

Manage Water by Adjusting Lawn Sprinkler Run Time:

Instructions for Eastern Washington State



Introduction

Irrigating to maintain a lawn while also reducing water use is a challenging task. Compared to a uniform farm field, a lawn can be a mixture of grass, shrubs, and trees (Figure 1). The house and trees can create shaded and sunny areas that vary by season, slopes, and soil types. All this affects the amount of water that plants use and how much water you need to apply.

However, you want to enjoy your lawn, not spend lots of time managing it. This publication presents a simple way of managing water that does not take a lot of time (Rain Bird Corporation 2022). You will be guided through a process for managing your underground sprinkler system using an automatic controller. For those living in the arid environment of eastern Washington State, this publication

will help you maintain your lawn, save money on water bills, and conserve water.

Steps to More Efficient Lawn Irrigation

Due to the varying shade, soil, and sprinkler system setups, perfect lawn irrigation can rarely be achieved. However, if you have an automatic underground sprinkler system with a modern controller, you can manage your water better by (1) adjusting for the seasons and (2) fine-tuning your controller's settings to your unique lawn.

This publication focuses on the seasonal adjustment for eastern Washington State.



Figure 1. A relatively uniform farm field (left photo) and a complex lawn environment (right photo). The adjusted run time method described in this publication will help improve irrigation efficiency of the lawn. Photos: A. McGuire.



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Here are the basic steps for managing lawn irrigation with automatic underground sprinklers:

1. Determine soil texture and days between irrigations.
2. Determine your sprinklers' water application rate.
3. Determine the maximum daily use rate.
4. Set the maximum (100%) sprinkler run time.
5. Program your sprinkler system controller.
6. Adjust your sprinkler zone run times monthly.
7. Fine-tune your sprinkler irrigation system.

An example of the lawn of the Grant County Courthouse in Ephrata will be used to demonstrate the steps (Figure 2).



Figure 2. This location, the Grant County Courthouse in Ephrata, has a silt loam soil. It will be used as our example through the rest of the steps. Photo: A. McGuire.

Step 1: Determine Soil Texture and Days Between Irrigations

Knowing your soil texture is important because it determines the water holding capacity of your soil, which is the total amount of water that a foot of soil can hold before it runs off. Texture is a term that describes the amount of different sizes of soil particles present in a soil. Particles are divided into three size categories, from largest to smallest: sand, silt, and clay. The amount of each of these categories determines the soil texture.

Soil texture can most easily be determined by using the [soil surveys of the Natural Resources Conservation Service](#). Click "SoilWeb," then click "OK" on the welcome window, and then click "Zoom To Location" (see Figure 3 and Figure 4).

If you are doing this on a cell phone with your location turned on, and you are standing in your yard, click "Use My Current Location." Otherwise, enter your address in the "Enter A Location" box and click "Go."

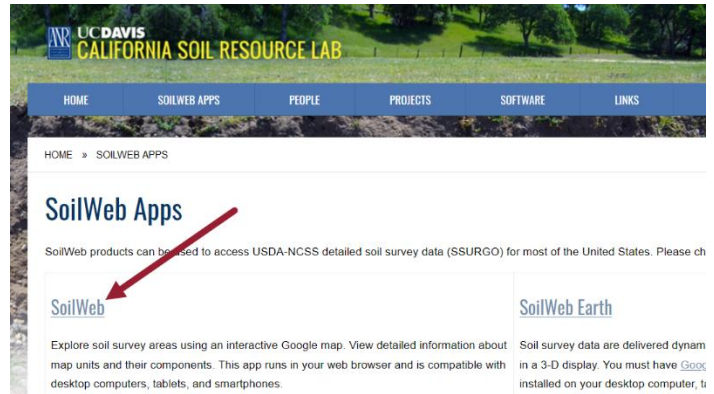


Figure 3. Click on "SoilWeb" to find your soil type.

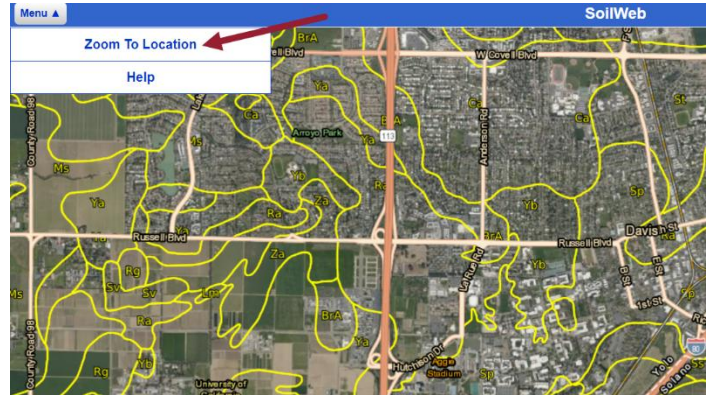


Figure 4. Click on "Zoom To Location."

The website will take you to an aerial photo of your neighborhood. Find your house and click on your lawn. Your lawn's soil texture will be in the upper left corner of the screen (Figure 5). If there is more than one soil texture given, use the one with the most sand. This will ensure that grass in all soil textures receive enough water. Record your soil type in Table 4 of Appendix A.

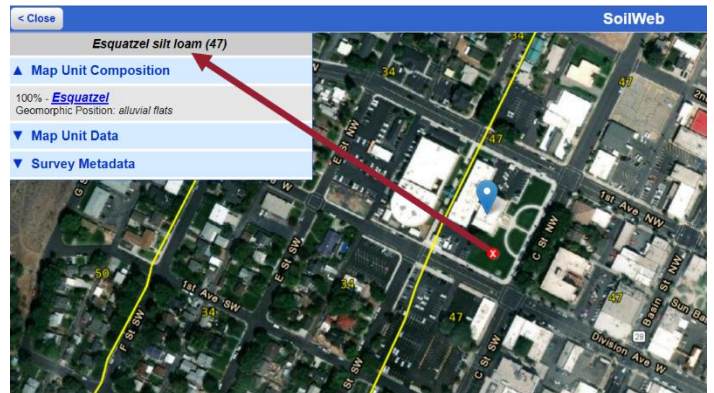


Figure 5. Soil type shown for clicked location.

The number of days between irrigations is determined by your soil texture. Every day is too often; it is inefficient and can cause disease problems. If your soil is a sand or loamy sand, the recommended interval is once every other day. With all other soil types, plan to run your sprinklers once every three days. Record the watering interval (in days) in Table 4 of Appendix A.

Step 2: Determine Your Sprinklers' Water Application Rate

This step is the most detailed and time-consuming of the process, but you only need to do it once.

What you'll need:

- 10–15 catch cups with straight sides (cans, plastic containers, etc.) Taller cans are better than short tuna cans for preventing water from splashing out.
- Ruler
- Timer
- Paper for recording data
- Calculator or app on phone

Do the following for each zone of your lawn sprinkler system:

1. Place catch cups in an even grid across the zone area.
2. Run the sprinklers for at least 15 minutes.
3. Use your ruler to measure the water in each catch cup. Write down the measurements for the zone.
4. Calculate the average application rate by first adding together all the measured depths for one zone. Divide this by the number of catch cups used to calculate the average application depth. Then divide the average depth by the time the sprinklers ran in that zone, in minutes. Multiply this by 60 to give you an average zone application rate in inches per hour.

In our example, assume the sprinklers at the courthouse have an application rate of 0.7 inches per hour.

Step 3: Determine the Maximum Daily Use Rate

You will need to know the lawn's water use. For Columbia Basin locations, you can find the maximum monthly water use in Table 1. This is a long-term average; we discuss how to adjust for hotter- or colder-than-average summers in Step 7.

Table 1. Maximum monthly water use (evapotranspiration) for locations across the Columbia Basin.

Location	Maximum monthly lawn water use (inches)
Hartline	8.70
Coulee City	7.90
Ephrata	8.50
Quincy	7.70
Royal City	8.20
Moses Lake	8.60
Othello	7.40
Mattawa	8.70
Connell	7.40
Pasco, Kennewick, Richland	8.60

Data for other locations in eastern Washington can be found on the [WSU Grant County Extension website](#). Next, take your maximum monthly water use rate and divide it by 31 days, because July or August will probably be the month(s) when your lawn uses the most water.

$$\text{Water Use Rate} \div 31 \text{ Days} = \text{Daily Water Use (in./day)}$$

For our courthouse example in Ephrata, the daily water use would be 0.27 in./day.

And because of the silt loam soil texture, it would be ideal to water every three days. Write down these results in Table 4 of Appendix A.

Step 4: Set the Maximum (100%) Sprinkler Run Time

Now you are ready to determine the maximum (100%) run time for each of your sprinkler zones. This is the length of time that you need to run each zone's sprinklers to give your lawn enough water during the hottest month. To do this, multiply how often you are irrigating (i.e., days, from Step 3) by your daily use rate (also from Step 3).

$$(\text{Days between irrigations}) \times (\text{Daily water use rate}) = \text{Water applied at each irrigation (in.)}$$

For the Ephrata courthouse example:

$$3 \text{ days} \times 0.27 \text{ inches} = 0.81 \text{ inches at each irrigation}$$

Then divide this number by each of your zone's application rates (Step 2).

$$\text{Water applied each irrigation} \div \text{Zone water application rate} = \text{Zone run time (hour)}$$

For the Ephrata courthouse example:

$$0.81 \text{ inches} \div 0.7 \text{ inches/hour} = 1.2 \text{ hours}$$

Record your maximum zone run times in Table 4 of Appendix A.

Step 5: Program Your Sprinkler System Controller

With these numbers you can program your sprinkler controller (Figure 6).



Figure 6. Automatic sprinkler controllers vary by manufacturer, but many will have a “Budget” or “Season Adjust” feature as shown here. Photo: A. McGuire.

First, set the run time for your zones using the results of Step 4.

Next, set how often the zones will run, in days, using the results of Step 3.

That’s it. You are now ready to irrigate. However, because our calculations were for the hottest month, we have to adjust for other months when less water will be needed. This seasonal adjustment is the part that will save you money while maintaining your lawn.

Step 6: Adjust Your Sprinkler Zone Run Times Monthly

Water use by plants, crops, and lawns varies depending on air temperature, wind, clouds, and other factors. However, the primary driver of water use is air temperature. Figure 7 shows the daily water use (evapotranspiration) for a lawn in Ephrata, Washington.

The good news is that lawn irrigation does not have to fit this curve perfectly to achieve thriving, green lawns. In fact, providing less than the maximum rate of water use will generally not hurt turf grass (Feldhake et al. 1984) and is far better than overwatering. Applying too much water costs you money (if you are on city-provided water), can cause disease problems in the grass, and risks the loss of

soil nutrients. Although water use varies daily, you only need to adjust your sprinklers monthly as water use changes from spring through summer to fall. With most sprinkler controllers, it will take you only a minute to adjust *all* your zones.

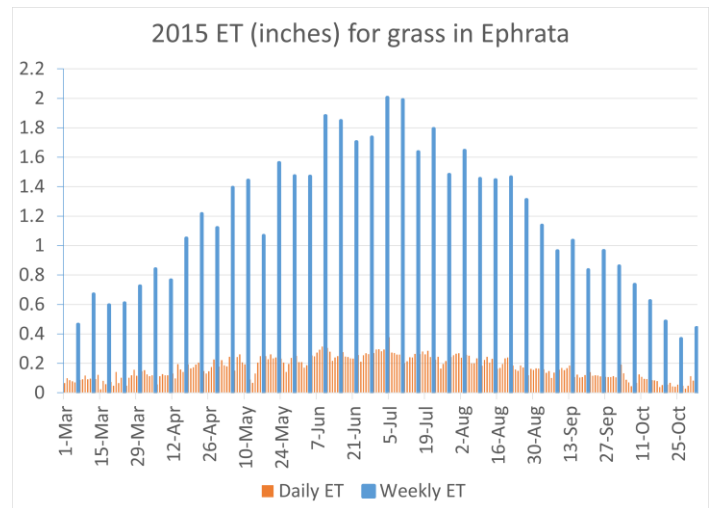


Figure 7. The water use (evapotranspiration, or ET) increased from spring to July, then decreased in the fall. The “Budget” feature of sprinkler controllers will allow you to manage for this change monthly.

These sprinkler run time calculations and settings are all based on the 100% budget setting, but this will only occur in July for locations in the Columbia Basin. The budget setting should be adjusted for all other months, starting with April or May. You can find these adjustments online at the [Monthly Sprinkler Timer Adjustments for Eastern Washington Lawns](#) (WSU Grant County Extension 2025) website for many locations across eastern Washington. Table 2 shows the adjustments for the Ephrata example location.

Table 2. Seasonal adjustment water application settings (sometimes called “Budget” or “Season Adjust” on controllers) by month for Ephrata, WA. These have been calculated based on long-term averages.

Month	Budget setting
April	56%
May	76%
June	84%
July	100%
August	88%
September	62%
October	34%

Make this monthly adjustment using your controller's budget setting (Figure 8), which affects all the zones in that program. This setting may be called something else on other brands of controllers. Set your phone to remind you once a month to change this budget setting.



Figure 8. Automatic sprinkler controller shown with an adjusted run time of 40%, here called the “Budget” setting. Photo: A. McGuire.

If you have a controller that does not have a budget setting (Figure 9), you can still use this method. Simply change each of your zone run times each month using the budget percentages for your location. It will take a few more minutes to make the calculations and change each zone but is well worth the effort to save water and money. Record your results in Table 5 of Appendix A so you can skip all the calculations in future years.



Figure 9. A controller without a “Budget” setting. You can still adjust your run times monthly by changing them for each zone separately. Post a table of your adjusted run times by your controller. Photo: A. McGuire.

Step 7: Fine-Tune Your Sprinkler Irrigation System

Steps 1 through 6 provide a simple way to calculate lawn irrigation needs and are a good starting point. However, with some fine-tuning, you can possibly save even more water or account for extreme heat events. Recall all those variables mentioned at the beginning of this publication? Those, plus any large deviations from your average summer temperatures, can be considered for improved water savings. This is done by adjusting your sprinkler zone run times and your seasonal budget settings.

Although eastern Washington is arid, significant rainfall can happen in the summer. If you get more than 0.2” of rainfall, delay your next irrigation for a day or more.

If you want to save more water and there are zones that appear to be getting enough water, try reducing the zone time by 10%.

New run time = 0.9 × Old run time (in minutes)

Continue using the seasonal budget adjustments. If the lawn, trees, and other plants in that zone do not wilt in the afternoons or otherwise show signs of severe stress, stay with the new setting. If plants in a zone are showing signs of water stress, try increasing the run time by 10%:

New run time = 1.1 × Old run time (in minutes)

Once this process of fine-tuning has been done, it should not need to be changed in future years unless something about the landscape changes, such as a tree growing larger and shading more of the lawn.

Abnormally hot or cool summers also can be handled using the budget setting. If you experience several weeks of hotter- or cooler-than-normal temperatures, you may want to increase or decrease the budget setting by 10%; for example, if June has abnormally hot temperatures lasting a couple weeks, increase from 80% to 90%. If more normal temperatures return, revert the budget to its normal setting for the month.

There is one last adjustment to consider. If your soil type is not sand or sandy loam, which have a low water holding capacity, try watering every four days instead of every three days. This will make irrigation more efficient, but, since sprinkler run times are longer, there is a risk of exceeding the rate at which your soil can take water. If this happens, the resulting runoff will ruin your efforts to save water. To adjust to a four-day sprinkler schedule, redo Step 4 and Step 5, then change your controller settings and see how it works. If you see water running off your lawn, go back to the three-day schedule.

Appendix A: Example, and Blank User Worksheets

Table 3. Completed example of recorded information and measurements.

	Location:	<i>Grant County Courthouse, 35 C ST NW, Ephrata, WA 98823</i>	
Step 1	Soil texture:	<i>Silt loam</i>	
	Usable water in top foot of soil:	<i>1.2</i>	inches
Step 2	Sprinkler application rates, Zone 1	<i>0.7</i>	inches per hour
	Zone 2		
	Zone 3		
	Zone 4		
	Zone 5		
	Zone 6		
	Zone 7		
	Zone 8		
Step 3	How often to irrigate:	<i>Every 3</i>	days
	Maximum monthly lawn water use:	<i>8.5</i>	inches
	Daily water use:	<i>0.27</i>	inches
	Water to apply at each irrigation:	<i>0.81</i>	inches
Step 4	Run time at 100% budget setting, Zone 1	<i>1.2</i>	hours
	Zone 2		
	Zone 3		
	Zone 4		
	Zone 5		
	Zone 6		
	Zone 7		
	Zone 8		
Steps 5 and 6	Does my controller have a "Budget" setting?	Yes. Adjust your controller monthly with this setting.	No. Proceed to Table 5 to calculate the adjustment for decreased irrigation times.

User Worksheets for Posting at Controller

Table 4. User worksheet for recording lawn and irrigation information.

	Location:		
Step 1	Soil texture:		
Step 2	Sprinkler application rates, Zone 1		Inches per hour
	Zone 2		
	Zone 3		
	Zone 4		
	Zone 5		
	Zone 6		
	Zone 7		
	Zone 8		
Step 3	How often to irrigate:		days
	Maximum monthly lawn water use:		inches
	Daily water use:		inches
	Water to apply at each irrigation:		inches
Step 4	Run time at 100% budget setting, Zone 1		hours
	Zone 2		
	Zone 3		
	Zone 4		
	Zone 5		
	Zone 6		
	Zone 7		
	Zone 8		
Steps 5 and 6	Does my controller have a "Budget" setting?	Yes. Adjust your controller monthly with this setting.	No. Proceed to Table 5 to calculate the adjustment for decreased irrigation times.

Table 5. User worksheet for those owning a controller without a "Budget" or "Season Adjust" setting.

Month	Zone Time Adjustment	Adjusted Zone Run Times (minutes)							
		1	2	3	4	5	6	7	8
April	%*								
May	%								
June	%								
July	100%								
August	%								
September	%								
October	%								

* To calculate, multiply by 0.4. Repeat for other percentages.

Table 6. User worksheet for a controller with a “Budget” or “Season Adjust” setting.

Month	Budget setting
April	%
May	%
June	%
July	100%
August	%
September	%
October	%

Note: Adjust on a monthly basis.

References

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