

CALIFORNIA TREE ACADEMY
STAFF & CORPS MEMBER TRAINING




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CTA Training Module 4 – Part 1 - Water

Key Concepts

1. Hydrologic (Water) Cycle – Be able to draw
2. Watershed – Be able to describe and/or draw
3. Be able to name at least three (3) local watersheds in your region
4. Know reasons why a watershed needs to be managed
 - a. To protect our Water Supply
 - b. To improve Water Quality in our streams, rivers and in our groundwater
 - c. To reduce pollution from Stormwater Runoff
 - d. To minimize soil erosion from construction or following wildfires
 - e. Mitigate pollution from fertilizers
5. Definition of Water conservation




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CTA Training Module 4 – Part 1 - Water

Key Concepts Continued

6. Be able to name at least three (3) Water Conservation practices
7. What is “grey water”?
8. What is “reclaimed water”?
9. Be able to name and describe two (2) methods of using “grey water” for landscape irrigation
10. Be able to name at least 3 principles that should guide landscape and irrigation design
11. Know the relative percolation rate differences between soils of different soil texture:
 - a) Clay
 - b) Sandy Loam
 - c) Sand
12. Be able to define “percolation”




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CTA Training Module 4 – Part 1 - Water

Key Concepts Continued

13. Know why filters are so important in irrigation systems, especially low flow or drip irrigation installations
14. Know the function of a “backflow preventer”
15. Know why a pressure regulator is needed on drip or low flow irrigation system installation
16. Know the difference between pressure pipe and non-pressure pipe in irrigation installation
17. Know why it is important to properly apply solvent on pipe fittings when installing irrigation systems




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CTA Training Module 4 – Part 1 - Water

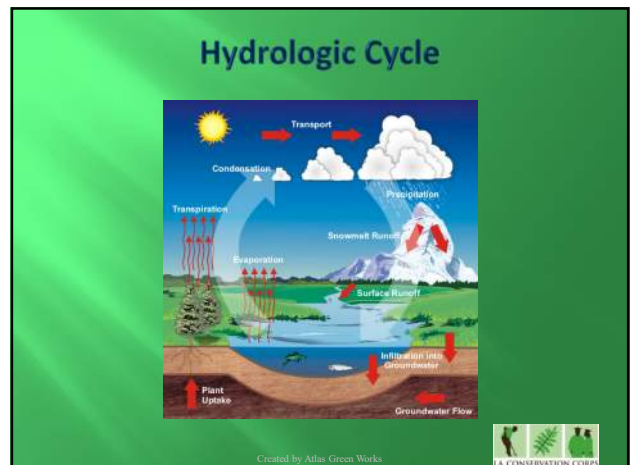
Key Concepts Continued

18. Know why it is important to be able to adjust the radius and arc of a sprinkler’s spray
19. Know why it would be important to have automated irrigation controllers that can be adjusted from a central computer or from a wireless device in the field
20. Know why it is important to connect irrigation controllers to soil moisture sensors and/or a rain gauge. Can this be considered a water conservation practice

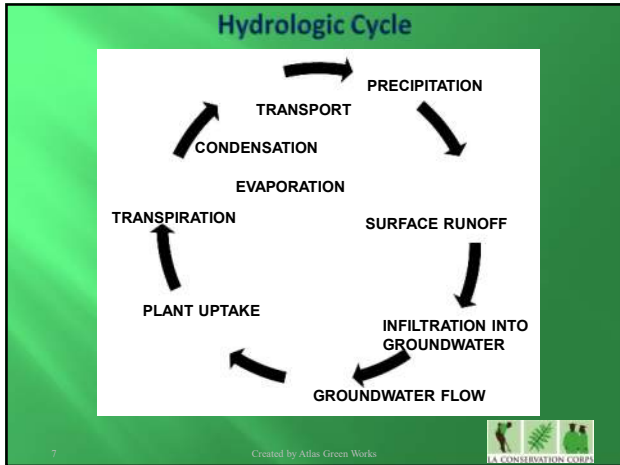


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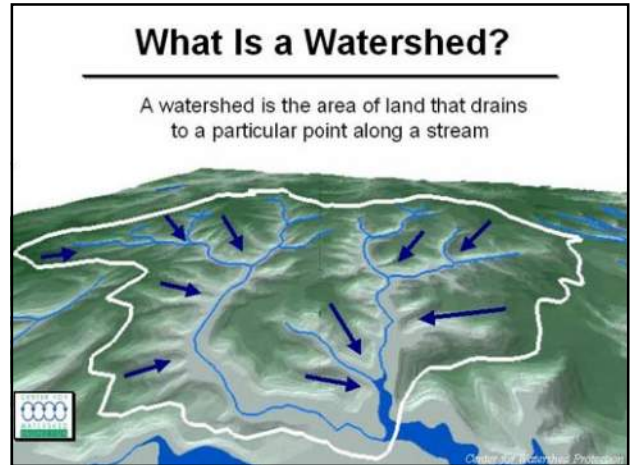
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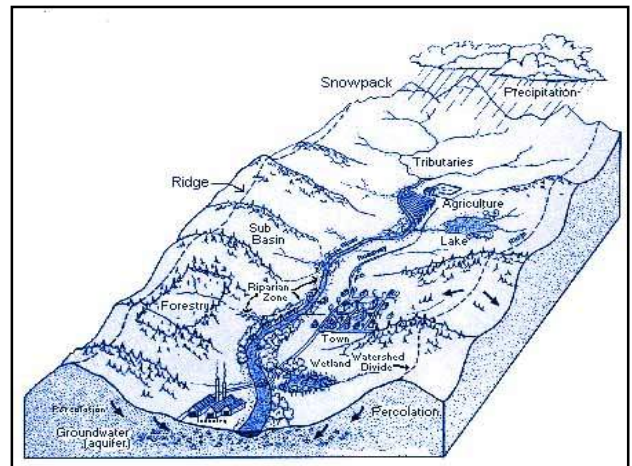
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WATERSHED ANIMATION

http://techalive.mtu.edu/meec/module_01/whatiswatershed.htm

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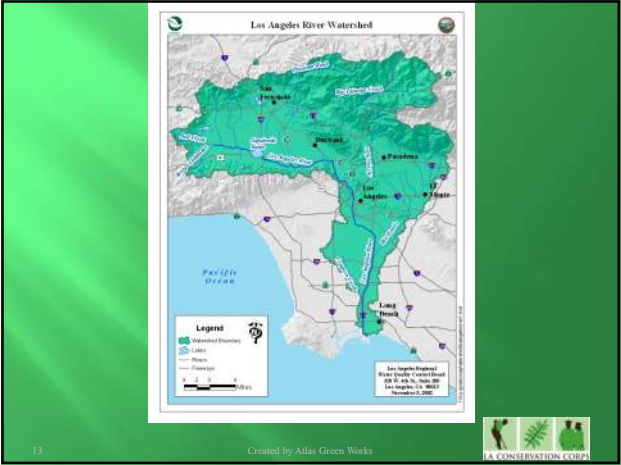
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Watershed Management – Why?
Water Supply

 A collage of four images related to water supply: a mountain range with snow-capped peaks, a winding river in a valley, a close-up of water flowing from a tap, and a dam structure. The slide is credited to Atlas Green Works.

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Watershed Management – Why?
Water Quality

 A collage of four images related to water quality: two workers in safety gear sampling water, a worker in a hard hat and safety vest, a group of people sitting on a rocky bank near a stream, and a graphic with the text "Keeping it Clean" and "GroundWater" from rpu. The slide is credited to Atlas Green Works.


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Watershed Management – Why?
Stormwater Runoff

 A collage of six images related to stormwater runoff: a close-up of a storm drain grate, a large pipe opening filled with debris, a person pouring water into a drain, a storm drain cover with a logo, a grassy area with a storm drain, and a concrete structure with water flowing over it. The slide is credited to Atlas Green Works.


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Watershed Management – Why? Soil Erosion




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Watershed Management – Why? Pollution from Fertilizers



Excess nutrients, like phosphorus and nitrogen, runoff from fertilizers, stimulates the growth of algae, which crowds out plant life and reduces oxygen levels available to aquatic life. This results in fish kills, unhealthy and smelly water. This process is known as eutrophication. Pet waste is also a contributor.

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VIDEO – L.A. RIVER WITH HUELL HOWSER

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Water Conservation Definition

Any beneficial reduction in:

1. Water use or
2. Water losses

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Water Conservation Guidelines – Focus on Landscape and Irrigation Practices

1. Use low-water, drought tolerant or plants naturally adapted to your region
2. Minimize or eliminate use of natural turf – consider using artificial turf as applicable, e.g., sports fields
3. Use water efficient irrigation design and equipment

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Water Conservation Guidelines – Focus on Landscape and Irrigation Practices

4. Design irrigation to eliminate overspray onto adjacent hardscape
5. Water in early a.m. before sunrise & avoid watering on windy days if possible
6. Divide irrigation system in zones with plants with similar water requirements

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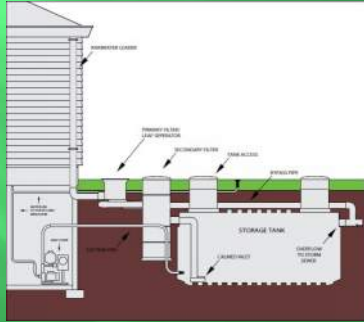

Water Conservation Guidelines – Focus on Landscape and Irrigation Practices

7. Use **grey water** if available
 - a. Grey water = wastewater generated from domestic activities such as laundry, dishwashing, and bathing, which can be recycled on-site for uses such as landscape irrigation and constructed wetlands
8. Use **reclaimed water** if available
 - a. Reclaimed water = former wastewater (sewage) that has been treated to remove solids and certain impurities, and then used in sustainable landscaping irrigation or to recharge groundwater aquifers.





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Water Conservation Practice – Gray Water Example 1

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Water Conservation Practice – Grey Water Example 2

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Water Conservation Practice –Rain Barrel




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Tree Establishment – Irrigation Principles


1. Plant trees and other plant material with low water requirements whenever possible
2. Plant trees and other plant material that naturally grow in the same climate in which your project exists

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Tree Establishment – Irrigation Principles

3. Maintain mulch area around tree that extends to dripline of tree – continue to expand as tree canopy grows
 - a. Mulch = more water for tree
 - b. Mulch = more oxygen for tree roots

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Tree Establishment – Irrigation Principles


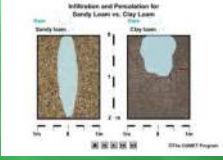


4. **Do not plant under tree canopy (within dripline)**
 - a. Other plant material will compete with tree roots for available water




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Tree Establishment – Irrigation Principles

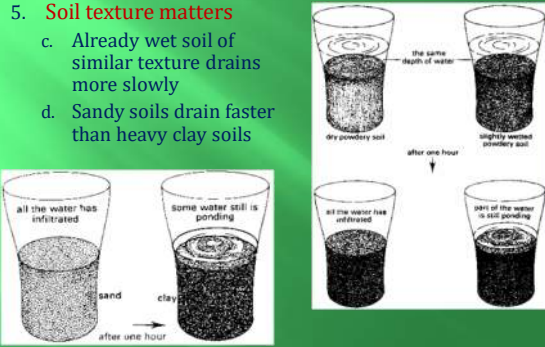

5. **Soil texture matters**
 - a. Is a critical factor in determining how much water, how fast and by what means it should be applied
 - b. Used in irrigation design
 - c. Diagram shows how soils are classified

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Tree Establishment – Irrigation Principles



5. **Soil texture matters**
 - c. Already wet soil of similar texture drains more slowly
 - d. Sandy soils drain faster than heavy clay soils

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Tree Establishment – Irrigation Principles


6. **Water pressure matters**
 - a. Water loses pressure as it flows through water meters, valves, and various size pipes on the way to the sprinkler head or other water emitting device
 - b. If don't account for this loss, then won't have enough pressure to distribute the water where the plants are

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Tree Establishment – Irrigation Principles

7. **Water volume matters**
 - a. How much water is needed to irrigate a particular area over a given time period?
 - b. Is there enough available?
 - c. What is an appropriate amount to use given existing environmental conditions?
 - d. Are we watering too much? Too little?
 - i. **Depends on tree species selected in design phase**



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Tree Establishment – Irrigation System Installation – Drip Systems




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Drip Irrigation System Components

- Water Filter(s) - Filtration Systems:
 - Very important for removing sand and silt from water supply
 - Without filters drip emitters will clog




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Drip Irrigation System Components

- Backflow Preventer
 - Device that prevents irrigation water from "backing up" into the drinking water supply
 - Required for any irrigation system that is connected to "potable" or drinking water supply



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Drip Irrigation System Components

- Pressure Regulator
 - Device that can alter water pressure anywhere along an irrigation system
 - Typically installed just downstream from where the irrigation system is connected to the water supply
 - Critical for drip irrigation systems to function properly

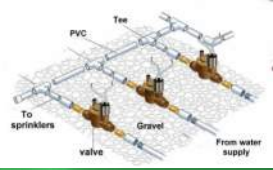



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Drip Irrigation System Components

- Pressure Line
 - Water in this part of the system is constantly under pressure
 - Used primary water delivery components of system - backflow preventer and valves
 - Wall thickness greater than with non-pressure water lines

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Drip Irrigation System Components

- Remote Control Valves
 - Control delivery of water to sprinklers or water emitting devices



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Drip Irrigation System Components

- Smaller diameter polytube
 - Non-pressure "piping" downstream from control valves
 - Can be rigid (traditional systems) or flexible (drip)
 - Wall thickness less than pressure pipe



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Drip Irrigation System Components

- ▣ **Emitting Devices**
 - Delivers water to where plants are
 - Types include:
 - Drip Emitters
 - Micro spray heads
 - Inline drippers
 - Trickle rings



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Drip Irrigation System Components

- ▣ **Controllers**
 - Automatic timers conserve more water because can control timing and amount of water delivery in relation to weather and other conditions



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Irrigation System Installation - Trenching

- ▣ Can be done by hand or machine
- ▣ Depth typically 12 to 18 inches
- ▣ Need to check for other underground utilities before beginning to dig





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Irrigation System Installation - Laying Pipe/Pipe Fitting

- ▣ Critical that pipe and device connections be sealed properly





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Irrigation System - Valve Installation

- ▣ Make sure using correct device
- ▣ If remote controlled then need to make sure that each one is connected with 12 volt wire that is routed in trenches back to controller




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Irrigation System - Sprinkler/Emitter Installation

- ▣ Make sure have correct head or emitting device
- ▣ Follow manufacturer's instructions
- ▣ Spray or rotor head devices usually need adjusting for radius and arc pattern





Photo above shows radius adjustment

Photo on left shows arc adjustment

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