



# Irrigation Management



## **Learning Objectives**

At the end of this unit, the student will be able to:

- Describe issues around Colorado's (western) water situation.
- Describe design criteria for efficient landscape irrigation.
- Describe maintenance criteria for efficient landscape irrigation.
- Describe management criteria for efficient landscape irrigation.
- Perform a lawn irrigation check-up.
- Set a controller for efficient landscape irrigation.

## **Reference /Additional Reading**

### **CMG GardenNotes**

- #260 Irrigation Management: References and Review Questions
- #261 Colorado's Water Situation
- #262 Water Movement Through the Landscape
- #263 Understanding Irrigation Management Factors
- #264 Irrigation Equipment
- #265 Methods to Schedule Home Lawn Irrigation
- #266 Converting Inches to Minutes
- #267 Watering Efficiently
- #268 Worksheet: Home Lawn Irrigation Check-Up

### **CSU Extension Fact Sheets and *PlantTalk Colorado***

- Automatic Sprinkler System Overview – Planttalk #2201
- Drip Irrigation for Home Gardens – Fact Sheet #4.702
- Efficient Irrigation – Planttalk #1903
- Graywater Reuse and Rainwater Harvesting – Fact Sheet #6.702
- Irrigation: Inspecting and Correcting Turf Irrigation Systems – Fact Sheet #4.722
- Water Conservation In and Around the Home – Fact Sheet #9.952
- Watering Colorado Soils – Planttalk #1621
- Watering Established Lawns – Fact Sheet #7.199

### **Websites**

- Colorado Springs Utility: <http://et.csu.org/>
- Denver Water: [www.denverwater.org](http://www.denverwater.org)
- Northern Colorado Water Conservancy District: [www.ncwcd.org](http://www.ncwcd.org)

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- Colorado Master Gardener *GardenNotes* are available online at [www.cmg.colostate.edu](http://www.cmg.colostate.edu).
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## Review Questions

### Colorado's Water Situation

1. Describe the western water rights doctrine of "prior appropriation" or "first-in-time, first-in-right." How does it differ from the "riparian" water rights system used in eastern states?
2. What percent of Colorado's water supply is used for landscape irrigation?
3. During the summer irrigation season, what percent of a community's water supply is typically used for landscape irrigation?
4. On a community-wide basis, what percent of the water used for landscape irrigation is wasted due to poor design, maintenance, and management of the irrigation systems?
5. Explain how landscape irrigation affects a community's water infrastructure? What is the primary purpose behind community water schedules, such as every third day or every other day?
6. What is the typical multi-year drought cycle in Colorado's climate?
7. How does population growth play into Colorado's water situation?

### Water Movement Through the Landscape

8. List how water enters the landscape. Explain how water is stored in the landscape. List how water leaves the landscape.
9. What is ET? What factors influence ET rates?

### Understanding Irrigation Management

10. Describe how these factors influence irrigation management:
  - a. Location of soil moisture
  - b. Type of soil
  - c. Water holding capacity
  - d. ET
  - e. Rooting depth

11. How does improving a sandy soil with organic matter influence irrigation management? How does improving a clayey soil with organic matter influence irrigation management?
12. Define *water holding capacity*, *saturation*, *field capacity*, *permanent wilting point*, and *available water*.
13. Compare the historical ET for a lawn in spring, summer, and fall.
14. Based on a soil's typical water-holding capacity, describe the amount of water to apply and frequency of irrigation for sandy, sandy loam and loamy/clayey soils with a six-inch, 12-inch and 24-inch rooting depth in the spring, summer and fall.
15. Describe the textbook amount of water to apply if a lawn required water every two, three, four, or five days in the typical summer.
16. Describe how these factors influence irrigation management:
  - a. Exposure
  - b. Previous irrigation pattern
  - c. Stage of growth
17. Give examples of mechanisms that plants use to tolerant/escape drought.

### Irrigation Equipment

18. Explain basic components of an in-ground sprinkler system, including the following:
  - Point of connection
  - Pressure regulator
  - Backflow prevention device
  - Supply line
  - Valve box
  - Valves
  - Secondary lines
  - Controller
  - Winter drainage
19. Describe the advantages and limitations of pop-up spray heads and rotor heads.

20. Describe the strengths and weaknesses of an in-ground sprinkler system.
21. Describe basic components of a drip system, including the following:
  - In-line filter
  - Pressure regulator
  - Half-inch tubing
  - Quarter-inch microtubing
  - Drip emitters
  - In-line drip tubing
  - Micro-sprayers
22. Describe a drip system made with soaker hose or soaker tubing.
23. Describe the strengths and weaknesses of drip irrigation.
24. Describe the strengths and weaknesses of hose-end, hand watering

#### Methods to Schedule Irrigation

25. Describe irrigation scheduling by the Type of Sprinkler Method.
26. Describe irrigation by the Precipitation Rate Method. Explain how to do a Precipitation Rate (Catch Can) Test.
27. What is the purpose of cycle and soak? Explain how to add cycle and soak to an irrigation scheduling method.
28. What is an ET controller? What is a soil moisture sensor?
29. Explain how to fine-tune an irrigation schedule.

#### Watering Efficiently

30. Of the seven principles of water wise gardening, why does watering efficiently have the greatest potential for water conservation in the typical home landscape?
31. With attention to irrigation design, maintenance, and management, what is the potential water savings for a typical home landscape?
32. List factors to consider with irrigation zones.
33. Describe design criteria for uniform water distribution.
34. Describe maintenance techniques for water wise irrigation management.
35. Describe management techniques for water wise irrigation management.

#### Irrigation Check-Up

36. What is the purpose of an irrigation check-up?