K-STATE Research and Extension

Watering Your Lawn

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Trying to maintain a lawn at the peak of perfection at all times, especially during the summer, is not only a waste of water, but it is bad for the grass and adds to pest problems. Through efficient use, water consumption can be reduced by up to 50 percent with only a 10 percent reduction in turf quality. This change is hardly noticeable and leads to positive effects such as less frequent mowing and fewer weeds, diseases, and insects.

Water conservation goals for a lawn might be to maintain attractive, healthy turf with less water, eliminate irrigation runoff and avoid soaking soil below the root zone, to water when evaporation loss from heat and wind is low, and plant water-conserving grasses. Factors that affect lawn watering include:

- Grass type — warm- or cool-season
- Weather — temperature, humidity, sun, rain, wind
- Soil type — sand, clay, loam, or compacted soil
- Sunny or shady location
- Seasons — shorter days and cooler temperatures during the spring and fall vs. longer days and hotter temperatures during the summer
- Amount of fertilizer applied
- Mowing height
- Slope of the yard

Follow these practices to conserve water.

- Water only when lawn shows signs of needing water.
- Water in the morning.
- Water slowly so all water is absorbed, no runoff.
- Direct the water only onto the turf.
- Use sprinklers that produce drops of water.
- Soak soil to a depth of 6 to 8 inches.
- Stop watering at least 30 minutes before sundown.
- Start water-conservation practices at the beginning of the season.
- Water as infrequently as possible without stressing grass.
- Avoid shallow, frequent watering and watering paved walks, drives, and streets.
- Do not water with a fine mist spray or in high winds.
- Do not mow grass short or fertilize excessively.

How Often to Water

Water more or less often depending on the weather, turfgrass species, soil type, season, shade, fertilization practices, mowing height, and slope. Weather changes by season and varies considerably from year to year. ***Adjust watering frequency to the weather and not the calendar.***

Water according to the weather

Water less	Water more
Cooler temperatures	High temperatures
Cloudy or overcast	Bright sunlight
Low wind	High wind
High humidity	Low humidity
Rain or showers	No rain

Use the soak and wait method. Soak soil to the depth of the root zone, and wait as long as possible before watering again. Watch for signs that the turf needs water such as a darker bluish-green color or footprints remaining in the turf. Do not wait until turf is severely wilted. Sandy soils have to be watered more often than loam or clay soils.

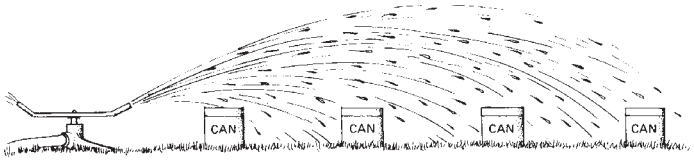
Watering too frequently and lightly is a common mistake. Frequent, shallow watering produces a shallow root system and reduces resistance to heat, cold, drought, and wear. Water as infrequently as possible without stressing the turf. Lawns differ in soil characteristics and species, so there is no simple formula. The following guidelines should be adjusted for the site.

Frequency of irrigation

Buffalograss	Least frequent
Bermudagrass	
Tall fescue	
Zoysiagrass	
Kentucky bluegrass	
Perennial ryegrass	Most frequent

How Much to Water

The amount of water to apply at one time depends largely on the soil. The type of soil determines how much water is absorbed and held in addition to the potential rooting depth of the grass. Apply enough water to soak soil slightly below the root depth. You can determine this by excavating a small portion of the soil profile with a shovel. Most roots grow 6 to 8 inches deep in a loam soil, deeper in sandy soil, and shallower in a clay soil. Roots will not grow as deeply in compacted soils because of a lack of oxygen.



This measures the rate of application and distribution uniformity.

Sandy soils hold the least amount of water and lose water quickly below the root zone. Loam soils hold water efficiently and are ideal for good root growth. Although clay soils hold the most water, excess water drains slowly and deprives roots of oxygen. It is important not to saturate clay soils.

Water needed to soak soil and absorption time[1]

Amount of water	Absorption time
Sandy soil 0.5 inch	30 minutes
Loam soil 1 inch	2 hours
Compacted clay soil 1–1.3 inches	5 hours

[1] Amount of water needed to soak soil 6 to 8 inches deep and time required for the soil to absorb water

Watering less than 3 inches deep is considered shallow watering. Shallow watering promotes shallow root growth, making the lawn less resistant to drought and more likely to have weed, insect, disease, and thatch problems. In addition, shallow watering results in more water evaporation. To make sure lawn has been sufficiently watered, push a rod or screwdriver into the ground. When the rod will go no further, dry soil has been found. If the rod penetrates slightly deeper than the rooting depth, the turf has been adequately watered.

When to Water

Morning is the most efficient time to water. Less water evaporates because it is cooler and there is less wind early in the morning. City water pressure is greater than it is during peak usage time of 5 p.m. to 10 p.m. While not harmful to the grass, mid-afternoon is the least efficient time to water. Evaporation loss from high temperature, wind, and low humidity is greatest during the afternoon hours.

Many people who do not have an automated underground sprinkler system begin watering after they get home from work and shut the water off at bedtime. Grass stays wet longer at night and is more likely to be infected by disease. If this is the most convenient time to water, shut the water off 30 minutes before sundown to give the grass time to dry.

Night watering is efficient in terms of temperature, wind, and humidity, but the watering cycle should be timed to finish after sunup. Some diseases can develop in as little as two hours when a film of water remains on the grass. Another drawback to night watering is that the homeowner may not notice water runoff, poor sprinkler coverage, and water breaks.

If grass is wilting severely, water immediately regardless of the time of day or night. Although turfgrass needs water for acceptable appearance during hot, dry weather, most turfgrass is overwatered. Problems created by overwatering are more numerous, serious, and take longer to correct.

Avoiding Water Runoff

A sprinkler should apply water at a rate that can be absorbed by the soil without runoff. If water starts to pool on the surface and runs off before soil is soaked to the rooting depth, the sprinkler is applying water too fast and should be replaced with one that applies water at a slower rate. Another way to control runoff is to cycle the watering. Run the sprinkler until water starts to run off. Then turn it off and let the water soak in for a few hours. Repeat the cycle.

Amount of water soils absorb in an hour without runoff

Soil type	Under healthy sod
Coarse sandy loam	1.3 inch per hour
Sandy loam	1.0 inch per hour
Silt loam	0.6 inch per hour
Silty clay loam	0.5 inch per hour
Compacted clay	0.2 inch per hour

Factors Affecting Lawn Watering

Soil types. Clay soils are the most difficult to water. Clay compacts easily, resulting in poor water penetration and root growth. Clay soils compacted during house construction should be replaced with 6 to 8 inches of sandy loam topsoil. A compacted, clay slope is an almost impossible situation.

Clay soils absorb water at extremely slow rates and have poor internal drainage. Although clay holds the most water, the pores are small and lack air for root growth when too wet. Clay soils should be aerated 2 to 3 inches deep, once or twice a year to increase water penetration and root growth. Species such as tall fescue root deeply in good soil and have good drought resistance, but will not be as drought resistant in a shallow, clay soil.

A sandy loam is the ideal soil for growing turfgrass. It has good water penetration, drainage and water-holding capacity. Roots grow deep in these soils, making a quality, easy-to-manage turf. The soak and wait watering method works well for sandy loam and loam soils.

Sandy soils absorb water quickly and drain well, but do not hold much water. These soils require more frequent watering but less water per application. Although roots grow deeply in sandy soil, it can be difficult to establish grass from seed in sandy soil.

Warm and cool-season grasses. Warm-season grasses (bermudagrass, zoysiagrass, and buffalograss) require less water than cool-season grasses. They use less water during the high water use summer months and only a small amount during the spring and fall. Cool-season grasses (bluegrass, fescue, and ryegrass) green up earlier in the spring and stay green later in the fall. A longer growing season means a longer watering season. More water is needed for cool-season grasses to maintain a quality appearance.

Sun versus shade. Sunny areas need more water than shady areas because they have a higher evaporation rate. Shady areas have less evaporation, so it is important not to overwater.

Fertilizer. Fertilizer speeds growth so lawn requires additional water. The more nitrogen applied, the greater the water requirement.

Mowing. Mow at the tallest height recommended for the grass species to encourage deeper rooting. Deeper roots allow the grass plant to draw water from deeper in the soil, making for a more drought-resistant plant.

Thatch. Thatch causes grasses to be shallow rooted and less drought resistant. Lawns with a heavy layer of thatch will wilt sooner than similar lawns with less thatch. Frequent, shallow watering is one of several contributing factors Core aeration helps to control thatch and aids water penetration and root growth into the soil.

Slope. Slope also influences irrigation practices. Slopes are drier because of water runoff, especially at the top. Slopes should

be watered slowly to allow for maximum uptake. Aerate in spring and fall to encourage water infiltration.

Effect of slope on watering rate

Slope reduce	Watering rate
0–5%	0–10%
5–10%	10–20%
10–15%	20–45%
15–20%	45–60%
Over 20%	60% and up

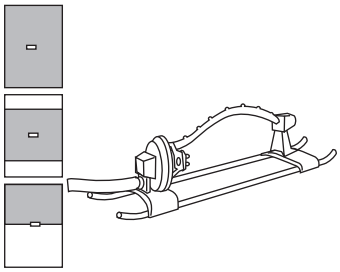
Native Grasses

Native grasses have become popular for lawns because of their low water requirements and natural look. They are warm-season grasses and should be planted where they receive full sunlight. Buffalograss, the most common native grass for turf, grows best in regions receiving less than 25 inches of annual rainfall.

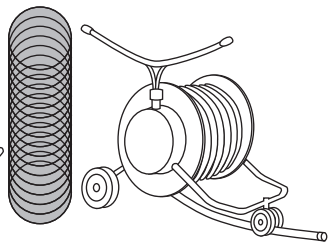
Native grasses need minimal watering and fertilization. Native grasses can become weedy when treated the same as regular lawn grasses, which undermines the low maintenance aspect. Planting native grass for the low-maintenance requirements but expecting the look of bluegrass is not realistic.

Types of Irrigation Systems

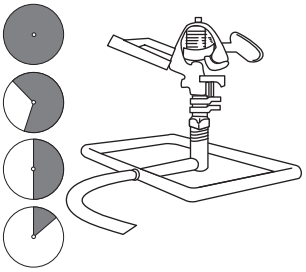
Aboveground irrigation system. The right sprinkler is the key to watering turf correctly without wasting water. Types of sprinklers include oscillating, traveling, pulsating and turret. The traveling sprinkler works best in odd-shaped areas, while an oscillating, pulsating, or turret sprinkler is suitable for more restricted areas.



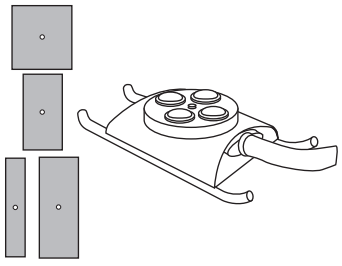
Oscillating sprinkler



Traveling sprinkler



Pulsating sprinkler



Turret sprinkler

Underground irrigation system. The underground irrigation system with an automatic timer is popular because of the convenience of not having to move hoses, sprinklers, and turn water on and off. An automatic timer does not account for changing water requirements unless there is a sensor attached that automatically turns the sprinkler system on and off according to the moisture in the soil. ***A moisture sensor saves money by reducing unnecessary water applications.*** Leaching of fertilizers past the root zone is less likely to occur. A rainout device can be installed to avoid irrigating when it is raining.

Water Quality

Municipal water that is safe for drinking is safe for turfgrass. Irrigation water from home wells should be free of suspended sand, soil, algae, and other particles that clog the irrigation system. Salty water is a common problem in Kansas. Home well-water samples should be taken to the local K-State Research and Extension office for salt and sodium analysis.

Watering Newly Seeded and Sodded Lawns

The information in this publication pertains to established grass. Newly seeded or sodded lawns require light, frequent watering, which is inappropriate for established lawns.

If soil is dry before planting time, soak it as deeply as possible several days before planting seed or laying sod. Adequate subsoil moisture makes it easier to keep the seedbed moist during the critical time of germination and establishment. An alternative to presoaking is to plant after a deep soaking rain.

After planting, the soil surface should be kept moist until seed germinates. Deep soaking is not necessary because the seed does not produce roots until after germination. When the grass is about 1 inch tall, begin to water less often but soak the soil more deeply. Let the soil surface dry between waterings.

Keeping the seedbed moist may require watering several times a day during hot weather. As the seedlings grow, gradually increase the interval between each irrigation, but apply more water each time to encourage deeper rooting. After the new grass has been mowed three times, water deeply and infrequently as for established grass. Check new grass daily for the first few months, and water whenever it shows signs of wilting. New grass can be overwatered, and continuously saturated soil can cause the roots to die.

Watering sod is much like watering newly seeded lawns. Although sod is mature grass, most of the root system is cut off during harvesting. Water sod immediately after it is laid and firmed into place. Water must go through the sod and wet the soil. Sod will not root into dry soil nor into saturated soil. Lift the corner of a sod piece every few days, checking that the soil is moist but not saturated. Also, look for new white roots growing into the soil. The challenge is to water often enough to keep the sod healthy but not so often that it doesn't root into the soil.

Backflow prevention. A backflow preventer keeps flow from the irrigation system from entering the home watering system. This ensures drinking water will not be contaminated. Check local city ordinances for regulations on backflow prevention.

Water Conversion Table

1 inch of water per 1,000 square feet = 623.37 gallons or 83.33 cubic feet
1 inch of water per acre = 27,154 gallons or 3,630 cubic feet
1 cubic foot of water = 7.48 gallons or 62.37 pounds
1 gallon of water = 0.1337 cubic foot or 8.34 pounds

Hose size and water application rate

Hose diameter	Length	Pressure	Flow rate
1⁄2 inch	50 ft	40 psi	3.00 gpm
5⁄8 inch	50 ft	40 psi	3.84 gpm
3⁄4 inch	50 ft	40 psi	5.28 gpm

psi = pounds per square inch; gpm = gallons per minute

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