WATERING LAWNS IN WASHINGTON TO SAVE WATER, SAVE MONEY, AND HAVE A HEALTHY, GREEN LAWN

Under-watering lawns leads to poor-quality grass. Overwatering leads to high water bills, contributes to lawn diseases, and leaches plant nutrients out of the soil and can move them into the groundwater where they degrade water quality. Knowing how much, and when, to water lawns can save water, save money, and improve the health and vigor of your lawn. This publication provides guidance to Washington State residents on how much and when to water their lawns.

How Much Water Should I Apply?

When watering, the goal is to completely fill the soil to the bottom of the root zone, which is usually about 12 inches deep and often greater for most of the varieties of lawn grasses grown in Washington State (Figure 1).

Silts, Loams, and Clay Soils: Watering one inch deep will typically refill the root zone completely.

Sandy Soils: These soils cannot hold very much water. Grass grown in sandy soils do not need *more* water; they need to be watered *more often* but in smaller amounts. A rough rule of thumb is to apply about one-half inch of water each time.

How Long Do I Water? How long it takes to apply one inch of water (or a half inch of water for sandy soils) depends on so many things that it is difficult to estimate accurately. Simply measure it! Set several straight-walled cans out (like soup, coffee, or tuna cans) in multiple different places within the area the sprinklers hit before you water (Figure 2), then water for a known amount of time and measure the water depth in the cans when you are finished (Figure 3). The average depth of water caught in the cans divided by the run time is the application *rate*. Then, the desired application depth (one inch for silt soils) divided by the application rate is how long the sprinklers need to be left on to apply to that application depth.

Figure 1. This lawn was watered deep and at infrequent intervals and has a root depth of about 16 inches. Photo: R.T. Peters.

WASHINGTON STATE UNIVERSITY EXTENSION

Example: I ran an impact sprinkler on my lawn for 4 hours and caught an average of 0.75 inches of water. So my water application rate is 0.75 inches ÷ 4 hours = 0.19 inches per hour. To apply one inch of water, I need to run 1 inch ÷ 0.19 inches per hour = ~5.25 hours.

How Deep Did the Water Penetrate? An easy way to test the depth of water penetration in the soil is to allow the soil to dry out to where you can see visible water stress in the grass (Figure 5, right-hand column). This indicates that the entire root zone is dry. Then, water for your normal full irrigation time. After irrigating, use a shovel or gardening fork to test the depth of water penetration in various places throughout the lawn. The garden tool will penetrate the wet soil easily, and the dry soil underneath will be much harder and will resist penetration. If the water did not wet to the full root zone depth, you should increase the irrigation run time. If it is wet all the way past the bottom of the root zone, then you can decrease the irrigation run time and save water! You also may find that your soil is not very deep, in which case the soil may not be able to hold as much water and it will be necessary to apply less water, but more frequently.

How Often Should I Water?

Not every day! That is, unless you are establishing new sod or a freshly seeded lawn, both of which have very limited root zones. Watering every day encourages plant diseases, shallow roots, and is inefficient as a larger proportion of the water is lost each day to evaporation from the wet grass and soil. It is much better to water deep (i.e., water longer) and at less frequent intervals. The amount of water applied is chosen based on your soil, as explained above. How frequently this amount of water is applied depends on the season and weather (Table 1 and Figure 4).

Automatic Sprinkler Systems

Grass water needs change *drastically* over a season. Table 1 and Figure 4 are the lawn water needs by month for various areas of Washington State in a typical year. These numbers can serve as a guideline to help adjust your automatic irrigation timer throughout the season.

A simple way to test your watering interval is to turn the automatic system off, and if the lawn still looks good a few days after you would normally water, then you can save water and money by increasing the time between watering.

Figure 2. Cans laid out to measure water application depth. Photo: R.T. Peters.

Figure 3. Measuring application depth. Photo: R.T. Peters.

Example: Someone living in Spokane who is applying one inch of water to a silt soil each time they water might irrigate twice in April (Table 1), four times in May and June, then go to five or six times in July, and so on, throughout the year. However, this schedule would apply too much water for a Seattle resident, and too little for a Kennewick resident. Obviously, these irrigations should be spaced out evenly throughout the month and adjusted for rain, or warmer or cooler weather than normal. Someone with sandier soil would need to apply roughly the same amount of total water but would apply less per irrigation event, and, therefore, water more frequently to compensate.

Table 1. Typical total lawn water needs in inches by month for various urban areas of Washington State (Peters et al. 2012; Karimi 2012).

Month	Seattle/ Puget Sound Area	Vancouver	Spokane	Ellensburg	Walla Walla	Moses Lake Yakima Wenatchee	Richland Kennewick Pasco
Mar	0	0	0	0	0	0	0
Apr	0.5	0.6	2.3	2.9	2.8	3.3	3.7
May	1.7	1.9	3.5	4.3	4.2	4.8	5.2
Jun	2.4	3.1	4.3	5.0	5.3	5.6	6.3
Jul	3.4	4.9	5.6	6.0	7.0	6.9	7.5
Aug	2.8	4.4	4.9	5.2	6.0	5.9	6.4
Sep	1.2	2.2	3.0	3.3	3.9	3.9	4.3
Oct	0	0	1.3	1.6	1.6	1.8	2.2
Nov	0	0	0	0	0	0	0
Total	**12.0**	**17.1**	**24.8**	**28.2**	**30.8**	**32.2**	**35.5**

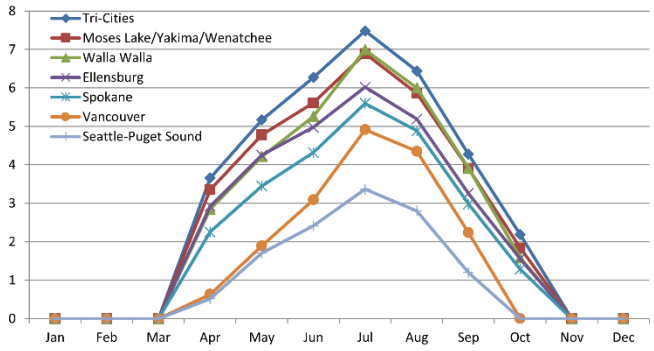

Figure 4. Typical total lawn water use in inches by month for various urban areas of Washington State (Peters et al. 2012; Karimi 2012). Notice the drastic changes over the season!

Dragging Hoses

For those who manually move sprinklers around the yard, a simple and efficient method is to simply avoid watering until there is visible water stress. Look for a darker green or blue color, or grass blades with folded or rolled leaves. Severely stressed grass will begin to look light brown or wispy (Figure 5, right-hand column). When water stress is noticed, apply the maximum amount of water that your soil can hold in the root zone to completely refill it (see the How Much Water Should I Apply section above). This will help avoid overwatering since there will be plenty of space in the soil to hold the applied water and will avoid the wasted effort of moving sprinklers when it is not needed. It will also encourage deep-rooting grass.

Smart Irrigation Controllers

There are new irrigation controllers available that will automatically adjust your watering to match the plant's changing water needs based on either soil moisture sensors or weather information. These have been shown to have the ability to keep your lawn green and result in 10–70% reductions in water bills (Dukes 2012). They have a wide variety of modes of operation, capabilities, and therefore costs. Search for "smart irrigation controllers" on the internet to learn more.

Irrigation Scheduler Mobile App

The Irrigation Scheduler Mobile app is available online at http://weather.wsu.edu/ism and provides estimates of actual water use by your lawn and suggests when to irrigate. It can also be found in iTunes or the Google Play store by searching for "irrigation scheduler mobile." There are in-app help links for every screen.

Problem Lawns

Some lawns are difficult to water because they are on steep slopes, they have compacted soils, clay soils, hydrophobic soils, or there is thick lawn thatch. All of these factors make it difficult to get water *into* the soil before it ponds and runs off. There are many ways to mitigate these things including dethatching, aerating, and using surfactants or wetting agents (see the Further Reading section below). However, many of these problems can also be managed by trying to apply water more *slowly* if possible. This means decreasing the irrigation water application rate to allow the soil more *time* to take the water in. This might require using smaller sprinkler nozzles or using sprinklers that have lower application rates, such as MP Rotator nozzles or sprinklers with larger wetted radii, or possibly cycling the sprinklers (running for ten minutes, then off for ten minutes, then back on, etc.).

Figure 5. Pictures of well-watered grass are in the left-hand column, and pictures of water-stressed grass are in the right-hand column. Photos: R.T. Peters.

Summary

Try to water such that the water penetrates to about 12 inches into the soil. How much water this is depends on the soil, but it is often about one inch of water per application for silty soils, and about one half inch of water for sandier soils. The water needs of grass change drastically over a season. Vary the time between irrigations in response to changing weather and the season. Use Table 1 and Figure 4 as a general guide as to how often you plan to irrigate. Some homeowners may wish to install a smart irrigation controller or use the Irrigation Scheduler Mobile app to track and respond to the changing rates of actual grass water use throughout the season.

Further Reading

References for further information on turfgrass physiology including different turfgrass varieties is included below.

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Dukes, M.D. 2012. Water Conservation Potential of Landscape Irrigation Smart Controllers. *Transactions of ASABE* 55(2):563–569. DOI: 10.13031/2013.41391.

Karimi, T. 2012. Revising Crop Coefficients for Washington State. Master's thesis. Washington State University Department of Biological Systems Engineering.

Peters, R.T., L. Nelson, and T. Karimi. 2012. Consumptive Use and Irrigation Water Requirements for Washington. Environmental and Water Resources Institute of the American Society of Civil Engineers.

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