Irrigation Management for Urban Trees

Chuck Ingels

UC Cooperative Extension, Sacramento County

Loren Oki

Plant Sciences Dept., UC Davis

Get Ahead or Get Parched: Six Ways to Survive the Drought

April 16, 2015

UC CE University of California Agriculture and Natural Resources Cooperative Extension

A Common Sight in 2014

Recognize water stress

- Initial
  - Color change to grayish green
- Temporary
  - Flagging, wilting
- Permanent wilting
  - Desiccation, drying
  - Nonrecoverable

Secondary effects

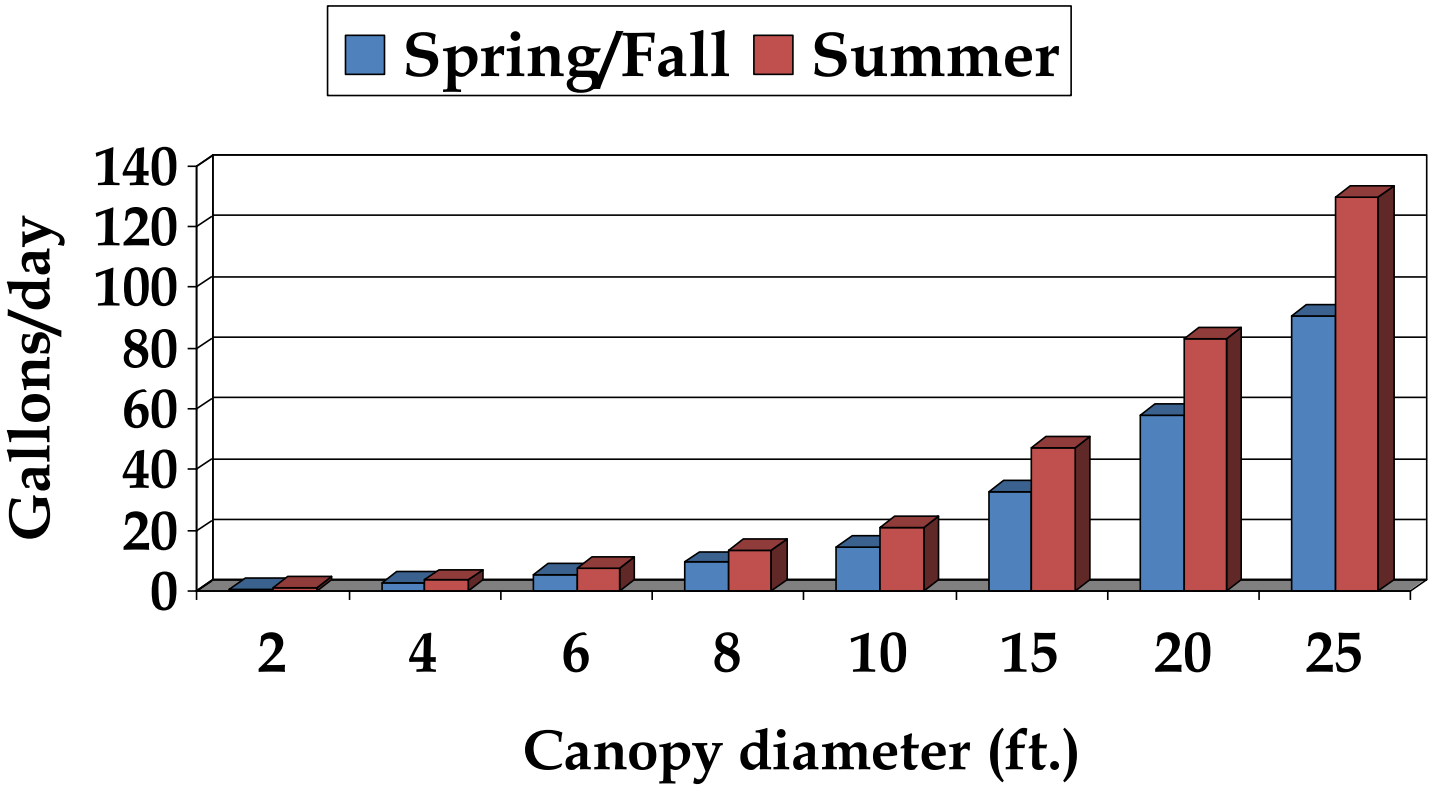
- Susceptibility to borers
  - Ambrosia beetles
  - Longhorned eucalyptus borers
  - Pacific flatheaded borers
  - Shothole borers

Things that increase water use

- Heat absorbing surfaces nearby
  - Parking lots
  - Large concrete surfaces
  - West and south facing walls

Fruit Tree Water Use – Central Valley

Based on Tree Size



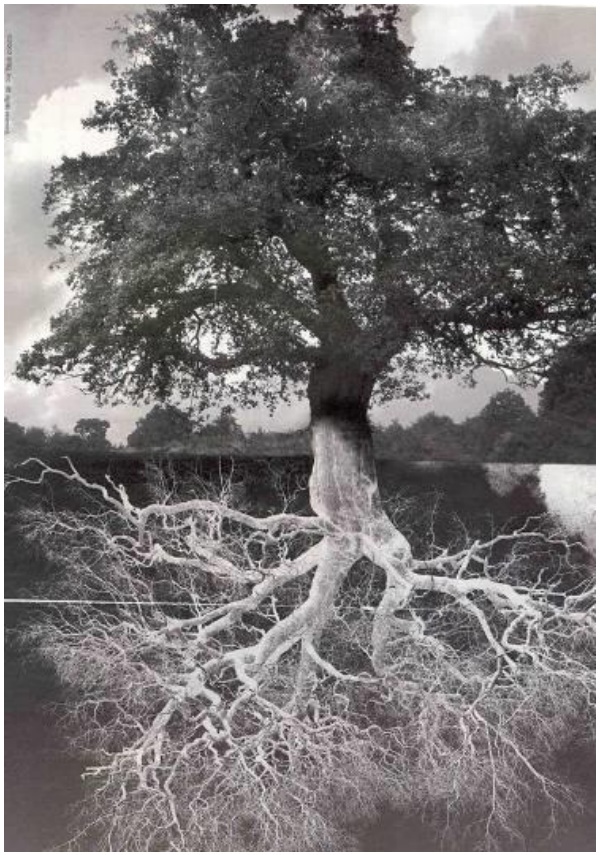
Source: The Home Orchard, UC ANR

Fruitless Mulberry

Unheaded
(Using more water)

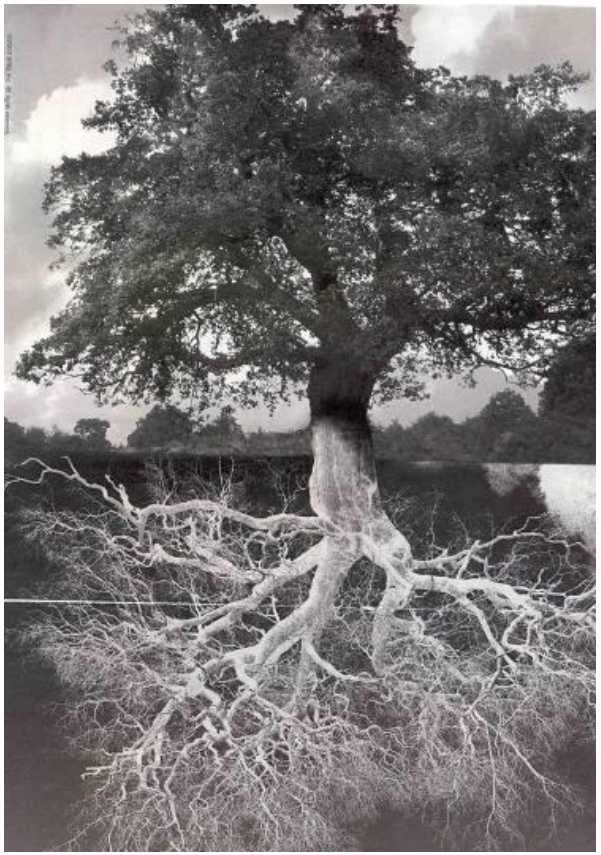
Headed Annually
(Using less water, initially)

Tree Root Growth



Mimics Top Growth

Tree Root Growth



Mimics Top Growth

NO!!

Depth of Rooting

(Majority of Roots)

Turf - 8 to 12 in.

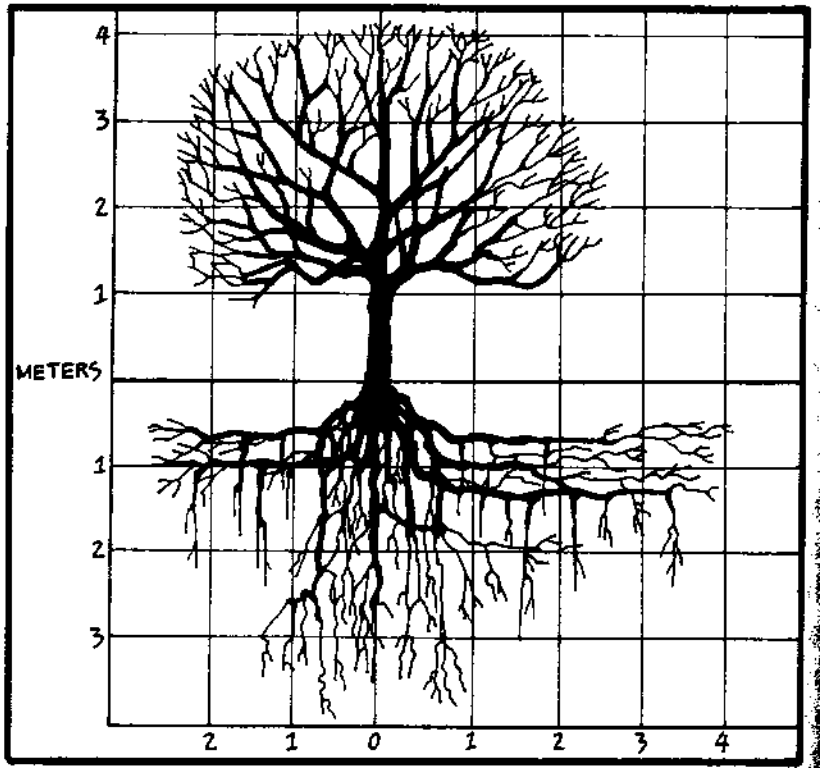
Shrubs - Small – 1 ft.

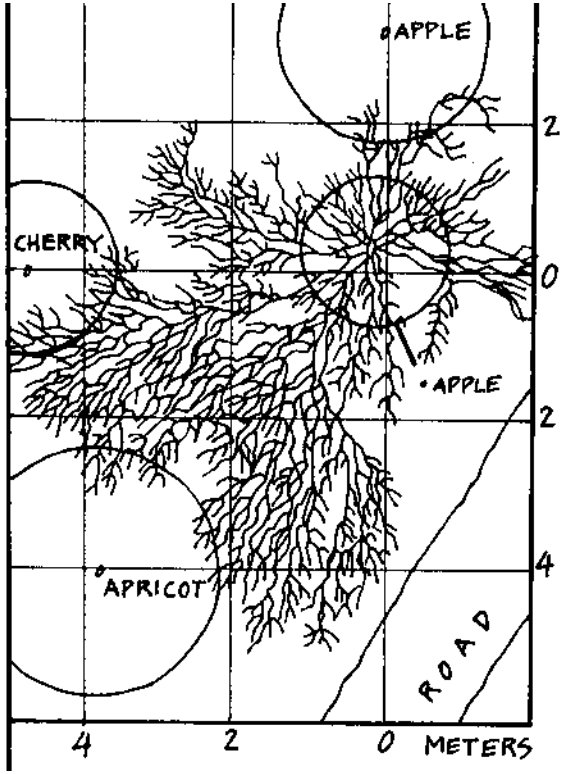
- Large – 2 ft.

Trees - Small – 2 ft.

- Large – 3 ft.

Actual Root Growth of Mature Fruit Trees





Source: Roots Demystified, R. Kourik

Root System of Mature Gingko Tree

Considered Deep Rooted

Trees in lawns

What's the problem?

- Improper tree selection
- Poor irrigation management
- Shallow roots

Dry and Compacted Soil

Shallow soil & watering reduce drought tolerance and anchorage

UC CE | University of California
Agriculture and Natural Resources | Co

Know Your Soil

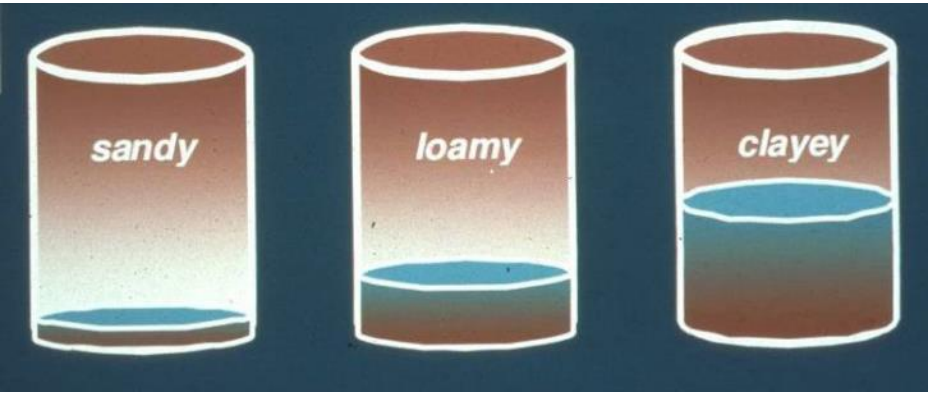
Determines how often to water

Sandy

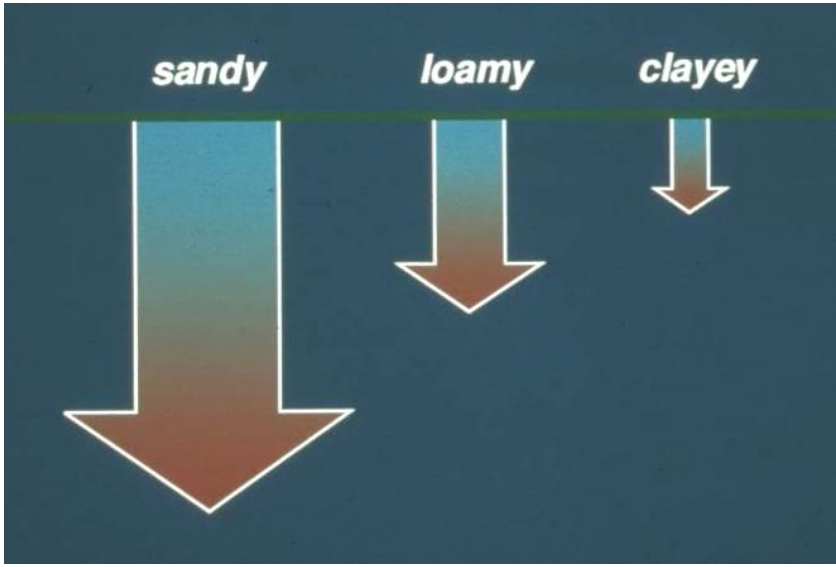
Clayey

Soil Texture Affects Soil Moisture

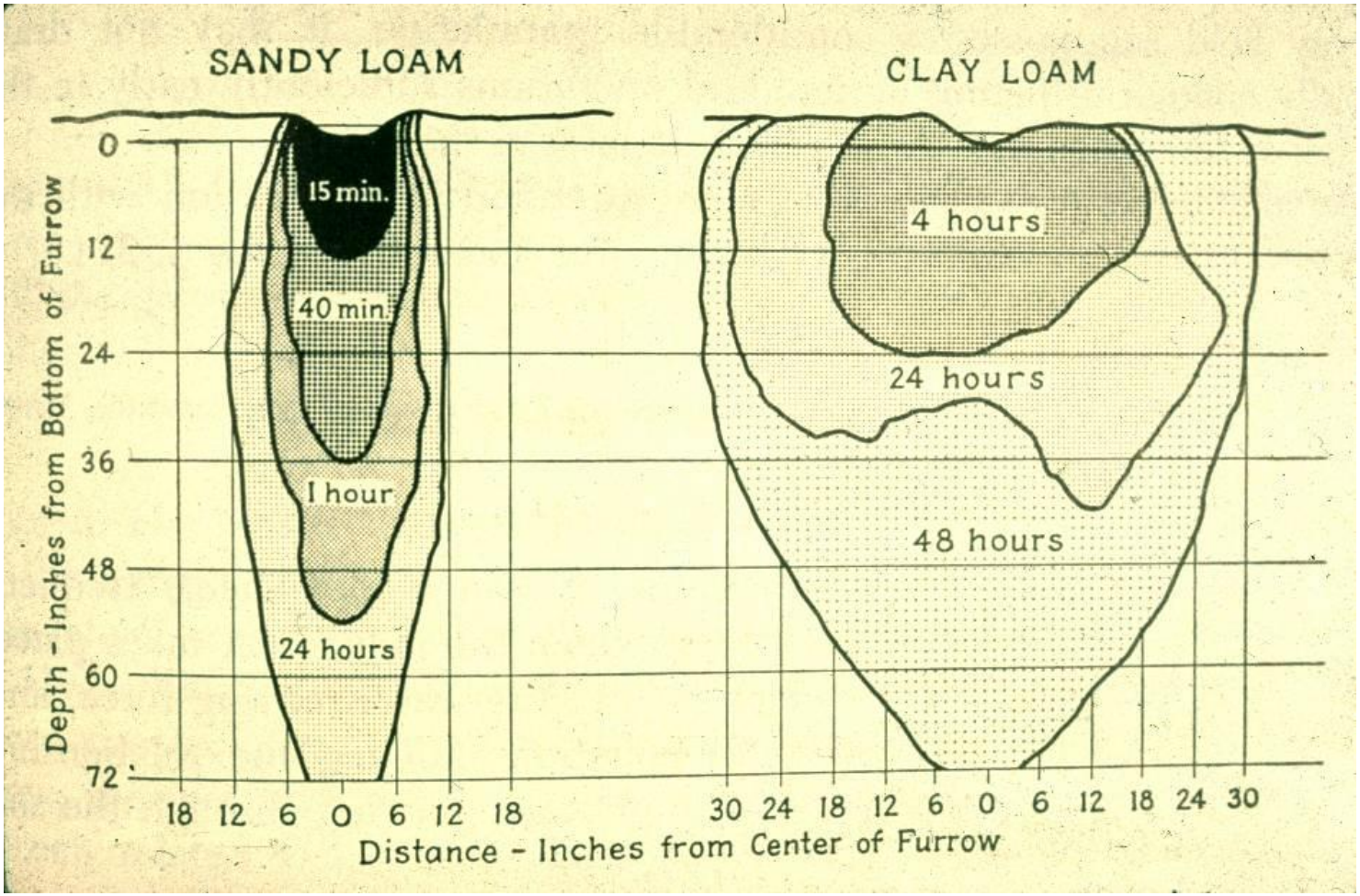
Water Holding Capacity



Permeability

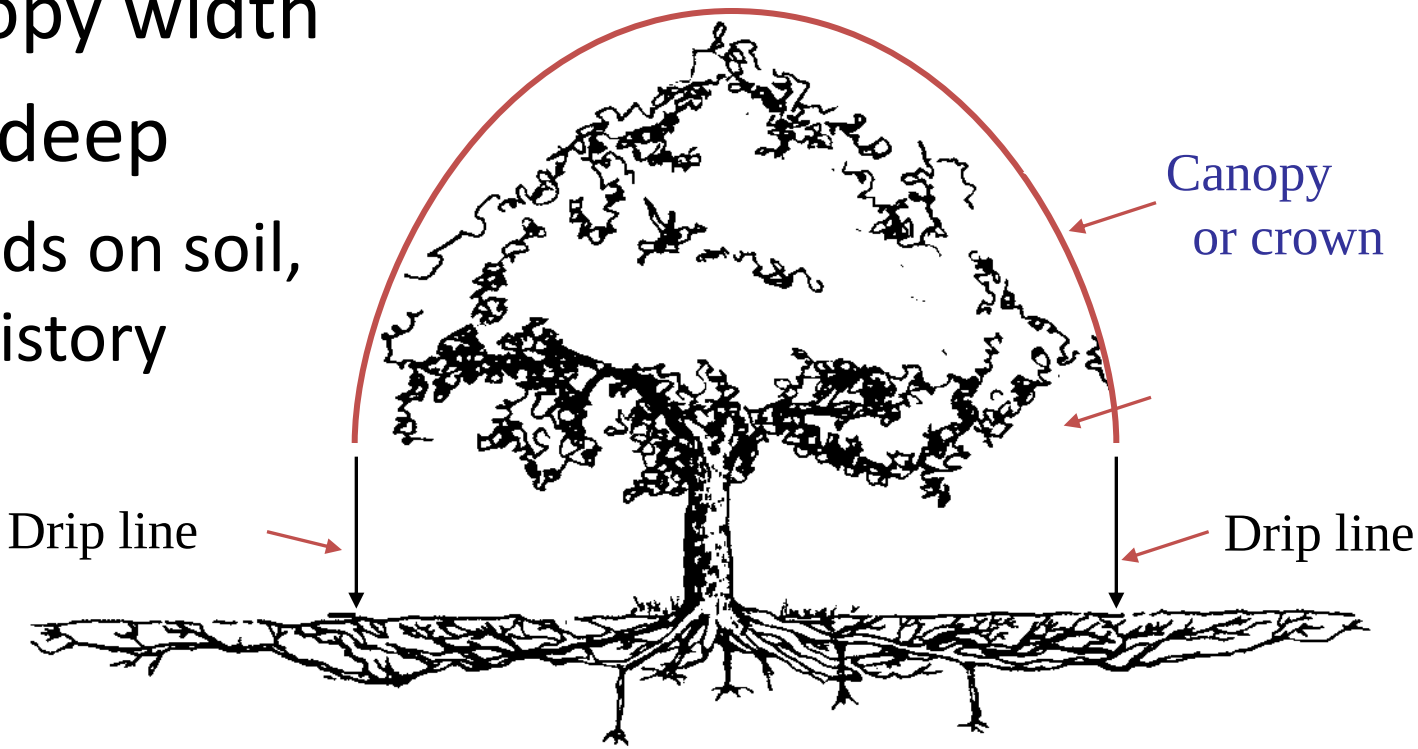


Soil Texture Affects Soil Wetting



Mature Tree Roots

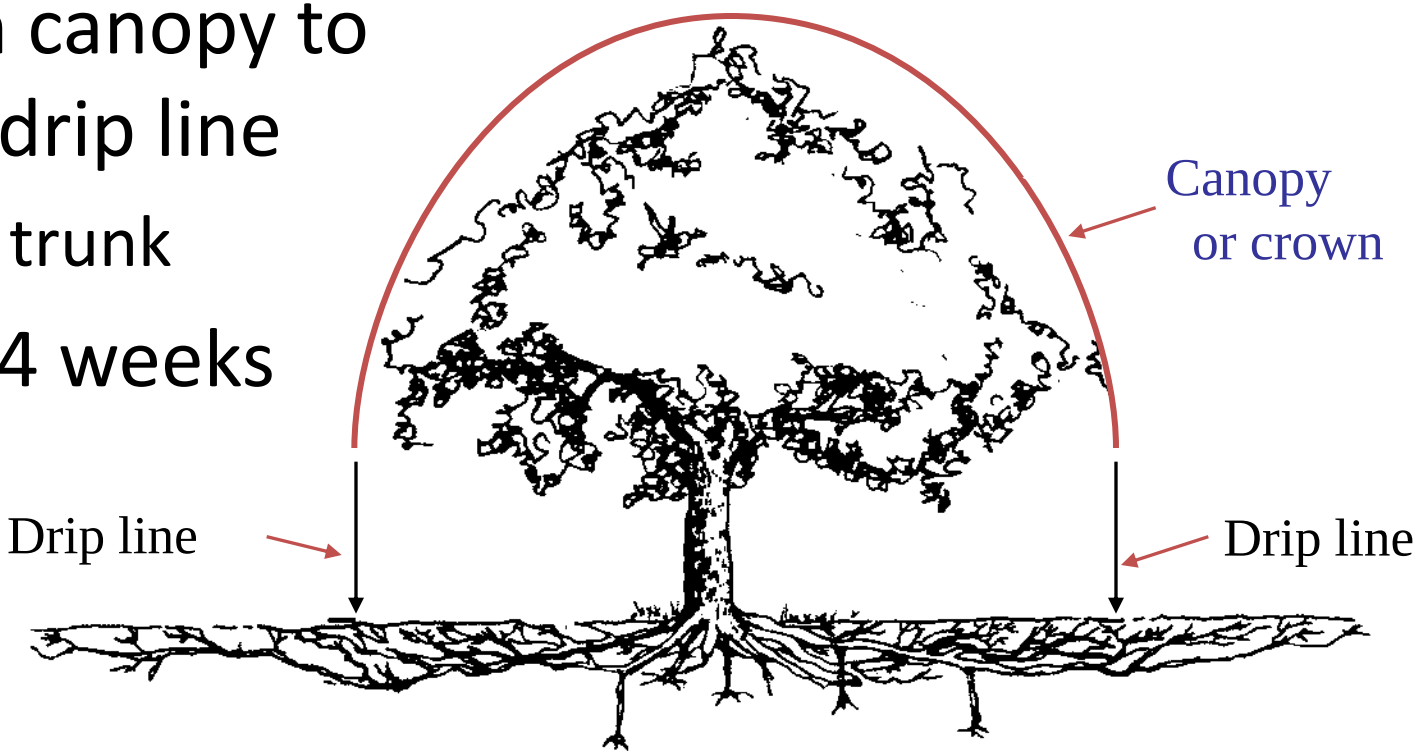
- Often extend 2-3 times the canopy width
- May be deep
  - Depends on soil, irrig. history



Graphic adapted from Harris et al. 2004

Where & When to Irrigate

- Deep to 2 -3 feet
- Beneath canopy to beyond drip line
  - Not at trunk
- Every 2-4 weeks



Graphic adapted from Harris et al. 2004

Keeping Trees Irrigated in Lawn Conversions

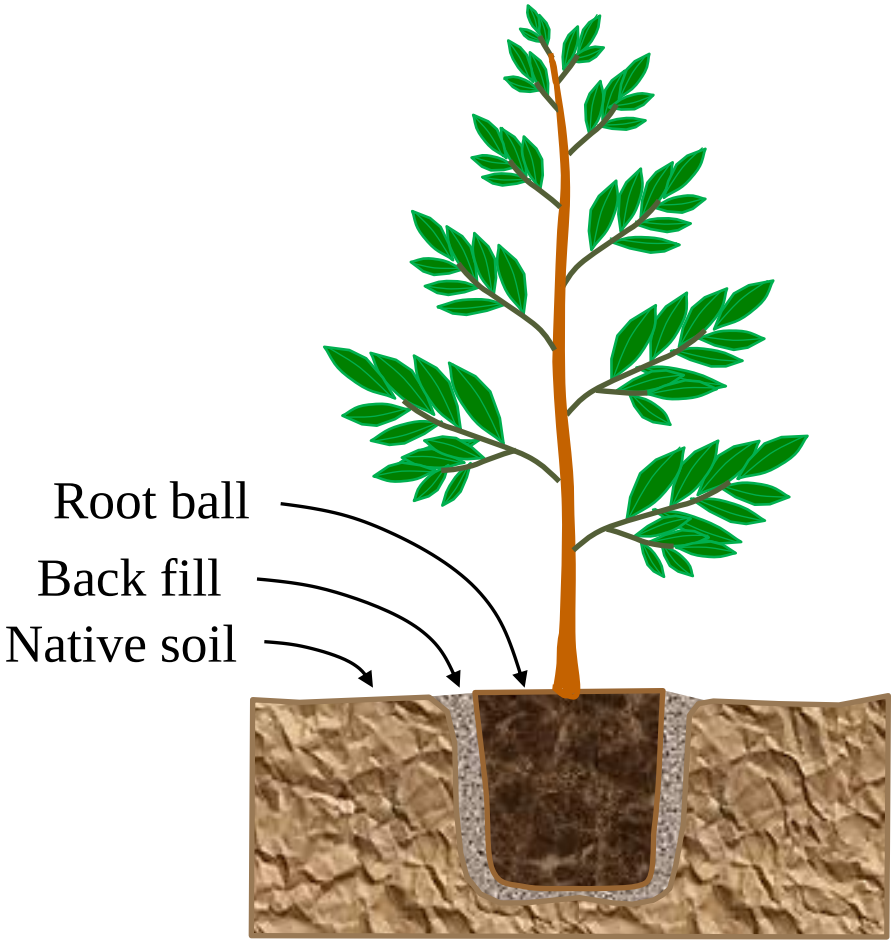
“Tree Ring Irrigation Contraption”

Loren Oki and Dave Fujino

- Calculates irrig. run time to wet a tree to 36” deep
- Input info for 1’ spacing:
  - Canopy radius, soil type, no. of 100’ drip lengths (Netafim)
- http://ccuh.ucdavis.edu/

Watering New Trees

- Roots are mostly within container soil ball
- Roots may be just entering native soil
- Takes several years to fully establish



Graphic by L. Oki

Key Elements for Landscape Water Conservation

- Plant selection and design
- Composting and mulching
- Fertilization
- Maintenance
- Irrigation management
- Choosing which plants get water

Plant selection & design

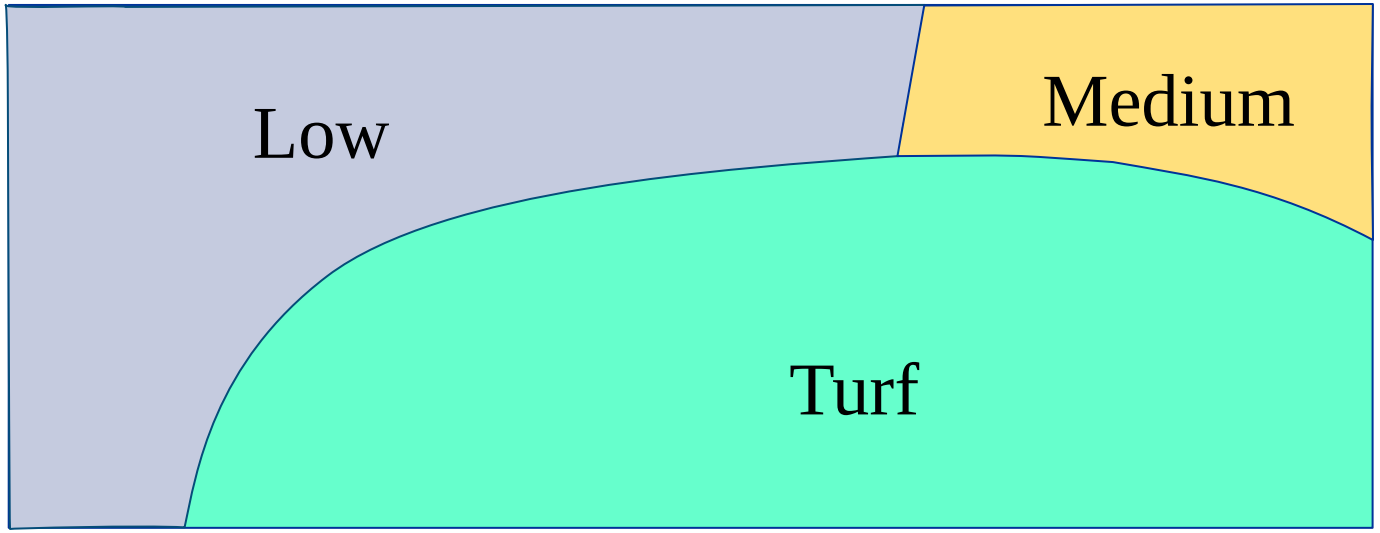
- Hydrozones
  - Plants with similar water use are grouped within an irrigation zone
  - Obtain information on plant water use
    - WUCOLS-

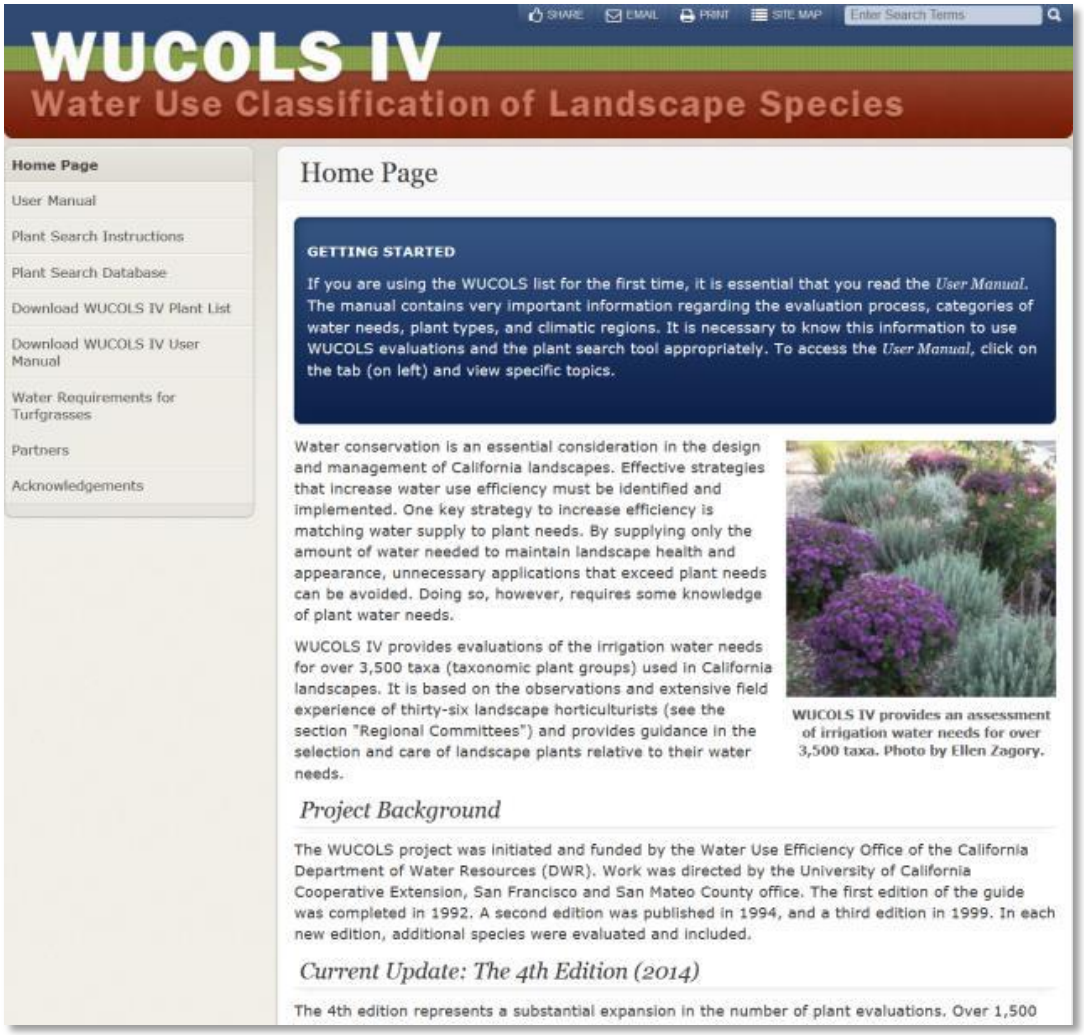
      Water Use Classification of Landscape Species

      www.ucanr.sites/WUCOLS

Plant selection & design

- Hydrozones
  - Group plants with similar water within an irrigation zone





www.ucanr.sites/WUCOLS

Choose Low Water-Using Tree Species Examples:

Plant Name	Common name	WUCOLS rating
Cercis occidentalis	western redbud	VL
Chilopsis linearis	desert willow	VL
Prunus ilicifolia	holly leaf cherry	L
Quercus chrysolepis	golden cup oak	VL
Quercus douglasii	blue oak	VL
Quillaja saponaria	soapbark tree	L
Vitex agnus-castus	chaste tree	L

Mulching

- Reduces direct evaporation, soil temperatures
- Acts like a blanket over the soil
- 2-4 inch layer

Fertilization

- Reduce
  - Limit plant growth
  - Maintain plant health

Prioritizing Plants to Irrigate

Considerations:

- Cost of replacement
- Beneficial use
  - Example: City of Folsom
    1. Top Priority: Maintain trees
    2. Active sports fields
    3. Ornamental plantings
    4. Non-active or ornamental turfgrass

Reduce tree water requirements

- Light pruning to reduce leaf area
  - DO NOT prune heavily
- Change irrigation schedule SLOWLY
  - Example:
  - 3x per week original schedule
  - 2x per week for 2 weeks
  - 1x per week for 2 weeks
  - Finally, 1x per month
- Watch for drought symptoms
  - Adjust as needed

Summary

- Water use depends on tree size
- Know your soil
- Proper plant selection and design
- Prioritize plants to water
- Use compost and mulch, reduce fertilizer
- Water deeply, but not too often
- Avoid runoff, apply water slowly
- Keep water away from tree trunks