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LAWN CARE

Auditing Irrigation Systems and other Water-saving Strategies for Home Lawns

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Auditing your irrigation system is an important practice for increasing water use efficiency and maximizing water conservation. Audits entail calculating inches of water applied during an irrigation event and also calculating irrigation system uniformity. A basic irrigation audit should be performed every spring as systems are charged up for the growing season. The following is a step-by step guide to auditing home lawn irrigation systems.

IRRIGATION SYSTEM AUDITING PROCEDURE

Step 1: System Inspection

- Run each irrigation zone and check for the following:
  - Broken nozzles and/or misaligned heads
  - Leaking heads or heads with low water pressure
  - Heads that may be watering impervious surfaces (e.g., driveways, sidewalks, etc.) or other non-target areas, to ensure water is only applied to the lawn
- Make repairs and adjustments accordingly.

REPLACE BROKEN AND LEAKING SPRINKLERS

Step 2: Performance Testing

- Place catch cans on the lawn in an evenly-spaced grid pattern throughout an individually irrigated zone.
- Straight-sided cans, such as tuna, cat food, or coffee cans will work; or you can purchase graduated catch-cans for the testing procedure.
- Place the cans 5 to 8 feet apart for small-area spray sprinklers, and 10 to 20 feet apart for large-area, rotor type sprinklers.
- A minimum of 20 cans should be utilized for each irrigated zone to allow for greater accuracy of system performance.
- Once all the cans are in place run the zone for 20 to 30 minutes. A longer run time provides more accurate results.
- Measure and record the depth, in inches, of water in each can.
  - Use the table on the next page to record your measurements
- Repeat this procedure for each individual zone in your irrigation system.

PLACE CATCH CANS IN A GRID PATTERN

IRRIGATION SYSTEM AUDITING PROCEDURE (continued)

Step 3: Calculating Precipitation Rate

- To calculate the precipitation rate of each irrigated zone calculate the average depth of water in the cans for one hour of runtime.

EXAMPLE

- If you ran the system for 30 minutes and the average depth of the 20 cans was 0.40 inches, then your precipitation rate would be 0.80 inches per hour.
- If your goal is to apply 0.5 inches of water per irrigation event then you will need to run that zone for 38 minutes (math below).
  - (0.5 inches × 60 mins) ÷ 0.8 inches = 38 minutes

MEASURE THE DEPTH OF WATER (inches) IN EACH CAN

Step 4: Calculating Distribution Uniformity

- Calculating uniformity will tell you if your system is over-watering or under-watering in certain areas of each zone.
- For uniformity calculations take the average depth from the lowest 25% of catch cans and divide that average by the overall average depth of all cans.

EXAMPLE

- If the average volume of water collected in your five lowest cans (20 cans ÷ 4 = 5 cans) was 0.25 inches, then divide 0.25 by 0.40 (e.g., 0.25÷0.40), which equals 0.625 or 62.5%.
- Irrigation systems with lower than 60% uniformity should be adjusted for more uniform coverage

Catch Can (inches collected)	Use the space below to calculate precipitation rate **(PR)** and distribution uniformity **(DU)**: **PR (in/hr) = [avg. depth collected ÷ minutes runtime] × 60 minutes** **DU (%) = avg. depth of lowest 25% ÷ overall avg. depth**
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	
16.	
17.	
18.	
19.	
20.	
Average (avg.)	

WATER-SAVING STRATEGIES

Water use in the home landscape is a hot topic - even in Minnesota. In the Twin Cities we use, on average, three times more water during the summer than in the winter, and much of this water is used outdoors. As urbanization increases and we continue to experience more periods of extreme heat and drought, greater pressure is placed on our water resources. If you own an irrigation system or water your lawn with portable sprinklers, reduce your overall water use by implementing the following water-saving tips.

1. Pay Attention to the Weather

- Over the past 30-years, the Twin Cities have received 17 inches of rainfall, on average, during June through September. Approximately 4-inches of rainfall occur, on average, during each of those months.
- If you have an automated irrigation system, adjust your irrigation schedules accordingly.
- Best way to save water is to keep your irrigation timer turned 'OFF' and only water your lawn when significant drought symptoms are visible (i.e., manually irrigate).

2. Select Turfgrasses for your Lawn that are Drought-resistant and Require Less Water

- Implementing drought resistant turfgrass varieties will greatly reduce your lawn's irrigation requirements.
- Traditional turfgrass species for Minnesota lawns include Kentucky bluegrass, perennial ryegrass, fine fescue, and tall fescue.
- Fescue species offer the best drought resistance; fine fescues require very little water, and tall fescue contains a deep root system to be able to access moisture deep within the soil.

3. Adjust Irrigation Programs to Conserve Water and Maximize Water-use Efficiency

- To encourage deeper rooting and greater drought resistance, lawns should be irrigated infrequently (once or twice per week), applying no greater than one-inch of irrigation each week.
- Depending on your soil-type (sand, loam, clay), your lawn may only require as little as a half-inch of water each week.
- Set your irrigation timer to run in the early morning hours; watering during the heat of the day reduces the amount of water absorbed by the soil and made available to the turfgrass.

IRRIGATION SYSTEM THAT NEEDS TO BE ADJUSTED SO WATER IS NOT WASTED

4. Audit Your Irrigation System

- Conduct an irrigation audit of the zones responsible for irrigating your lawn.
- Irrigation contractors will perform this service for you if you contract with them.
- Be certain to check and inspect all system components including sprinklers, valves, and controllers, making all necessary adjustments and repairs prior to auditing the system.
- Conduct the audit and program your irrigation timer accordingly.

WATER-SAVING STRATEGIES

5. Implement Water-Saving Technologies

- Minnesota statute 103G.298 requires all automated irrigation systems to be furnished with technology which inhibits operation of landscape irrigation systems during periods of sufficient moisture.
- Rain sensors have been widely used to meet compliance with this statute but significantly greater reductions in water use have been observed using smart controllers and add-on soil moisture sensors.
- Smart controllers use Wi-Fi to connect to local weather stations to adjust your irrigation runtimes based on enviromental conditions such as temperature, humidity, sunlight, and precipitation.
- Soil moisture sensors monitor the moisture in the turfgrass rootzone and by-pass scheduled irrigation when moisture is sufficient.

6. Improve Soils and Lawn Quality through Good Maintenance Practices

- Mowing high (≥ 3 inches) and fertilizing at the proper use of fertilizers will improve lawn quality and reduced turfgrass irrigation requirements.
- Aerating a lawn followed by top-dressing with quality compost can reduce compaction and add organic matter to the soil; and will also improve infiltration in loam and clay soil and moisture holding capacity in sandy soil.

7. Recycle Water When Possible

- Recyling water for irrigation requires proper design of water storage and separation to supply the water to irrigation sprinklers.
- You can purchase rain barrels from local municipalites and companies to reuse rain water to irrigate your landscape plants.

8. Change Expectations

- Consider changing your expectations for your lawn to allow for temporary discoloration during periods of drought stress.
- It is very rare to have extend droughts that complete compromise the aesthetic and functional integrity of a lawn.

For More Information:

UMN Extension Lawn Care: www.extension.umn.edu/turfgrass
UMN Turfgrass Science Blog: www.turf.umn.edu
Metropolitan Council: https://metrocouncil.org/Wastewater-Water/Planning/Water-Supply-Planning.aspx
Conducting an Irrigation Audit: www.irrigation.org/Resources/Audit_Guidelines.aspx

The University of Minnesota Extension Turfgrass Science Program is proud to partner with the Metropolitan Council in providing this information on water conservation to homeowners.

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