

Best Management Practices for Watering Lawns

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Many factors influence lawn water requirements, and no two lawns are identical. A healthy, high-quality lawn may need up to 1¾ inches of water per week to keep it growing vigorously under hot, dry, windy summer conditions. This total water requirement includes both rainfall and irrigation. The lawn will require much less water when the weather is cool or cloudy. A turf-type tall fescue lawn may require less watering than a Kentucky bluegrass lawn, if it can grow a deep root system. In many cases, however, tall fescue rooting is limited by poor soil conditions and subsequently such lawns require as much watering as Kentucky bluegrass to look good and maintain healthy vigorous growth. Fine fescues are excellent choices for lawns receiving limited or no irrigation. Fine fescues, however, are less tolerant of traffic under drought stress than Kentucky bluegrass, tall fescue and perennial ryegrass. Zoysiagrass lawns can remain green for weeks without watering, even during hot dry summers. Zoysiagrass, however, is a warm-season grass that turns off-color quickly in October and remains brown until late spring. For more information on fine fescues and zoysiagrass see Rutgers Cooperative Extension fact sheets FS688 and FS521. These fact sheets can be downloaded from the Rutgers Cooperative Extension website at <http://www.rce.rutgers.edu/pubs/pdfs/fs688.pdf> and <http://www.rce.rutgers.edu/pubs/pdfs/fs521.pdf>, respectively.

Shady lawns and areas protected from wind require less water over the growing season than more exposed turf sites. The roots of trees and shrubs, however, also need water. Thus, you may need to water mature landscapes because of the competition for water from the roots of many plants. Healthy turf, encouraged by proper mowing, fertilizing, and cultivation uses water more efficiently and is more drought resistant.

WATERING EFFICIENTLY

Application of Water

Each time you water the lawn, apply enough water to moisten as much of the root zone as possible. Use a soil probe or shovel to determine the average rooting depth is in your lawn. If the roots grow down 6 inches, water until the soil is moistened to that depth.

If the soil has a considerable amount of clay, apply 1 to 1½ inches of water to moisten to a 6-inch depth. Sandy soils hold less water therefore you should apply about ½ inch of water to wet the soil to the 6-inch depth. Use a rain gage or straight-rimmed cup to measure the depth of water applied by sprinklers. It is important to know not only how deep the roots grow, but also how deep your irrigation water penetrates. Use a shovel after irrigating to determine how deep the water has percolated. Watering too deeply, especially on sandy soil, wastes water and allows it to percolate past the root zone.

Frequency of Watering

Based on the above, turf grown on sandy soil must be watered more often than the same grass grown on clay or loam soils. Even after a thorough watering, sandy soils hold less plant-available water and require more frequent irrigation with a smaller amount of water. Conversely, turf growing on a loamy-clay soil can be irrigated less frequently with larger quantities of water. Watering too often (daily) results in less efficient use of water because of greater loss to evaporation. Excess watering can also increase the amount of weeds that appear in a lawn. Under most lawn situations in New Jersey, a thorough watering of a lawn more than twice per week is probably excessive.



Do **not** apply water too rapidly, otherwise it may runoff from sloped sites, thatchy turf, or turf growing on highly compacted soils. In these situations, it is more effective to apply only a portion of the total water needed and move the sprinkler or switch to another station (on automatic controller) to water the lawn. This allows the applied water to soak into the soil rather than runoff. An hour or so later, apply another portion of the water and repeat the cycle until all the water is applied. Core cultivation (aeration) can resolve some water infiltration problems by reducing soil compaction and thatch. Wetting agents may also be beneficial, but these are not a cure-all solution. Wetting agents are surfactants which when added to water or applied to the turf can enhance water infiltration.

A healthy durable lawn that withstands minor drought is achieved by watering thoroughly but as infrequently as possible. Allowing some wilt stress to develop in a lawn will not ruin the lawn. As drought stress becomes more severe, however, the lawn becomes more susceptible to insect and disease damage and to weed invasion.

A sure sign that turf will benefit from irrigation is a wilted appearance. One initial symptom is “footprinting”, where footprints on the lawn will not disappear within 1 hour. This symptom is soon followed by actual wilt, where the leaves of the turf lose an upright erect appearance and take on a grayish or purple-to-blue cast. Usually, only a few spots will appear wilted in the same general location of the lawn and will serve as good indicator spots for the need to water. You can delay watering the entire lawn for another day or so by watering only the wilted spots. If the weather pattern provides rain, you will have avoided watering the entire lawn by watering only the wilted areas.

Time of Day

The most efficient time of day to water is late evening through early morning (between 10 p.m. and 8 a.m.). It is generally less windy, cooler, and more humid at this time, resulting in less evaporation and a more efficient application of water. Water pressure is usually better at night resulting in a more uniform application of water through sprinklers. Contrary to popular belief, watering at night does not stimulate disease development.

Seasonal Need for Watering

Based on historical records of rainfall, established lawns in New Jersey usually need watering to maintain vigorous growth during the months of June, July, and August. In occasional years, watering during the months of May and

September may be useful for an established lawn. Watering in May and September should only be done infrequently to compensate for minor drought (for example, watering thoroughly once or twice per month).

Sound cultural practices, often referred to as best management practices, are needed if a lawn is to have good drought resistance or survive dormancy. Mowing, fertilization, and cultivation (aeration) are important cultural practices, in addition to irrigation, that affect the health of a lawn and its ability to survive drought.

CULTURAL INPUTS RELATED TO WATERING

Mowing

Two important aspects of mowing are height and frequency. The preferred mowing height for most lawn species in New Jersey is 2½ to 3 inches. Mowing less than 2 inches decreases drought and heat resistance and increases the incidence of insects and disease damage, and weed invasion.

Mow the turf often enough so that no more than 1/3 of the grass height is removed in a single mowing. You may need to mow a recently fertilized lawn every 3 to 4 days in the spring but only once every 7 to 14 days when growth is slowed by heat, cold, drought or limited fertilization. Generally, fine fescue lawns require less frequent mowing than lawns comprised of perennial ryegrass, tall fescue, or Kentucky bluegrass.

If weather or other factors prevent mowing at the proper time, raise the height of the mower temporarily to avoid cutting too much at one time. Cut the lawn again a few days later at the normal mowing height.

The appropriate mowing frequency allows you to let the grass clippings fall back to the lawn without any detriment to the lawn. Grass clippings decompose quickly and provide a source of recycled nutrients and organic matter for the soil. Grass clippings do not contribute to thatch accumulation. Mulching and side-discharge rotary mowers do this easily if the lawn is mowed at the proper frequency.

Fertilization

Fertilizers must be used correctly; otherwise the practice will be ineffective or wasteful. Nitrogen (N) is the most important nutrient for promoting good turf growth, cover,

Table 1. Nitrogen fertilizer application schedule for established lawns in New Jersey.

Maintenance Practices	Timing of Application					
	Annual N to Apply ¹	Mid-March to April ²	May to Mid-June ³	July to early August	Mid-August to mid-September	Early October to early November ⁴
	----- pounds of nitrogen to apply per 1000 square feet of lawn area -----					
Irrigated, clippings removed	3 to 5	½ to 1	½ to {1}	not required	1	1 to (2)
Irrigated, clippings not removed	2 to 4	½ to 1	½	not required	1	1 to (1½)
No irrigation, clippings not removed	1 to 2	½	not required	not required	½ to (2)	not required
Zoysiagrass	1 to 2	Apply no N	½ to 1	½ to 1	Apply no N	Apply no N

¹ Use lower rates for older (mature) healthy lawns that have been properly managed for many years.
² The March-April nitrogen application may not be needed if you fertilize late (September to November) the previous year. When spring green-up and growth is satisfactory, delay fertilization until May or June, or possibly Mid-August.
³ To avoid excessive growth approaching the stressful summer months, use a slowly available source of nitrogen (sulfur-coated urea, polymer-coated urea, IBDU, methylene urea, or natural organic-based fertilizers) for amounts of ¾ to 1 pound of nitrogen applied per 1000 square feet of lawn area. Application shown in {}.
⁴ Apply only when grass is still green. Do not apply if grass is dormant (brown). Use higher nitrogen applications where greater turf cover (quality) is desired or on heavily used turf. Nitrogen applications above 1 pound per 1000 square feet must use slowly available sources of nitrogen; 50% or more of slowly available nitrogen is suggested. Applications shown in ().

- On very sandy soils, do not fertilize turf after early October to avoid nitrogen leaching. Use slowly available nitrogen fertilizers on sandy soils throughout the year to reduce the potential for leaching losses.
- Fertilizer should not be applied to water bodies or impervious surfaces where rain can wash fertilizer nutrients into water bodies. Excess nutrients entering streams, ponds, and lakes will lower water quality.

and color. Excess nitrogen fertilization, however, will cause excessive shoot growth and limit root growth. Over-fertilization can also contribute to thatch buildup and more frequent mowing. Avoid fertilizing during July and August. Under-fertilization results in weak grass plants that cannot develop an adequate root system or compete with invasive weeds. Thus, improper fertilization results in a loss of drought resistance in the lawn. Follow the nitrogen fertilization guidelines in Table 1 to develop a lawn with good drought resistance. Fertilizing late in the season (September through November) of the previous year reduces or eliminates the need for fertilizer in the spring, reduces the frequency of mowing, and improves drought resistance.

Newly seeded or sodded turfs have a higher fertilizer requirement to establish the lawn than mature established lawns. Lawns that do not respond to nitrogen may be deficient in other nutrients, or require liming. Get the soil tested to determine the specific needs for fertilizer and lime.

Do not misapply fertilizers to water bodies (streams, ponds, etc.) because excess nutrients in water will harm water quality. Do not misapply fertilizer to streets, sidewalks, driveways or parking lots because the fertilizer nutrients will wash into nearby water bodies with subsequent rains.

Cultivation

Thatch is a tight, brown, organic layer of both living and dead grass roots and stems that accumulate above the soil surface. Thatch can be a problem on some Kentucky bluegrass, fine fescue, bentgrass, and zoysiagrass lawns. Thatch is generally not a problem on tall fescues and perennial ryegrass lawns. Compacted soil also contributes to thatch buildup.

As a thatch layer thickens, it becomes the primary rooting medium of the lawn. This predisposes the turf to drought stress and increases the possibility of damage due to insects and disease. Fertilizers and pesticides applied to thatchy turf may work less effectively.

Light (shallow) power raking may be beneficial if done often. Core cultivating or aerating is more beneficial than power raking. Core cultivating improves the root zone by relieving compaction, improving water infiltration and controlling thatch accumulation. Power raking and core cultivating are best done in the spring or fall when lawn grasses (except zoysiagrass) grow vigorously and can recover from the damage caused by these practices.

DRY SOIL CONDITIONS—SEVERE DROUGHT

Dormancy of Lawns

Many lawns can survive drought quite well by going dormant (leaves turn brown), if the turf is healthy and damage from insects, diseases, or foot traffic are minimal. Drought-induced dormancy of lawns in New Jersey is rarely long enough to cause failure of the grass, if the lawn is healthy. Allowing an unhealthy lawn to go dormant on poor soils will result in severe thinning of the lawn. Thinning of the turf enables weeds to invade the lawn when rain re-wets the soil, thus increasing the need for herbicides. In severe cases, thinning of the lawn will result in erosion of exposed soil during rainstorms increasing the likelihood of water quality impacts through sedimentation. Thus, maintaining a healthy turf cover on a lawn enhances both drought resistance and environmental quality.

Mowing

If a decision is made to stop watering during severe drought, decrease mowing frequency and raise the mowing height (3 inches) as the soil dries and growth of the grass slows. Mowing during the coolest part of the day (early morning) will minimize the added stress caused by mowing. Ultimately mowing should be stopped when the soil dries to the point that the lawn is wilted. Mowing when the lawn is wilted can damage the lawn. A lawn wilts severely before it becomes dormant.

Fertilization

Established lawns should not be fertilized immediately before or during the time a lawn is experiencing drought stress or developing dormancy. Fertilizer stimulates growth of the lawn and increases the need for water and mowing. Thus, fertilization during very low soil water availability (drought) increases the risk of lawn failure.

Late season (September through November) fertilization will prepare a lawn for drought in the following year better than spring fertilization (see Table 1).

A healthy turf cover will re-develop more rapidly after a severe drought if fertilization is resumed after rainfall has returned. Recovery will be enhanced with application of nitrogen fertilizer at $\frac{1}{2}$ to 1 pound per 1000 square feet of lawn area. Rapid return of turf cover in the lawn minimizes weed invasion.

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