Watering Your Landscape

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Presentation available at:  http://ucanr.org/schwankl
Precipitation for Fresno

Rainfall - Fresno, CA
2013-2014 vs. Average

Cumulative Rainfall - Fresno, CA
2013-2014 vs. Average
Landscape Irrigation:

What Determines Water Use in a Landscape?
Landscape Irrigation:

What Determines Water Use in a Landscape?

1. Growing environment
   - Climate - hot, cool, dry, humid, cloudy, windy
Landscape Irrigation:

What Determines Water Use in a Landscape?

1. Growing environment
   - Climate - hot, cool, dry, humid, cloudy, windy
   - Plant exposure - sun, shade
Landscape Irrigation:

What Determines Water Use in a Landscape?

1. Growing environment
   - Climate - hot, cool, dry, humid, cloudy, windy
   - Plant exposure - sun, shade
   - Surroundings - other plants, hardscape
Landscape Irrigation:

What Determines Water Use in a Landscape?

1. Growing environment
2. Types of plants
   - Trees
Landscape Irrigation:

What Determines Water Use in a Landscape?

1. Growing environment
2. Types of plants
   - Trees - on a canopy area basis, they *can* use significantly more than turfgrass.
Plant Water Use:

- Measure evapotranspiration (ET).

Evaporation from the soil + Transpiration from the plant
Where do you get ET estimates?
Historical ET estimates:

Walnut historical ET - inches during period

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Real-Time Weather Monitoring:

- Measure evapotranspiration (ET).
- CIMIS weather stations predict the ET of pasture grass (Reference ET = ET₀).
Accessing CIMIS data:

Go through the Department of Water Resources

www.cimis.water.ca.gov
Weather monitoring:

- Measure evapotranspiration (ET).

- Weather stations predict the ET of pasture grass (Reference ET = ET₀).

- Convert the reference ET (ET₀) to your crop’s ET (ET₉crop) using a crop coefficient (k₉).
Determining Crop ET:

Crop ET = Reference ET x Crop Coefficient

\[ \text{ET}_{\text{crop}} = \text{ET}_o \times k_c \]

Crop Coefficient for Walnuts \((k_c)\) in late June = 1.0
**Irrigation scheduling example:**

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Landscape Irrigation:

What Determines Water Use in a Landscape?

1. Growing environment
2. Types of plants
   - Trees - on a canopy area basis, they can use significantly more than turfgrass. Nice shade & can be food.
Landscape Irrigation:

What Determines Water Use in a Landscape?

1. Growing environment

2. Types of plants
   - Trees - on a canopy area basis, they *can* use significantly more than turfgrass. Nice shade & can be food.
   - Turfgrass - cool season, warm season
Landscape Irrigation:

What Determines Water Use in a Landscape?

1. Growing environment

2. Types of plants
   - Trees - on a canopy area basis, they *can* use significantly more than turfgrass. Nice shade & can be food.
   - Turfgrass - cool season, warm season
   - Stand-alone, smaller plants (shrubs, etc)
     - Wide range of water use, but water use is a function of their canopy size and surrounding environment.
Landscape Irrigation:

What Determines Water Use in a Landscape?

1. Growing environment
2. Types of plants
3. Irrigation system
Landscape Irrigation:

What Determines Water Use in a Landscape?

1. Growing environment
2. Types of plants
3. Irrigation system
   - Can the irrigation system provide *just the right amount* of water to all the plants in the landscape? Without wasting any?
Landscape Irrigation:

What Determines Water Use in a Landscape?

1. Growing environment
2. Types of plants
3. Irrigation system
   - Can the irrigation system provide just the right amount of water to all the plants in the landscape? Without wasting any?
   - Want to apply water only to those areas where plants can take it up.

Efficiency
Look for “Targets of Opportunity” to Save Water

1. Sprinklers are often good candidates - a lot of water can be lost to runoff down the gutter.
Look for “Targets of Opportunity” to Save Water

1. Sprinklers are often good candidates - a lot of water can be lost to runoff.
2. Turf & deciduous trees are often big water users.
   - Turf is large user and is sprinkler irrigated.
Look for “Targets of Opportunity” to Save Water

1. Sprinklers are often good candidates - a lot of water can be lost to runoff.

2. Turf & deciduous trees are often big water users.
   - Turf is large user and is sprinkler irrigated.
     - Water use reduced by being more efficient or reducing turf area.
Turfgrass Irrigation - Saving water:

- Don’t irrigate so entire lawn is green & lush.
  - Back off on irrigation until see stressed areas in lawn. Irrigate those areas periodically by hand.
Turfgrass Irrigation - Saving water:

- Don’t irrigate so entire lawn is green & lush.
- Reduce the water lost to runoff.
  - Time when runoff starts = station run time.
  - If need more irrigation time, cycle on and off
    - Wait at least 1 hour between irrigations.
Turfgrass Irrigation - Saving water:

- Don’t irrigate so entire lawn is green & lush.
- Reduce the water lost to runoff.
  - Time when runoff starts = station run time.
  - If need more irrigation time, cycle on and off
    - Wait at least 1 hour between irrigations.
  - Adjust the sprinklers so don’t water sidewalks & driveways.
Turfgrass Irrigation - Saving water:

- Don’t irrigate so entire lawn is green & lush.
- Reduce the water lost to runoff.
- Irrigate in the early morning.

Reduce evaporation
Turfgrass Irrigation - Saving water:

- Don’t irrigate so entire lawn is green & lush.
- Reduce the water lost to runoff.
- Irrigate in the early morning.

Reduce evaporation
Visually check for problems
Turfgrass Irrigation - Saving water:

- Don’t irrigate so entire lawn is green & lush.
- Reduce the water lost to runoff.
- Irrigate in the early morning.
- Adjust your controller for changing water needs.
Smart Controllers

- Biggest thing happening in landscape irrigation now.
Smart Controllers

- An irrigation controller which *automatically* adjusts the irrigation run times based on *environmental conditions*.
Smart Controllers

- An irrigation controller which automatically adjusts the irrigation run times based on environmental conditions.

What environmental conditions?
Smart Controllers

- An irrigation controller which *automatically* adjusts the irrigation run times based on *environmental conditions*.

**What environmental conditions?**
- Soil moisture conditions
- Weather conditions
Smart Controller with Soil Moisture Feedback?

Types of soil moisture feedback:

1. You set the irrigation schedule & soil moisture feedback cancels the programmed irrigation if “irrigation is not needed”.

2. Soil moisture feedback controls the irrigations. Turns it on when needed.
Smart Controller with Soil Moisture Feedback?

Weakness: Where do you place the soil moisture sensor? Is it representative of the whole landscape?
ET = Evapotranspiration = Plant Water Use
Smart Controller with Weather Conditions Feedback?

1. Historical ET info. in controller so that irrigation runtimes change as ET has changed historically. “Average” year.
2. Historical ET with adjustment from an on-site weather station.
3. Controller uses on-site weather station to determine irrigation run times.
4. Controller hooked into a wireless system which “beams” info. to controller.
   - Some hooked in so you can input / access data via the internet.
   - Initial costs + annual subscription
Smart Controller with Weather Conditions Feedback?

Weakness: Is the weather info. the decisions are based on representative of what your landscape is experiencing?

- Weather station citing.
- Measurement instrument accuracy / reliability.
- Conversion of weather info. to landscape plant ET.
Smart Controller: Use them?

- For turf, they should be beneficial.
- For mixed landscapes, difficult to use.
Turfgrass Irrigation Management:

- How long to run the sprinklers?
  - Depends on:
    1. Time of year.
    2. Sprinkler application rate.

How Long Should I Run the Sprinklers?
Adapted from UC Pub #7497, 8044, and 21503
Michelle Le Strange, UC Cooperative Extension, Tulare & Kings Counties

Spring is the time to prepare the lawn for summer heat because mild temperatures favor root growth and roots supply water to leaf blades. Watering thoroughly and infrequently allows roots to develop deeper than six inches in the soil profile. Deep roots help lawns stay vigorous in hot weather.

Step 2. Determine the output of the sprinklers.
To determine sprinkler output, conduct “can tests” by setting small, empty, straight-sided, equal-sized containers such as tuna or cat food cans on top of the lawn every 10 to 15 feet (or closer depending on the size of the lawn) between sprinkler heads operated by the same valve. Run the system for 20 minutes and then use a ruler or tape measure (in inches) to check the water depth.
Turfgrass Irrigation Management:

- How long to run the sprinklers?

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<tr>
<th>Warm-season turfgrasses</th>
<th>Cool-season turfgrasses</th>
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<tbody>
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<td><strong>Minutes per week</strong> to irrigate if your hourly sprinkler output is:</td>
<td><strong>Minutes per week</strong> to irrigate if your hourly sprinkler output is:</td>
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**Turfgrass Irrigation Management:**

- **Sprinkler application rate:**
  - Set out some “catch cans” to determine your application rate.

5-foot spacing
15 min run time
Turfgrass Irrigation Management:

- Sprinkler application rate:
  - Set out some “catch cans” to determine your application rate.

Measure the amount of water collected
Turfgrass Irrigation Management:

Catch can test

15 min x 4 = 1 hr
24.5 mm = 1 inch

mm collected in 15 minutes

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*Sprinkler*
**Turfgrass Irrigation Management:**

**Catch can test**

Inches per hour  
Average = 0.52 in/hr

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Turfgrass Irrigation Management:

- Sprinkler application = 0.52 in/hr

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Turfgrass Irrigation - Saving water:

- Don’t irrigate so entire lawn is green & lush.
- Reduce the water lost to runoff.
- Irrigate in the early morning.
- Adjust your controller for changing water needs.
- Try to avoid daily irrigations.
  - Odd/even watering requirements.
Turfgrass Irrigation - Saving water:

- Don’t irrigate so entire lawn is green & lush.
- Reduce the water lost to runoff.
- Irrigate in the early morning.
- Adjust your controller for changing water needs.
- Try to avoid daily irrigations.
- Make sure sprinklers pop up above the grass.
Drip Irrigation:
Questions?

Larry Schwankl  www.anrcatalog.ucdavis.edu
559-646-6569  Lawn Watering Guide for CA: Pub. 8044
ljschwankl@ucanr.edu  Drip Irrig. In the Home Landscape: Pub. 21579
Presentation available at: http://ucanr.org/schwankl
Questions?

BABY BLUES

How could you possibly have gotten hamma hama's back-to-school shopping done so quickly??

We're guys.

We see clothes that fit, and throw them in the cart.

MEN DON'T SHOP... WE BUY.

Say the guys who spend two hours choosing a new screwdriver.

Hardware is different.

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