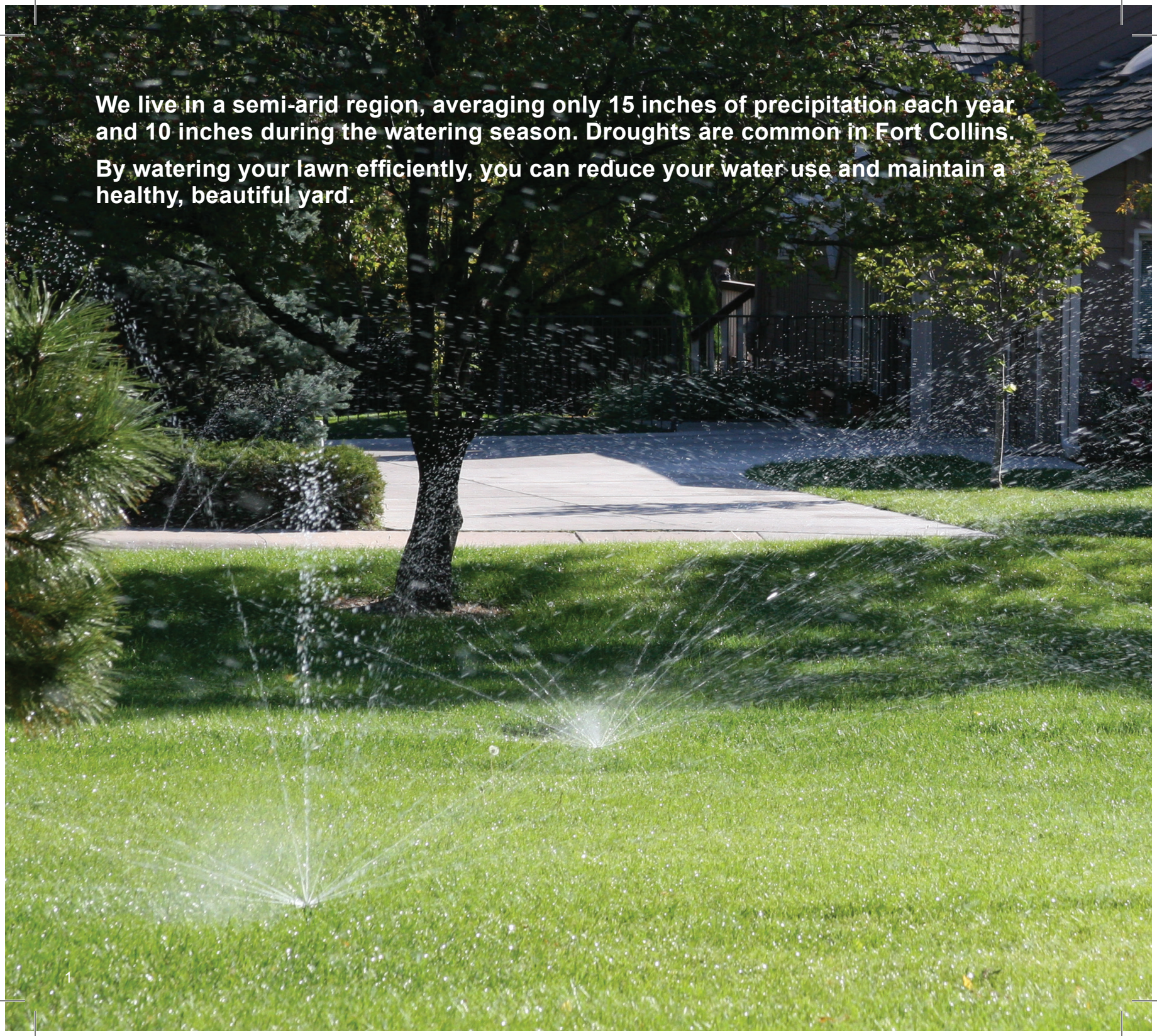


Water-Wise Lawn Care

Make Efficient Choices

We live in a semi-arid region, averaging only 15 inches of precipitation each year and 10 inches during the watering season. Droughts are common in Fort Collins. By watering your lawn efficiently, you can reduce your water use and maintain a healthy, beautiful yard.





Water-Wise Lawn Care

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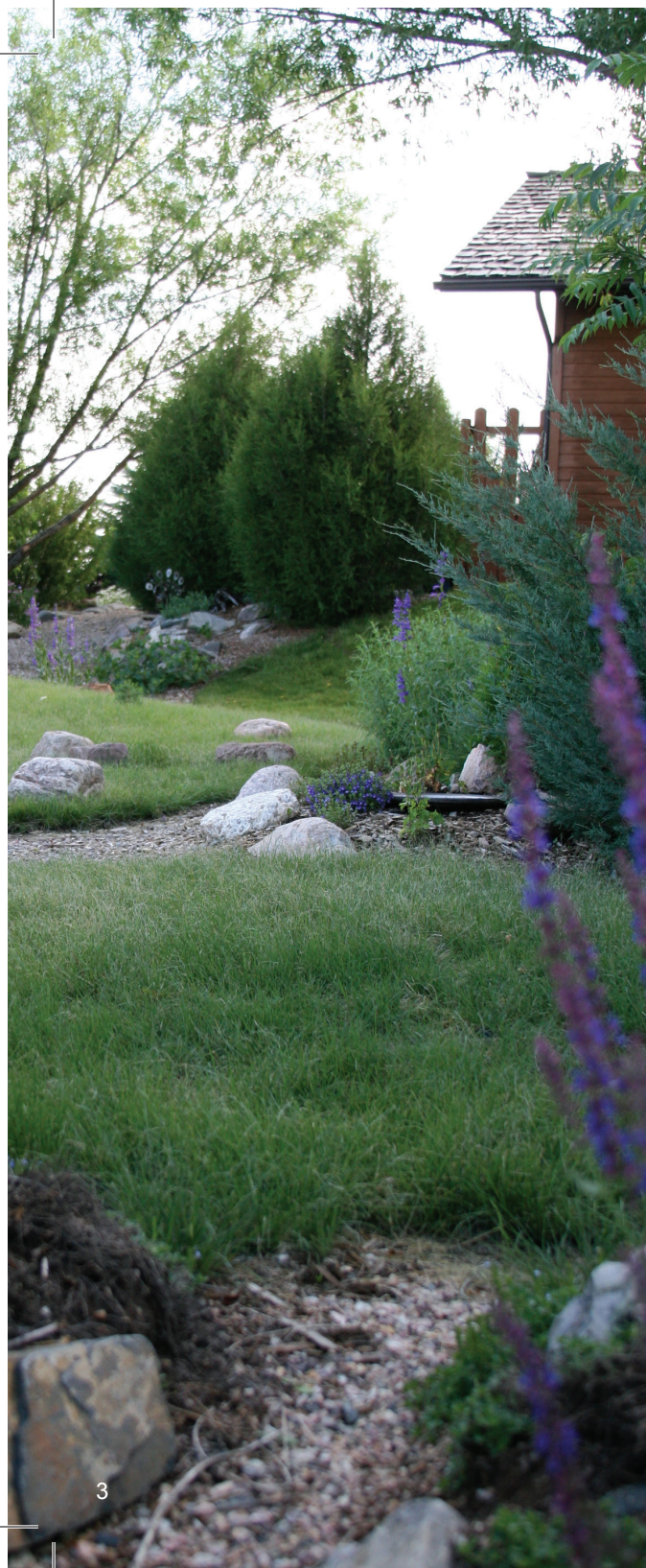


Get to Know Your Sprinkler System

In Fort Collins, about half of a home's annual water use typically is for watering the landscape. Understanding your sprinkler system is crucial for efficient watering. To make educated decisions about outdoor watering, use this guide to learn how much water your system applies, the rate at which soil can accept water and the amount of water your lawn and plants require.

Lawns typically get more water than needed. Too much water can be just as damaging as too little and can:

- suffocate roots
- wash away nutrients
- encourage insects, weeds and disease



Know How Much Water Your Lawn Needs

Lawns use water differently

Plants use water to soak up nutrients, maintain structure and cool the leaf surface. Sun, heat, low humidity and wind make a lawn thirsty. Shady areas protected from the wind require less water. It all depends on the evapotranspiration (ET) rate.

The ET rate is the amount of water, in inches, a typical lawn uses through soil evaporation and plant transpiration. When watering, the goal is to replenish only the amount of water lost through ET.

The difference is soil and roots

Soil – Successful water use begins with understanding your soil. Most soil in the Fort Collins area is predominantly clay and absorbs water slowly. When water is applied too quickly, it puddles or runs off before being absorbed. Our soil can absorb only about $\frac{1}{4}$ inch of water an hour.

If you're starting a new lawn, you are required to add 3 cubic yards of organic matter per 1,000 feet of landscape and rototill to a depth of 6 inches. Good soil, along with annual aeration, helps roots grow deeper and allows water to penetrate into the soil.

Roots – Using a soil probe or a small trowel, dig out a small patch of your lawn to see how far down the grass roots grow. Most bluegrass roots are only 3 to 6 inches deep. Plants can only use water the roots can reach, so it's not helpful to water below the root zone. Roots won't grow through dry areas to search out moisture.



Root
zone
3-6"



High-efficiency rotary nozzles

What are PR and DU?

The precipitation rate (PR) of a sprinkler zone is a measurement of water, in inches per hour, applied by sprinklers. Distribution uniformity (DU) is how evenly the water is being applied.

Sprinkler options

Grass areas

Spray heads

- 5–15 feet in diameter
- Apply water at a fast rate
- Fair distribution uniformity
- Best for irregular shaped areas

Rotor heads

- 15–35 feet in diameter
- Apply water at a slow rate
- Good distribution uniformity

High-efficiency rotary nozzles

- 8–35 feet in diameter
- Apply water at a slow rate
- Great distribution uniformity

High-efficiency spray nozzles

- 5–15 feet in diameter
- Apply water slower than conventional spray heads
- Great distribution uniformity

Planting beds

(shrubs, perennials and trees)

Drip emitters

- Beds less than 5 feet wide
- Water plants separately

Micro-sprays

- Within 5 feet of foundation or hardscapes
- Water groups of plants

Know How Much Water Sprinklers Apply

Choose the right sprinkler

You will need to use different types of sprinklers to water various areas of your yard most effectively. For grass areas, spray and rotor sprinkler heads work best. Drip emitters and micro-sprays are used for perennial and shrub beds. Because each type of sprinkler delivers water at a different rate, do not mix heads within a zone.



Different sprinklers for different areas

Spray heads – These sprinklers are stationary when running and emit water in a fixed fan-shaped pattern. Various nozzles can water quarter, half or full circles. For good coverage, the sprinkler heads should pop up at least 2½ inches above the top level of the grass.

As a general rule, spray heads deliver 1½ inches of water per hour. They can deliver ¼ inch of water in 7 to 10 minutes. Use spray heads for smaller lawn areas or when the borders require tight control.

Rotor heads – Although the spray of a rotor is more uniform than that of a spray head, rotors can take much longer to water. In general, rotor heads deliver ½ inch of water per hour. For ¼ inch of water, run the sprinkler 20 to 30 minutes.

These heads can be adjusted to water from a small arc to a full circle. Choose rotors to water lawn areas wider than 15 feet.





Drip emitter

Drip emitters – These deliver water at a slow, consistent rate, such as 1 to 2 gallons per hour. Emitters connect to distribution tubing to reach individual plants. These can be used to water trees, shrubs and flowerbeds. For most plant material, drip zones only need to run once a week for about 2 hours to reach the root zone. Subsurface drip irrigation is a new technology for using drip emitters to water turf at the root zone.

Micro-sprays – Groupings of flowers and other small plants can be efficiently watered with micro-sprays, which spray water over a small, specific area. Make sure all the plants have similar watering needs.



Micro-spray

Choose the right sprinkler for your hose

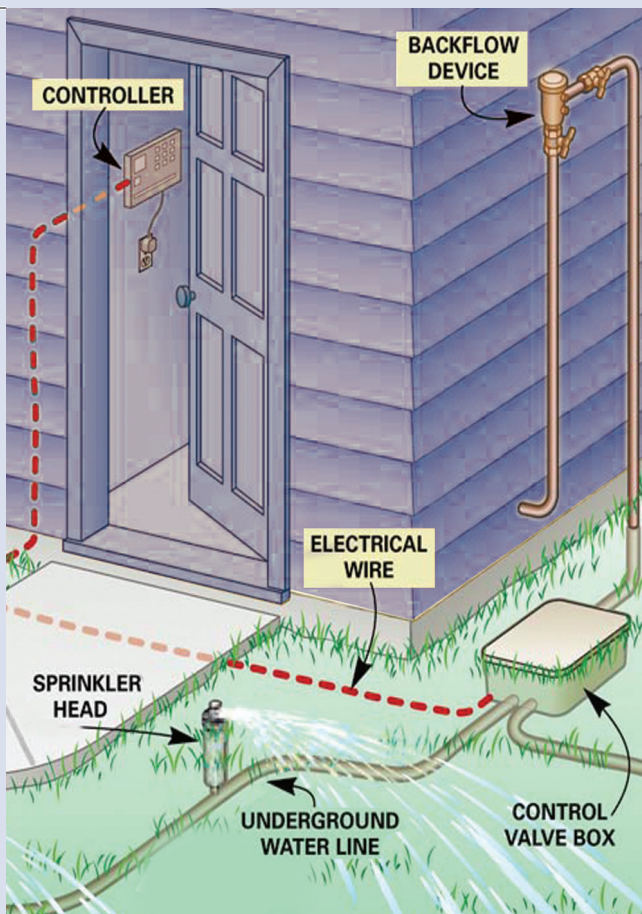
If you water your lawn with a garden hose, choosing the correct sprinkler is critical when it comes to watering wisely. Use a sprinkler that matches the size and shape of your lawn.



- Spot sprinklers work for small areas less than 50 feet in diameter. They are designed to water round, square or rectangular areas. Some offer a variety of watering patterns.
- Spinner or rotary sprinklers are appropriate for medium-sized areas around 50 feet.
- Impact sprinklers are best for medium or large areas up to 90 feet in diameter.

Water flow of hoses

- ½ inch diameter hose delivers about 300 gallons per hour (gph)
- ¾ inch hose delivers 600 gph
- 5/8 inch hose delivers 500 gph



System components

Controller – The controller is the system's timing mechanism. Its job is to activate the sprinkler system as programmed. Look for a controller that allows you to precisely adjust watering times and has multiple start times, cycles and programs. It should offer seasonal adjustments and skip cycles when it rains. Battery backup and surge protection also are helpful features.



Nozzles – Nozzles determine the spray pattern of a sprinkler head, radius of throw and amount of water delivered. Spray head nozzles have matched precipitation rates. A 90° nozzle delivers one quarter of the water of a full circle nozzle. Variable arc nozzles (VAN) can be adjusted from 0° to 360° of spray with a simple twist. Rotors have adjustable arcs, although adjustability varies by model and manufacturer. For optimum performance, use one brand of sprinkler head throughout the system.

Backflow preventer – This device is required on all sprinkler systems to keep water from being back-siphoned into a home's drinking water and must be tested every three years.



Catch can test



High-efficiency rotary nozzle

Sprinkler rebates

Fort Collins Utilities water customers can receive rebates to upgrade their sprinkler systems with new technologies.

- Residential rebates:
fcgov.com/sprinkler-rebates
- Commercial rebates:
fcgov.com/water-efficiency

New technology

Weather-based controller – These controllers continuously monitor actual site data and automatically adjust the watering schedule each day. By factoring in soil type, slope and sun exposure for each zone, the landscape is only watered when needed. Some controllers use historical weather data and others have a weather station installed, or use a subscription service that brings weather data to the controller via radio, Internet or phone connection.

Soil moisture sensor – This sensor has a set of probes or a sensor board that monitors actual soil moisture. It is connected to a controller and shuts it off when soil moisture reaches a set level. When the soil dries out, the controller operates normally again.

Rain sensor – This sensor turns off the sprinkler controller during or after a rainfall. A wafer collects the rain and when it dries out, the controller turns back on. The amount of rain that triggers the system to shut down is adjustable. The sensor can be mounted on an eave, side of the house, pole or fence. Both wired and wireless models are available. They can be retrofitted to any existing sprinkler system.

High-efficiency rotary nozzles – This turns a spray head into a rotating head that can water more efficiently. Water is applied at a slower and more uniform rate, allowing it to soak into the ground instead of running off. In addition, the water jetting from these nozzles is more resistant to wind, less likely to mist and significantly reduces runoff onto streets and sidewalks.



Rain sensor

Catch can test

Follow these steps for each of your sprinkler zones.

1. Place six cans of equal size within the spray of the sprinklers.
2. Turn on the sprinklers for 10 minutes.
3. Check the depth of water collected in each can. If each can has about the same amount of water, your sprinklers are delivering an even amount. However, if some areas are receiving more water than others in the same zone, you may need to adjust or replace some of your sprinkler heads.
4. Pour all the water from the cans into one can. With a ruler, measure the depth of the water. The result is the inches per hour the sprinklers in that zone deliver. Use this calculation in the Run Time Worksheet.

Calculate run time

To calculate the run time for each zone, simply divide the amount of water you want to apply (inches) by the precipitation rate (inches per hour). For example, if you want to apply $\frac{1}{4}$ inch of water and the zone delivers $1\frac{1}{2}$ inches per hour, you would set the run time to 10 minutes.

Run Time Worksheet (example)

Water to apply (inches)	\div	Rate for zone (inches/hour)	=	Run time (minutes)
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$\frac{1}{4}" \div 1\frac{1}{2}" \text{ per hour} \times 60 = 10 \text{ min.}$

Match Sprinkler Output to Lawn's Needs

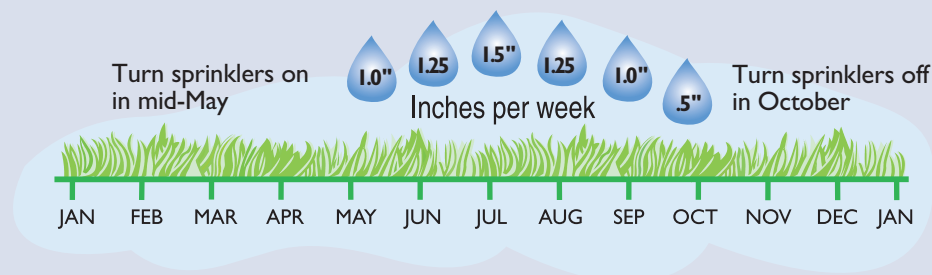
Once you know how much water the lawn needs and the rate sprinklers apply water, you can calculate how long the sprinklers need to run.

When to water

Save water by regularly adjusting the controller according to the weather and season. Better yet, operate the controller manually.

Eyes and a screwdriver – Before watering, look for signs that the lawn needs to be watered. A dull bluish-gray color and footprints left on the grass are signals that it's time to water. You also can check the soil moisture by poking a screwdriver into the ground. If it's hard to push in, it's time to water.

Historic ET – Adjust your sprinkler schedule monthly according to historic weather data. Follow the chart below to determine how much water a bluegrass lawn needs each week during a typical year and adjust for weather and site conditions.



Real-time ET – Look for the daily watering guide near the weather map in the *Coloradoan* or at fcgov.com/lawn-guide. The guide shows how much water a bluegrass lawn needs, minus rainfall. It's time to water when the ET value reaches $\frac{1}{2}$ inch since the last time you watered,

You also can check the ET rate and rainfall at a weather station. Northern Water collects data from two Fort Collins weather stations and reports it at northernwater.org/WaterConservation/WeatherandETInfo.aspx.

Avoid runoff with “cycle and soak”

A cycle is when the controller waters each zone in the yard. Since our clay soil only can absorb about ¼ inch of water an hour, it's most efficient to set each zone to deliver no more than ¼ inch per cycle.

We recommend watering ¼ inch, two times, to equal ½ inch of water. To reduce runoff, run the system to apply ¼ inch of water for each zone. Wait an hour and water another ¼ inch. This allows each application of water to reach the roots where it does the most good. Be sure the first cycle is complete before scheduling a start time for the next cycle to avoid overlap.

How often to water

Watering two days a week should be sufficient during most of the summer. If necessary, add a third watering day during extreme heat or dry periods. Be aware that most trees and shrubs have bigger root zones and need about half the amount of water as the grass. It's best to use a separate program to water trees and shrubs.

Some recommended watering times:

	May	June	July	August	Sept	Oct
Spray	1-2 days/wk	2-3 days/wk	2-3 days/wk	2-3 days/wk	1-2 days/wk	1 day/wk
	2 cycles of 6 minutes	2 cycles of 8 minutes	2 cycles of 9 minutes	2 cycles of 8 minutes	2 cycles of 7 minutes	2 cycles of 6 minutes
Rotor	1-2 days/wk	2-3 days/wk	2-3 days/wk	2-3 days/wk	1-2 days/wk	1 day/wk
	2 cycles of 16 minutes	2 cycles of 18 minutes	2 cycles of 20 minutes	2 cycles of 18 minutes	2 cycles of 16 minutes	2 cycles of 16 minutes

Save water

Monitor your grass. If stressed areas appear just before the next watering, your timing is probably about right. This will save a tremendous amount of water without seriously affecting the lawn's appearance.

Signs of a leak

- Broken sprinkler head
- Weak output
- Constant leak in lowest sprinkler
- Water meter constantly running
- Wet spots in the lawn
- Water-filled valve box



Water pressure

Too much or too little water pressure can make a sprinkler system less efficient and waste a lot of water. Ideal pressure should be 30 pounds per square inch (psi) for spray heads and 50-60 psi for rotors.

- **Low pressure** – When pressure is too low, sprinkler heads emit large drops; producing a poor spray pattern of water that doesn't reach the next head. Low pressure for spray heads is under 25 psi and under 35 psi for rotors. If pressure is less than 20 psi, a booster pump is needed. Low pressure may be caused by a leak, too many heads on a zone or a long sprinkler line.
- **High pressure** – If pressure is too high, the heads will produce a fine mist, causing water loss due to evaporation in even light winds. High pressure also can lead to overspray and a distorted spray pattern, along with other problems. High pressure is over 35 psi for spray heads and over 70 psi for rotors. To lower pressure, install pressure reducing heads or a pressure regulator on the system.



High pressure

Specialty heads and nozzles

Pressure-Reducing Stem (PRS) heads regulate the pressure at the head to provide the correct watering pressure.

Seal-A-Matic (SAM) heads or check valves can be used to prevent water from draining from low-lying heads and reduce the risk for water hammer.

High-efficiency spray nozzles apply water at a slower rate than standard nozzles, which is optimal for clay soils. These nozzles apply 1 inch per hour as opposed to 1½–3 inches per hour for standard nozzles.

High-efficiency VAN nozzles (HE-VANs) are new to the sprinkler market. They are fully adjustable to cover any angle with a higher rate of uniformity.

Spray nozzles also are available in specialty patterns:

- **Side Strip (SST)** used in parkway strips or narrow grass areas
- **End Strip (EST)** used in parkway strips or narrow grass areas
- **Left Corner Strip (LCS)**
- **Right Corner Strip (RCS)**
- **Square patterns**



Check Your Sprinkler System

Inspect your system regularly. Turn on each zone for 5 minutes and observe any problems. To make repairs easier, write down or flag what you see. Be sure to look for:

- **Dry or wet areas in the landscape.** Dry areas mean the spray pattern from one sprinkler head isn't reaching the next one. Wet areas mean the spray from too many sprinklers is reaching one area or there is a leak.
- **Heads that are emitting large drops (low pressure) or a fine mist (high pressure).** See the side bar on page 11.
- **Broken, leaking or missing heads.** Repair them right away.
- **Tilted heads.** Adjust so the heads are vertical.
- **Low or sunken heads.** Raise so they are level with the ground surface.
- **Clogged heads.** Remove the nozzle and wash the grit screen.
- **Improper arc or radius.** Adjust or replace nozzles to increase or decrease radius.
- **Overspray onto sidewalk, patio, driveway or street.** Move heads away from hard surfaces or adjust the radius of throw.
- **Mixed heads.** Because rotors and spray heads deliver water at different rates, they should not be used on the same zone. If you have a spray head in a rotor zone, consider swapping out the nozzle with a high-efficiency rotary nozzle.
- **Low head drainage.** Install in-line check valves or heads with built-in check valves.
- **Obstructions.** Prune plants or move objects that interfere with the spray pattern.
- **Broken drip emitter.** Replace with a new emitter or plug the hole with a "goof plug."



Fort Collins Utilities offers free sprinkler audits to:

- Fort Collins residential water customers
- Homeowners associations

Audits include a:

- visual inspection of each zone
- measurement of how much water is being applied
- custom lawn watering schedule

For more information, visit fcgov.com/sprinkler-audit or call (970) 221-6700.

Water-wise ideas

- Avoid watering when it's windy or raining.
- Water between 6 p.m. and 10 a.m. to reduce evaporation.
- Hand water dry spots rather than overwatering the entire lawn.
- Use low-angle nozzles to reduce windblown water waste.
- Don't plant grass on steep slopes or in areas less than 10 feet wide.
- Replace some bluegrass with planting beds or water-wise grasses.
- Use fertilizer sparingly, since it encourages grass growth that requires more water and mowing. Lightly fertilize bluegrass in the spring and fall.
- Use a "cycle and soak" watering plan (see page 10).

Mowing tips

Mow early – Mowing when it's cool reduces stress on grass.

Mow sharp – Dull mower blades tear the grass causing it to stress.

Mow higher – Mow bluegrass 2½ to 3 inches tall. Longer grass blades promote deeper rooting and shade the plant's root zone, so the grass needs less water. Never cut off more than one third of the leaf blade.

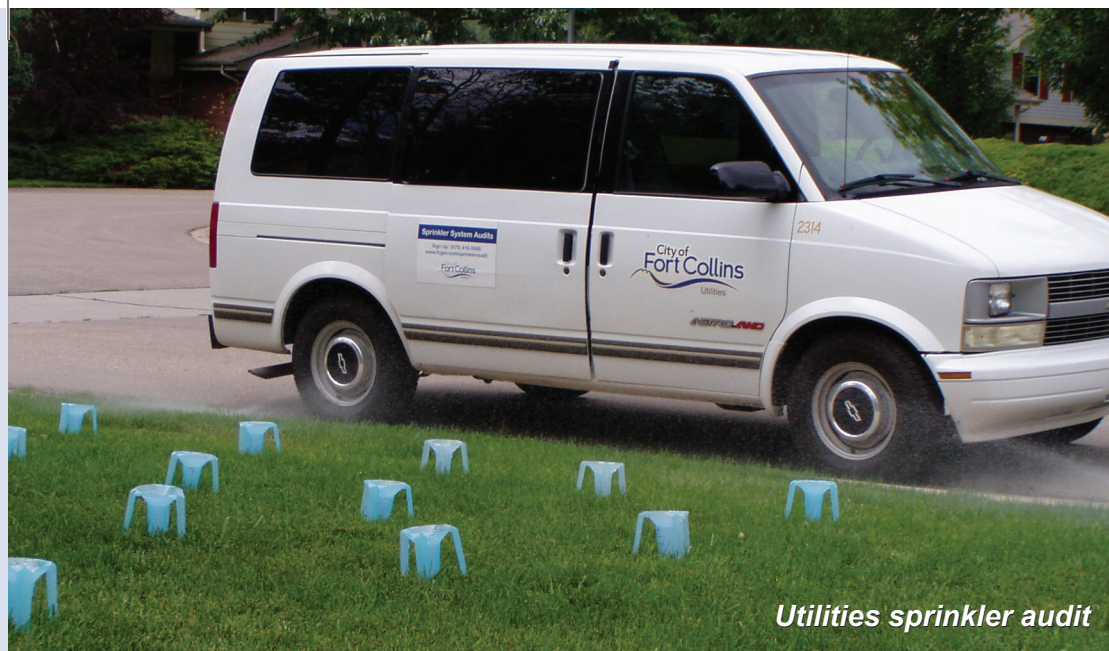
Leave clippings where they fall – Grass clippings contain nutrients and decrease the need for fertilizer. Use a mulching mower to cut the leaf blades into smaller pieces.

Brown spots

Don't automatically increase watering time when you have a brown spot. Instead, water manually with a hose. Usually brown spots are caused by poor sprinkler coverage, disease, insects, pet urine or chemical damage.

Turn on the zone(s) in the troubled area, inspect each head and apply some of the solutions described in this manual. Repair or modify the sprinkler system for better coverage. Tree roots that are depleting the water at the edge of the canopy also may cause brown spots.





Utilities sprinkler audit

Do-it-yourself sprinkler audit kit

Borrow a kit with all the equipment and instructions you need to conduct a self-audit of your system.

For more information, visit fcgov.com/sprinkler-audit.

Resources

- Sprinkler audits – fcgov.com/sprinkler-audit
- Self-audit sheets and instructions – fcgov.com/self-audit
- Residential sprinkler rebates – fcgov.com/sprinkler-rebates
- Daily lawn watering guide – fcgov.com/lawn-guide
- Backflow prevention – fcgov.com/backflow
- CSU Extension publications – www.ext.colostate.edu
- Turfgrass program – csuturf.colostate.edu/Pages/homelawncare.htm
- Northern Water weather stations – northernwater.org/WaterConservation/WeatherandETInfo.aspx
- Associated Landscape Contractors of Colorado – alcc.com
- Xeriscape – fcgov.com/xeriscape

For more information, call (970) 221-6700, email utilities@fcgov.com or visit fcgov.com/conserves.





fcgov.com/conserves • utilities@fcgov.com • 970-221-6700 • TDD 970-224-6003