



Principles of Xeriscape

Steps 5 & 6 : ***Irrigation and Mulch***

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Irrigation

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

Irrigation zones reflect water demand

- ❖ Match irrigation application to soil type and root depth. Avoid applying more water than can be contained in the root zone.
- ❖ 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.

Additional Guidelines for Proper Irrigation

- ❖ 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.
- ❖ 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 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.

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?
 - PWSD'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 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.

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.

- ❖ If the amount of water in some containers is significantly more or less than others, it indicates that the system is poorly designed or heads are malfunctioning.

Converting inches to minutes

Formula:

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

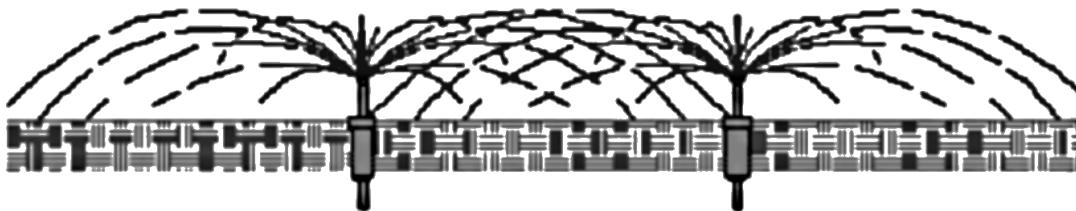
Example:

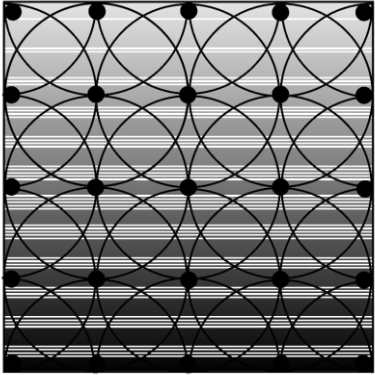
$$\text{Run time} = \frac{0.25 \text{ inches}}{1.5 \text{ inches/hour}} \times 60 \text{ minutes/hour} = 10 \text{ minutes}$$

Uniform Delivery

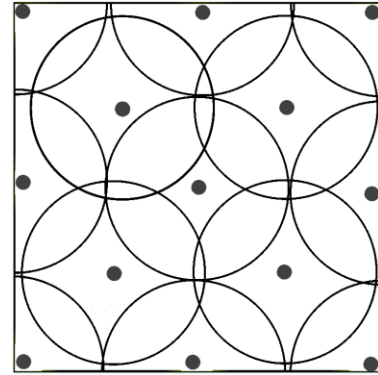
- ❖ Uniformity of water delivery = water savings.
- ❖ If your sprinkler system does not provide uniform coverage, consider upgrading the design.
 - Water savings 20% to over 40%
 - Recover costs in 3 – 15 years
- ❖ Make sure you have uniformity in the type, brand and style of heads that are installed 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.
- ❖ 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
 - Fairly similar = soil or plant problem
- ❖ 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

Maintenance criteria for uniform water distribution

- ❖ 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.

Water-wise irrigation management

- ❖ Turn off irrigation in rainy weather!
 - Rain shut-off sensor
 - Required by law in many parts of the county – PWSD customers by 8/1/12.
 - Manually

Considerations

- ❖ Soak Cycles?
 - 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
 - Soak Cycles 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 (6 PM to 9 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 models
- ❖ Drip irrigation on shrub and flower beds, small fruits, and vegetables reduces water use by 50%.
- ❖ Match turf with needs of site!
 - *If you don't walk on it, you DON'T need it in bluegrass!*

Kentucky bluegrass does NOT require heavy irrigation

- ❖ Water use depends on the expectations - most landscapes are significantly over-watered!
- ❖ Bluegrass goes dormant under water stress
- ❖ Makes a great "reduced input" lawn, allowing it to go dormant in hot/dry weather.
- ❖ Drought-tolerant varieties use 30% less water (in theory....).

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!

Water-wise Lawn Care

- ❖ 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
- ❖ Higher quality = High water demand
- ❖ Lower quality = Lower water demand
- ❖ Points to ponder
 - Increased drought tolerance with 3" to 4" mowing height
 - Spring fertilization decreases drought tolerance
 - Any grass is intolerant of traffic when under water stress

Mulch

Benefits of Mulching

- ❖ Reduces evaporation by 25-50%
- ❖ Organic mulch promotes soil micro-organism activity (which improves soil tilth, reducing compaction)
- ❖ Stabilizes soil moisture
- ❖ Prevents soil compaction
- ❖ Control weeds
- ❖ Controls erosion
- ❖ Moderates soil temperature extremes
- ❖ Gives a finished look

Wood/Bark Chip Mulch

- ❖ Benefits
 - Great for trees, shrubs, perennial flowers and small fruit trees.
 - Creates favorable environment for earthworms and soil micro-organisms.
 - On shrub and flower beds, cuts irrigation needs by as much as 50%.
 - Note: does not reduce irrigation needs over tree rooting area because only a small portion of the rooting area is typically mulched.
 - Wood chips placed on the surface of soils do not tie up nitrogen.
 - Sawdust and very fine chips, when used as mulch, can tie up soil nitrogen and can decrease soil oxygen levels.

Wood/Bark Chip Mulch Application

- ❖ Depth
 - 3" to 4" standard
 - Best weed control
 - Eliminates compaction forces of foot traffic.
 - 1" to 2" for poorly drained soils
 - On compacted/clay soils with poor drainage, 3-4" may reduce water evaporation so that plants develop root rot under frequent irrigation.
 - More than 4" may reduce soil oxygen levels.
- ❖ Bark chips float
 - Not suited for areas with standing water or heavy surface run off.
- ❖ Bark chips can blow away
 - Chips are generally not suited for windy areas.
 - Shredded type mulch is more wind resistant.

- ❖ Do not use landscape fabric under organic mulches!
 - Inhibits the spread of perennial plantings.
 - Fabric prevents the compost created from the decomposing mulch (on top) from working back into the soil.
- ❖ Wood/bark chips are not recommended in vegetable or annual flowerbeds where the soil is routinely cultivated to prepare a seedbed.

Rock mulch

- ❖ Great for non-crop areas
- ❖ Doesn't blow or fly away
- ❖ Doesn't decompose
- ❖ Lower maintenance
- ❖ Disadvantages
 - May increase soil temperature, resulting in increased spring-time plant growth.
 - May reduce evaporation from soil surface.
 - Doesn't add to soil tilth.
 - May increase irrigation requirements due to "heat island" effect.
 - Reflected heat can cause damage to some plant material.

Landscape Fabric

- ❖ Fabric is great if you have no intention of growing plant material.
 - Use it under flagstone/brick patios.
 - Use it on a hillside of junipers and rock
 - Use it to line drainage swales
- ❖ Even with fabric and "just rock", topsoil blows in over time and seeds will germinate in that soil that is trapped on top of your fabric.

Glass Mulch, Rubber Mulch, Mulch Volcanoes

- ❖ Same kind of "heat island" effects that rock mulch produces.
- ❖ Don't do it.....