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G94-1221 Checking the Performance of Your Landscape Irrigation System

Don Steinegger
University of Nebraska--Lincoln, dsteinegger1@unl.edu

Roch E. Gaussoin
University of Nebraska-Lincoln, rgaussoin1@unl.edu

DeLynn Hay
University of Nebraska at Lincoln, dhay@unlnotes.unl.edu

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Checking the Performance of Your Landscape Irrigation System

This NebGuide outlines methods to assess and improve landscape irrigation performance.

Donald H. Steinegger, Horticulture Specialist
Roch Gaussoin, Extension Turfgrass Specialist
DeLynn Hay, Extension Water Specialist

- Control System
- Valve Conditions
- Wiring Condition
- Backflow Prevention
- Soil Moisure Sensors
- Rainfall Sensor
- Pressure Regulator
- Landscape Zones
- Physical Problems
- Drains Winterizing the Irrigation System

A properly designed and functioning irrigation system can save water, improve plant appearance, and reduce non-point source pollution. An irrigation system also must apply water uniformly, at a rate that the soil can absorb, and the proper amount to meet the water needs of the landscape plants. Runoff can result when an improperly functioning system applies water faster than the soil can absorb it. This runoff can carry applied fertilizer, such as nitrogen, as well as some pesticides into the streets and eventually into storm drains. Another concern is that excess irrigation water entering the soil can carry in nitrogen and pesticides below the root zone and into the groundwater. Uniform water application helps to assure no portion of the landscape is over- or under-watered.

It is a common misconception that an irrigation system will perform indefinitely without service or adjustments. Problems will develop; however, they are correctable. Some will likely be beyond the do-it-yourselfer's skills, requiring the expertise of an irrigation specialist. This publication is intended to aid in a step-by-step evaluation of your irrigation system. The included checklist evaluates the control system, zoning of stations, and physical condition of the system components. The checklist also introduces the main categories a specialist uses when evaluating an irrigation system. Although most home owners will not be able to go through all the items, the list can
be used to guide you through the concepts
and vocabulary encountered when dealing

with irrigation specialists. Working through the list procedures will also identify conditions that lead to wasting water. While certain steps may apply only to installed systems, others are relevant to a hose and hose-end sprinkler system as well.

Figure 1.Green "doughnut" typical of leaking valves or sprinkler heads.

After you have completed the checklist and made the necessary corrections to your system, determine the performance evaluation of your water application system by finding the application rate (how much water is applied in 30 minutes) and how uniformly is water delivered to the landscape area, (does one area receive more water in 30 minutes than another). Use the application rate information, along with soil infiltration rate, to determine the length of time the system should run to apply necessary water while avoiding runoff. (See *Evaluating your Landscape Irrigation System*, G93-1181-A).

Figure 2.An irrigation system should apply water only to desired landscape areas. Note proper application (top) and improper water wasting application (bottom).

Control System

Find the controller or time clocks, which determine when and how long the system, or each station, runs. Also, evaluate the condition of control system components. Look for bad connections, frayed wires, and unreadable indicators. If the system includes an electro-mechanical clock, check its timekeeping and operational capabilities. You may want to replace it with a more accurate electronic model. Be sure your controller is sufficiently flexible to: allow easy change in watering schedules, irrigate turf and shrubs separately (zone watering), and operate in short irrigation cycles to prevent runoff. Make a list of all of the stations and where they irrigate. Place it in the controller for future reference.

Valve Conditions

A valve controls the flow of water through a pipe. A typical irrigation system valve will be either fully closed or fully open. Your kitchen sink's water faucet works the same way and like a kitchen sink, irrigation valves should not leak. To check for leaks, turn off all water and read the meter. After 12 hours, (do it overnight when no water is being used for any purpose), read it again. If the meter hand has moved, check for leaks. Make sure each valve opens when the controller calls for watering of that zone. If the controller has a battery back-up, check the charge on

the battery.

Wiring Condition

Inspect visible wiring for breaks, poor connections, or broken insulation. Wiring problems can cause malfunctioning valves. You can verify by checking wire voltages. If you find problems, hire a qualified professional to make repairs.

Backflow Prevention

Most city codes require a backflow prevention device be installed on irrigation systems. This device prevents any flow from the irrigation system from entering your home's water system, assuring your drinking water will not be contaminated. Be sure you have a backflow prevention device, even when not required. Check with your local building inspector for the regulations in your area. Some backflow prevention devices may have tester to be sure the device is functioning properly. Read the operator's instructions or ask the installer how to check the system.

Soil Moisture Sensors

Sensors can be wired into the controller to trigger the irrigation system when a given soil moisture level is reached. This helps assure the plant needs are met and that unneeded irrigation is not applied. Correct placement of the sensors is critical. Place them in the plants' root zone within the area covered by the irrigation system. Check to make sure the sensor is operating properly. Sensors differ in the way they work, so check manufacturer's directions for proper installation and operation. Sensors can also be used with hose and hose-end sprinkler systems.

Rainfall Sensor

These sensors can be integrated into the controller to override programmed irrigations when particular-sized rainfall is received. This is an important water saving device. Observe the system after rain to be sure it is functioning properly.

Pressure Regulator

Your irrigation system may have a pressure reducing valve. This is true for both sprinkler and drip irrigation systems. Excessive pressure results in fogging, misting and even the physical bursting of system components. Misting creates very fine droplets and distorts spray patterns causing non-uniform water distribution and water waste. On the other hand, insufficient pressure causes inadequate break-up of sprinkler spray patterns and uneven

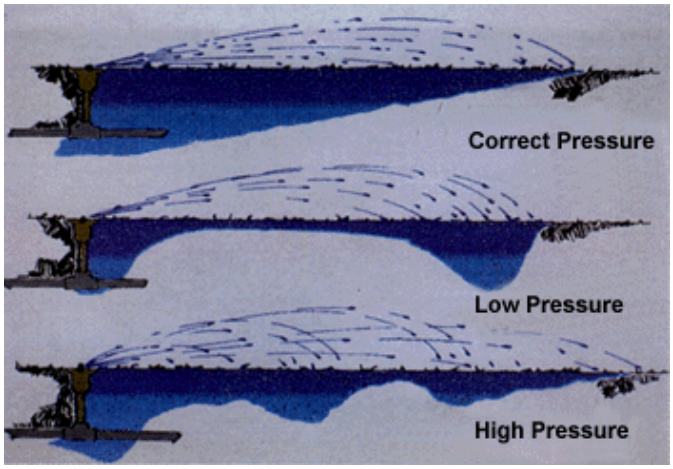

Figure 3. Proper system pressure is critical to peak irrigation system performance.

discharge rates from sprinklers or emitters. Green "doughnuts" around sprinklers are a sign of low pressure.

You should have at least two pressure regulators if your system uses a sprinkler system for turf and a drip system for shrubs and flower borders. Two regulators may be required if a combination of impact or other rotating spray-type sprinklers are used.

Pressure regulator function can be evaluated by checking the pressure at various locations within the system. Pressure will not be equal at all points for several reasons including friction loss as water flows through the pipe system and elevation changes.

Landscape Zones

Each zone (different areas of irrigation control) of the irrigation system needs to be evaluated. Read the following "checklist" for the factors to evaluate.

Avoid mixing plant types that have vastly different water requirements in the same watering zone. For example, Kentucky bluegrass and yews should not be in the same zone, as yews will not survive on the amount of water required for Kentucky bluegrass. Also, avoid a single station that waters both sunny and shady areas.

Frequently, the irrigation system was installed before materials were planted in the landscape. When the landscape matures, trees interfere with spray patterns. Contact an irrigation designer/installer to change or reset the heads for effective irrigation.

Physical Problems

The three most common physical problems in an irrigation system are broken components, such as risers, improperly designed or spaced heads, and dissimilar heads or nozzles.

Check rotation and direction of spray. Adjust the radius and arc to avoid spraying sidewalks and buildings. Physical problems with the system can result in lack of application uniformity, leading to the development of wet and dry spots.

As the system ages and the landscape matures, sprinkler heads sink, or are pushed-off vertical, may stop turning, or become clogged. All of these physical problems affect the spray pattern.

Clean the sprinkler's trash filter screen if it has one. Check the wiper seal at the base of the sprinkler heads. If it is worn, water will squirt out of the base if it is worn. Make corrections to assure proper operation and water distribution.

While a hose and hose-end sprinkler system lacks many of these components, the checklist is still valuable in evaluating the proper-use of this system and the effectiveness of the hose-end sprinkler.

Drains — Winterizing the Irrigation System

An irrigation system can be drained either by blowing the water out of the irrigation lines or draining the pipe lines with an automatic or a manual drain valve located at the low points of the system. Check with an authorized turf irrigation specialist to see that these drain valves are functioning properly and not leaking.

Irrigation System Evaluation Checklist
(A printable PDF version of this worksheet is available.)

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Location: Evaluator:

Address: Telephone:

Contact Person: Date:

Telephone: Time Spent:

System type: sprinkler, mini-sprinkler, drip, etc.	**Write in pertinent information**						
Plant type: Warm season turf, cool season turf, trees, shrubs, bedding plants							
Station by Station System Evaluation (√) indicates problem observed							
Station number	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Not zoned for plant requirements							
Not zoned for exposure							
Obvious overwatering							
Obvious underwatering							
Broken components							
Heads/nozzles not similar							
Heads not vertical							
Heads not turning							
Ponding near plant trunks							
Mulch needed							
Spacing uneven							
Spray pattern blocked							
Clogged nozzles/emitters							
Worn nozzles/emitters							
Soil compaction							
Excess turfgrass thatch							
Spray misdirected							
Sucker heads							
Unequal discharge rates and pressure							
Any other problems observed,							

specify							

Irrigation Control System Evaluation
(A printable PDF version of this worksheet is available.)

1. Number of Stations	_____			
2. Number of Programs	_____			
3. Controller Type	_____			
4. Valve Conditions (circle)	Good	Not Working	Leaking	Bad Solenoid
5. Writing Conditions (circle)	Good	Broken	Poor	Connections
6. Backflow Prevention	Yes	No		
7. Soil Moisture Sensor	Yes	No	Station #_____	
8. Rainfall Sensor	Yes	No		
9. Rainfall Regulator	Yes	No	Multi	

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