET₀% - (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 ET₀%- (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

Delta Grassland Mix™
A Blend of Native Grasses
Ideal for Low Maintenance Lawns

 Producers and Installers of
Premium Peat Grown Sod
Grows on Degradable Mulch

Native Mow Free™

- Western Mokolunne Fescue - *Festuca occidentalis*
- Idaho Fescue - *Festuca idahoensis*
- Molate Fescue - *Festuca rubra*

Low Water Use



Low Water Use



Moderate Water Use



Low Water Use

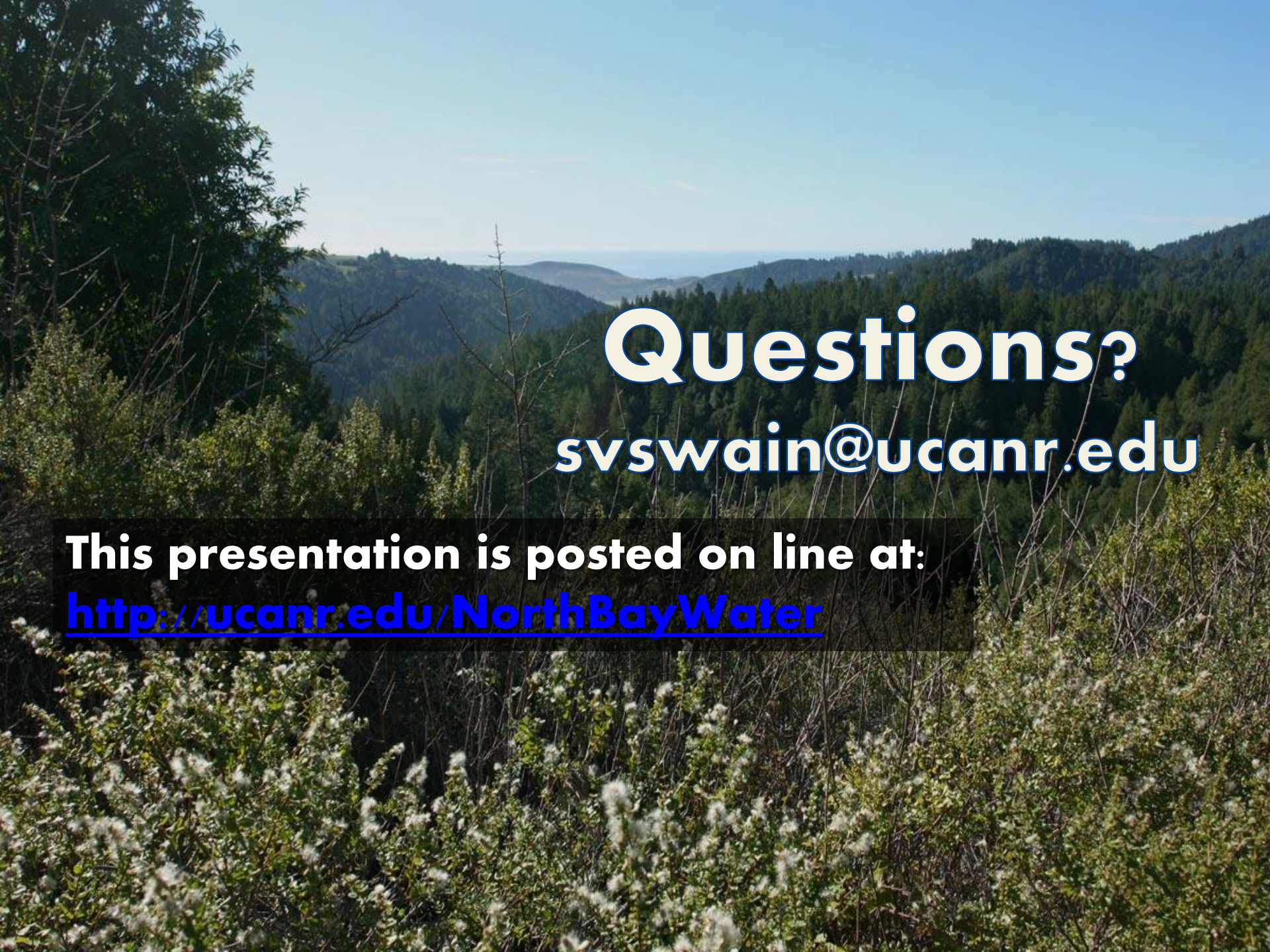


Low Water Use



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





Questions?
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<http://ucanr.edu/NorthBayWater>