

# THE SECRETS OF IRRIGATION MANAGEMENT

## *Save Money and Create a Healthier Landscape*

This article provided by courtesy of  
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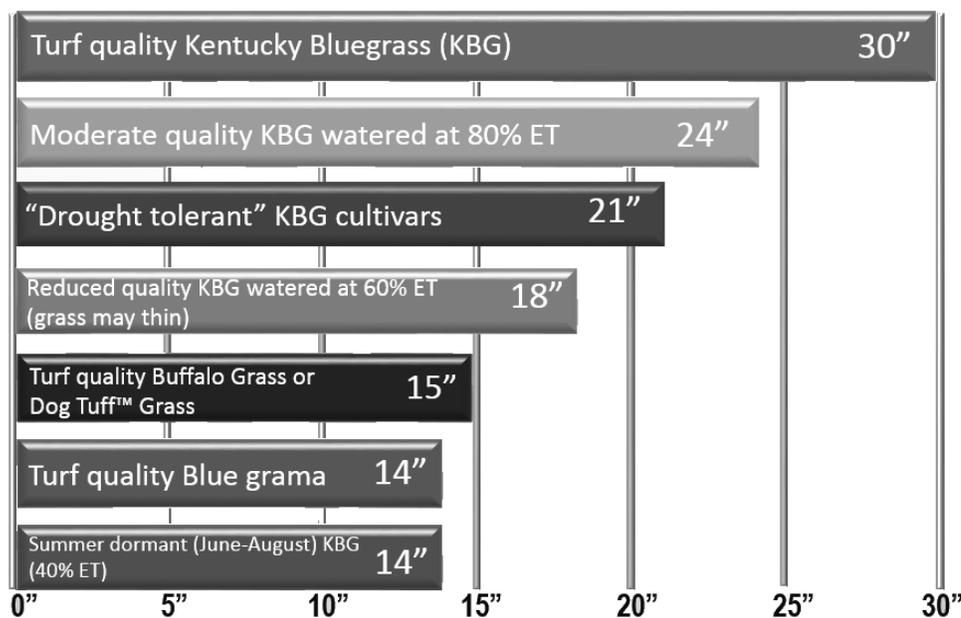
### **WATERING EFFICIENTLY**

- More than half the water used between May and October is used for landscape irrigation.
- Based on community water use figures, 40% to 50% of that landscape irrigation water is wasted!
  - Poor design
  - Poor maintenance
  - Poor management
  - Past irrigation system design was seldom focused on water conservation

### **EXPECTATIONS FOR BLUEGRASS IN COLORADO**

- Bluegrass does NOT require heavy irrigation – water use depends on expectations.
- Good performance spring and fall, and when weather is cool and rainy.
- Expect brown spots and discoloration during the heat of summer!
  - This is especially true if your irrigation efficiency is poor, or soil preparation is inadequate (typical in our landscapes).
- Bluegrass goes dormant under water stress.
- Makes a great “reduced input” lawn, allowing it to go dormant in hot/dry weather.

### **COMPARATIVE ANNUAL WATER REQUIREMENTS**



## **WATER-WISE GARDENING**

- Water-wise gardening is not about “lawn-less landscaping”, it is about matching the landscape with the actual use of the site.
- Grass provides significant environmental and people benefits - just be sure your use of it makes sense!

## **MATCH TURF WITH NEEDS OF SITE!**

- *If you don't walk on it, you DON'T need it in bluegrass!*

## **WATER-WISE LAWN CARE**

- Higher quality = higher water demand, lower quality = lower water demand.
  - Routine irrigation = high performance bluegrass varieties and turf type tall fescue.
  - Reduced irrigation = “reduced input” Bluegrass and drought tolerant bluegrass
  - Minimally or non-irrigated = Buffalograss, Blue Grama and Dog Tuff™ Grass
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## **IRRIGATION EFFICIENCY**

- Match irrigation application to soil type and root depth. Avoid applying more water than can be contained in the root zone. ***Never water when the soil is wet!***
- Irrigate according to the requirements of the plants.
- The duration and frequency of irrigation needs to be modified based on evapotranspiration (ET) rates. Apply only enough irrigation to replace water lost by ET.
- Water lawns and shrub beds/perennial beds separately. (These should be on different irrigation zones.)
- Water trees and shrubs, which have deeper root systems, longer and less frequently than shallow rooted plants.
- Do not over water - most established vegetation does not require more than one inch per week depending on the season and rainfall. Plants will develop deeper roots and ultimately require less watering when not over-watered.
- Watering too frequently may promote some diseases in the landscape.
- Create zones based on exposure to sun, heat, and wind.

## **IRRIGATION AUDIT**

- The purpose of an irrigation audit is to evaluate:
  - System Design
  - Maintenance
  - Management
    - Precipitation rates
    - Run times
    - Scheduling methods
- Tool to evaluate:
  - Is the system working properly?
  - What adjustments do I need to make?
  - CPNMD's “Guide to Outdoor Water Management” provides a simplified method of standard audit procedures for the home gardener.
- When properly completed:
- 20% to 70% water savings
- 40% average water savings
- Improved plant health!

## **THE "CATCH CAN" TEST**

Measuring your precipitation rate (PR)

- Step 1 – Place 6 identical, straight sided, flat bottom cans (or glasses) randomly between sprinklers in one zone.
  - Do not use short cans like tuna cans, as water may splash out.
- Step 2 – Run sprinklers exactly 10 minutes.
- Step 3 – Pour all the water into one of the six cans.
- Step 4 – Measure depth of water in can.
  - This is the precipitation rate (PR) in inches per hour.
- Evaluate dry spots
  - Compare amount of water received in can from the dry spot to the can from the green area.
  - Significantly less = water delivery problems/poor system design/malfunctioning heads
  - Fairly similar = soil or plant problem

## **CONVERTING INCHES TO MINUTES**

Formula:

$$\text{Run time} = \frac{\text{Water to apply (inches)}}{\text{PR (inches/hour)}} \times 60 \text{ minutes/hour}$$

Example:

$$\text{Run time} = \frac{0.25 \text{ inches}}{1.5 \text{ inches/hour}} \times 60 \text{ minutes/hour} = 10 \text{ minutes}$$

## **DISTRIBUTION UNIFORMITY**

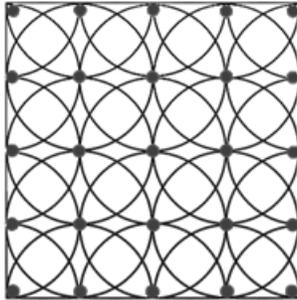
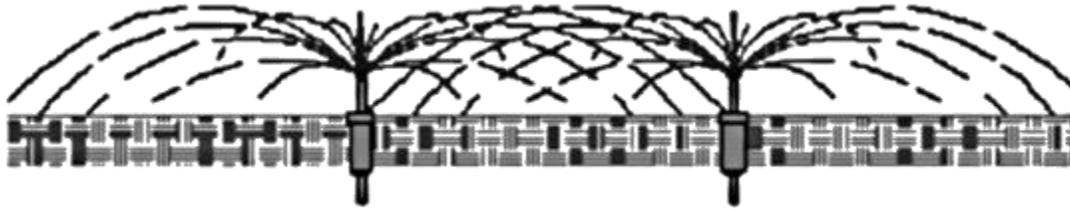
- How evenly your irrigation system applies water
- Poor uniformity = excessively wet or dry areas
- Uniformity of water delivery = water savings.
- If your sprinkler system does not provide uniform coverage, consider upgrading the design.
  - Water savings 20% to over 40%
  - Recover costs in 3 – 15 years
- Make sure you have uniformity in the type, brand and style of heads that are installed in an irrigation zone.
  - Pop-up heads apply water at 1 to 2 ½ inches per hour.
  - Rotor heads apply water at ¼ to ¾ inches per hour.

## **IRRIGATION EFFICIENCY**

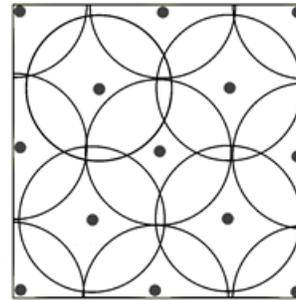
- Four Keys to Efficient Irrigation Systems
  - Head Spacing
  - Matched Precipitation Rates
  - Proper Pressure
  - Maintenance

## HEAD SPACING

- “Head-to-head” Coverage – the water from one sprinkler goes all the way to the next sprinkler.



FULL COVERAGE: HEAD-TO-HEAD SPACING. SPRAY FROM EACH HEAD TOUCHES THE NEXT SPRINKLER OVER THE ENTIRE AREA.



SPACING IS NOT HEAD-TO-HEAD. NOT FULL COVERAGE, MANY MISSED AREAS & DRY SPOTS

- Causes of poor sprinkler spacing
  - System design and/or installation
  - Heads relocated during maintenance
  - Nozzle changes made during maintenance
- Solutions
  - Physically move heads
  - Change nozzles
    - Must consider flow rates and precipitation rates!
  - Retrofit to Rotary Nozzles
    - Inexpensive, very efficient, use 30% less water

## MATCHED PRECIPITATION RATES

- Spray type nozzles have “built-in” matched precipitation rates
- Impact or rotor nozzles do not unless they come with interchangeable nozzles.

## PRESSURE

- Causes of pressure problems
  - Leaks or obstructions in the sprinkler system
  - Valve malfunctions
  - Changes in water distribution system
  - Poor design
- Sprinkler heads and nozzles are designed to operate within a specific pressure range
- Pressures that are too high or low can result in decreased performance
- High pressure -
  - Misting or fogging

- Increased flow rates and precipitation rates
- Decreased uniformity of coverage
- Low pressure -
  - Decreased radius or throw pattern
  - Decreased uniformity of coverage

### **MAINTENANCE**

- Check for proper operation of the sprinkler heads
  - Soil particles plugging nozzles
  - Coverage - water hitting target vegetation, not sidewalks, drives, etc.
  - Broken/missing heads
  - Replace/repair leaky valves
    - The rubber diaphragm in the valve wears out over time, preventing proper opening/closing of the valve.

### **THE FOOTPRINT TEST**

- The easiest way to determine if your lawn needs water is the simple footprint rebound test. If the plants immediately rebound (upright themselves) after a firm step of the foot, then the plants are not under stress from lack of water.
- If, however, the grass lays flat and does not recover quickly, it's probably time to water your lawn.

### **WATER-WISE IRRIGATION MANAGEMENT**

- When determining the watering needs of planted areas, dig down about 4 to 6 inches to determine the moisture content of the soil. Do not worry about the dryness of the top inch of soil. If the soil is too dry to form a ball when squeezed in the hand, it needs water.
- **Never water if the soil is still wet!**
- Water all plants deeply but infrequently to encourage deeper, healthier rooting. Prolonged intervals between watering (short of drought damage) will provide maximum encouragement of plant growth.
- Practicing the following guidelines can decrease water use by up to 30% over the watering season:

#### **Spring**

- Wait to activate your sprinkler system as late into the season as possible depending on the weather. May is usually a good time to start up your system.
- Starting later encourages grass roots to seek water and grow deeper. When hot, dry summer days arrive, the deeper root system means the grass can go longer between waterings.
- Watering a lawn on a frequent shallow basis results in the death of deep roots, increasing the need to water.
- When you start up your system, go through each zone to check for problems and make repairs.
- Be sure to check for any leaks in the system, especially at the backflow preventer and in the valve boxes.
- This is the time to adjust all the heads to ensure the water is being applied to the correct areas.
- Set the controller to water only half the amount your landscape will typically need in July. Consider decreasing the number of days in half and not the time per zone.

#### **Summer**

- Minimize evaporation by watering at night or in the early morning when there's less wind.

- Check out the system once a week to observe how well it's working. Manually run the controller through each zone to check for leaks and make sure water is being applied properly.
- Turn off irrigation in rainy weather!
  - Rain shut-off sensor
    - Simple inexpensive retrofit – wired and wireless models.
    - Required by law in many parts of the country.
- Cycle and Soak?
  - Most compacted/clay soils can't absorb water as quickly as sprinklers apply it.
    - Typical Front Range clay soils = ¼" per hour
  - If applying more than ¼ inch:
    - Multiple short runs an hour apart
    - Cycle and Soak also most appropriate for slopes
- Consider installing low-angle nozzles on tops of slopes to improve efficiency. Irrigation systems should also apply more water at the top of the slope and less at the base to prevent excess runoff.
- Watering time?
  - Night / early morning (9 PM to 6 AM)
    - Reduced evaporation
    - Less wind
    - Avoids hours of peak water demand
- ET Based Smart Controllers
  - Controllers are automatically reprogrammed daily to replace only that water that has been lost through ET (evapo-transpiration).
    - Stand-alone models with on-site weather stations
    - Subscription service and internet based models
    - Smart controllers don't fix dumb irrigation!
- Drip irrigation on shrub and flower beds, small fruits, and vegetables reduces water use by 50%.
- Points to ponder
  - Increased drought tolerance with 3" to 4" mowing height.
  - Spring fertilization decreases drought tolerance!
    - Fertilize with a half rate in late-May (Memorial Day), a half rate early July (4<sup>th</sup> of July) and a full rate in mid to late-October
  - Any grass is intolerant of traffic when under water stress.