



Efficient Landscape Irrigation during Drought and with Limited Water Availability in Colorado

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Landscape irrigation makes possible the growth of plants that enhance the quality of life in semiarid Colorado. Without it there would be no dense grass and other plant cover. These plants minimize airborne dust and soil movement outdoors and into buildings that otherwise would cause major cleanliness and environmental concerns in cities and towns. On average, fifty percent of the water consumed in residences is used to irrigate landscapes.

More efficient use could be made of landscape irrigation water. Savings averaging 40 percent are easily possible with proper design, maintenance and management of automatic irrigation systems. A better understanding of plant water needs, soil water storage and other factors affecting landscape irrigation can lead to increased application efficiency whether water is applied with a hose, automatic sprinkler or through drip irrigation. Keep in mind these points for using water wisely in landscapes.

Improve Irrigation Management

- Make sure that the irrigation system is operating properly as described in the maintenance section
- Avoid watering if the soil is still wet. Use a trowel or shovel to check soil moisture rather than guessing. Water to match your soil type, more frequently with smaller amounts on sands and less frequently on clay soils that store more water than sands.
- Water to meet the needs of plants. Practice seasonal setbacks by watering less in cool spring and fall weather and increasing applications in hot summer weather. Newer irrigation controllers allow a percentage adjustment of peak, 100 per cent summer applications to make seasonal setbacks convenient.
- Review how to set irrigation days, zone start times, run times and multiple cycles on your controller. To reduce water loss from evaporation, water at night when it is cooler and there is less wind. Water between 6:00 p.m. and 10:00 a.m. or according to local water restrictions.
- Use multiple start times or manually practice soak and cycle irrigation to avoid runoff water waste. Especially important on slopes and compacted soils, water and allow to soak in before applying more water. On clay soils, operate spray heads no more than 8 minutes

and rotor heads a maximum of 24 minutes before stopping at least 30 minutes to allow water to soak in. Apply water slowly enough that runoff and puddling does not occur.

- Water as infrequently as possible, without causing undue stress to the lawn and other landscape plants.
 - Turn the irrigation controller to the "Manual" position (from "Automatic") and learn how to operate it manually.
 - Don't irrigate on a set schedule (every 2 or 3 days); plant water use can vary greatly from one day to the next.
 - The roots of trees, shrubs, and flowers may rot if over-watered. Over-watered plants with root damage need more water in the heat of the day.
 - Lawns may need water every three or four days during the heat of the summer, less in cooler times of year. Shrubs and trees may need water only once every few weeks, while perennial flowerbeds may need water only once a week. Plants growing in sandy soils may need more frequent watering.
 - Irrigate when footprints or mower wheel tracks become easily visible on turf and large areas of the lawn take on a bluish-gray color.
 - Don't water again until abundant signs of water stress (footprinting, blue/gray coloration) appear in the lawn.
 - Hand-watering small or isolated dry spots can allow extending the time between watering by another day without watering the entire lawn.
- Consider "smart technology" ET controllers that perform daily adjustments of water applications according to weather information delivered via radio page, phone or internet. ET controllers adjust both the amount and frequency of water applied. Other smart technology such as rain sensors that prevent irrigation systems from operating during or shortly after rainfall can save water.
- As landscapes mature, more shade develops from trees. Plants growing in shaded conditions often use less water and the amount of water delivered should be decreased. Note that intensive root competition for water may actually require more water in dense tree and shrub plantings.
- Winter watering can be a critical tool to minimize stress to trees, shrubs, flowers, and turf in areas receiving low winter precipitation and subject to drying winds.
- Application of water once a month during dry winter periods allows plants to emerge from winter healthier. A common reaction to plants damaged by winter drought is overwatering in spring in a vain attempt to help plants recover. Timely winter watering avoids this water-wasting reaction to winter drought damage and results in better plant quality.

Design of irrigation system affects efficiency

- Sprinklers should be zoned properly so lawns can be watered separately from trees, shrubs and flowers. Also water vegetable beds and rose gardens separately from lawn areas.
- Design sprinklers to "line out" driveways, walks, roads and non-irrigated areas. Sprinklers should be next to hard surfaces to throw water onto landscape areas. Avoid a

design where the sprinkler heads shoot from the center towards pavement to avoid runoff water waste.

- Design irrigation zones so water from one head reaches the neighboring head(s). Too much space between sprinkler heads creates dry spots. Sprinklers are best installed in a triangular or square pattern to insure "head to head" coverage. Sprinkler heads that do not overlap cannot be expected to water the intended area properly.
- Install only as many heads per irrigation zone as the water pressure will allow. Irrigation heads are designed by manufacturers to apply a certain amount of water over a specific area when performing within a certain operating pressure range. Installing more heads than the water system will handle results in dry spots. Symptoms of low water pressure often appear as donuts of green grass around the sprinkler head with dry areas between heads.
- Avoid oscillating sprinklers and sprinkler heads that produce mists or fine sprays. High water pressure should be reduced by adding pressure regulators to the system.
- Install the same type of head with the same precipitation rate within each zone. Mixing heads within a zone leads to uneven water application, unsatisfactory plant growth and often runoff water waste.
 - The water delivery rate of rotary, spray heads and impact sprinkler heads is different. Impact heads deliver as little as 1/2 inch of water per hour, while pop-up spray heads may apply up to two inches of water per hour.
- Long, sloping turf areas may require several different sprinkler zones; each line of sprinklers, controlled by a valve, is called a zone.
 - Irrigation zones should be installed along the top of the slope, rather than up and down the slope. The slope may require two or more lines of sprinklers, each controlled by its own valve. Because water runs downhill, the bottom of the slope tends to receive more water. Adjust sprinkler zones running along the middle and bottom of the slope so they apply progressively less water than the sprinklers at the top of the slope. Watering for the same amount of time in each zone wastes water.
- If possible, install water-conserving devices such as check valves, pressure regulators or climate sensors (i.e. rain, temperature and wind sensors). These suspend irrigation under unfavorable weather conditions.
- Consider water efficient drip irrigation for shrub borders, flower and vegetable gardens. Drip irrigation exceeds 90 percent efficiency whereas sprinkler systems are 50 to 70 percent efficient.

Maintenance Practices to meet Present and Changing Plant Water Needs

- Annual maintenance of irrigation systems is necessary to keep them operating efficiently.
 - Replace broken or missing sprinkler heads
 - Straighten sprinkler heads to vertical that are tilted from winter soil heaving or blows from lawnmowers and foot traffic.

- Pop-up heads that don't reach high enough to achieve a clear spray trajectory should be raised or replaced with taller heads.
- Adjust head alignment so that water is not thrown onto streets and driveways .
- Check nozzles for plugging and clean filters.
- Check that rotor heads are turning properly.
- Place catch containers on persistent dry spots to determine if poor sprinkler coverage is the problem. If not sprinklers, soil conditions, slope, aspect or wind should be considered.
- Periodic maintenance of irrigation systems is also needed. Plants mature and change. People also change landscapes over time. Add or relocate system components as needed to maintain uniform distribution of water. Ensure that system modifications do not exceed the system watering capacity.
 - Drip irrigation installed at the base of newly planted trees should be moved as the tree root system expands. Drip irrigation is a point source delivery method that does not distribute water far away from emitters. Drip irrigation that is not relocated over time, wastes water because the fine roots that pick up moisture have grown away from the base. Tree roots grow and spread to reach two to three times the width of the tree canopy. Microspray heads can deliver water over wider areas for small trees but not to wide-ranging root systems of large trees.
 - If sprinkler systems are over ten years old, they often require part replacements and component upgrades.

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