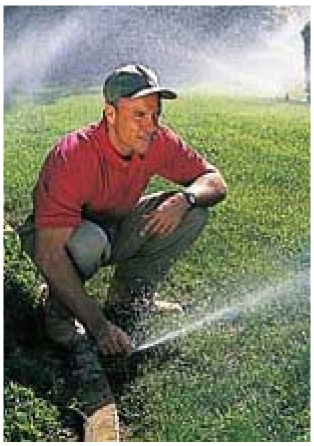
Earth Kind:

Environmental Stewardship Program

Irrigation System Auditing:



The summer irrigation season is almost here. That means home and small business owners will soon be applying valuable water resources to the landscape. It is the responsibility of all Texans to ensure that water is used wisely. An audit of the irrigation system has been shown to be the most effective tool for maximizing water use efficiency in the landscape. Here are some Earth Kind tips for system operation and management that will help promote water conservation.

Irrigation audits consist of three main activities:
- Site inspection,
- Performance testing
- Irrigation scheduling

Each activity in itself can result in significant water and cost savings. Together, these activities provide valuable information based on site specific conditions and irrigation system performance.

Site Inspection:
Over time, even the most efficiently designed irrigation system will begin to break down. In the absence of a regular maintenance program, minor operation and performance problems can continue for months resulting in excessive water use, reduced efficiency and decreased plant performance. Sunken sprinkler heads that do not "pop-up" properly, misaligned spray patterns that throw water onto streets, sidewalks or hardscapes, and broken or missing sprinkler heads resulting from mower damage can result in significant water waste.

Performance problems are often inherent in an irrigation system. A sprinkler system where the heads are spaced too far apart will result in poor water distribution and/or dry spots in the landscape. In order to compensate for this poor uniformity, the system is often set to operate longer, which in turn overwaters most of the landscape.

Earth Kind uses research-proven techniques to provide maximum gardening and landscape enjoyment while preserving and protecting our environment.

The objective of Earth Kind is to combine the best of organic and traditional gardening and landscaping principles to create a new horticultural system based on real-world effectiveness and environmental responsibility.

The principal goals of Earth Kind include:

- ☑ Water conservation
- ☑ The safe use and handling of fertilizers & pesticides
- ☑ Reduction of yard wastes entering urban landfills

As your interest and knowledge in these areas grows you will have an increased awareness of the many programs, practices and activities that are Earth Kind. Working together we can make a difference in conserving and protecting our valuable natural resources.

For more information see our Web site:

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Insufficient or excessive operating pressure can also lead to water loss through wind drift or poor coverage. Low water pressure is generally caused by insufficient static pressure and/or high pressure losses through valves, meters, piping, too many heads or other components of the irrigation system. Visual indications of low water pressure include large water droplets and short sprinkler throw. High water pressure, on the other hand, indicates an absence of a proper pressure regulation device. High pressure is generally characterized by excessive misting of water that easily evaporates or blown by the wind.

Performance Testing:
Sprinkler application devices, including pop-up spray heads, rotors, micro-sprays and bubblers are designed to operate within specific operating pressures and head spacing. Manufacturer's specification catalogs rate the performance (mainly flow rate) in gallons per minute and precipitation rate in inches per hour. Commonly, the rated performance listed in the catalogs do not accurately represent actual performance. For example, insufficient or excessive operating pressure and improper head spacing will significantly increase or decrease precipitation rate.


Commercial catch can with stand.

For irrigation scheduling purposes, the most accurate determination of precipitation rate is achieved by conducting a "catch can" test. Catch can tests measure the amount of water that actually hits the ground at various points within the landscape, and also serves to measure application uniformity. Since irrigation systems commonly use different types and brands of sprinklers, it is important to conduct catch can tests for each individual zone or "station" on an irrigation system.

Following is the general approach to conducting a catch can test:

1. Turn on the irrigation system, one zone at a time, to locate and mark sprinkler heads.

2. Starting with zone 1, layout catch devices only on the part of the landscape covered by zone 1. Catch devices should be placed in a grid-like pattern throughout the zone to achieve an accurate representation of sprinkler performance.

Note: Small (5"x8") plastic containers (typically used for "leftovers") make excellent catch cans.

Note: Try not to place catch devices too close to sprinkler heads to avoid altering spray patterns.

3. Turn on zone 1, allowing water to fill the catch devices. Keep track of the number of minutes that the zone is allowed to operate.

4. After a measurable amount of water has fallen, measure the depth of water (in inches) contained in each device using a ruler. (It is recommended that the ruler measure in "tenths" of inches). Record these values on a data sheet. Also record how long (in minutes) the zone was operated.

5. Repeat steps 1-5 above for each remaining zone on the system.

Using the data from catch can testing, the precipitation rates for each individual zone on the irrigation system can be determined. The simple equation for calculating precipitation rate is given below:

Precipitation rate = (average catch can depth / test run time) x 60
Where: Precipitation rate = inches per hour
Average catch can depth = inches

Irrigation Scheduling:
When water supplies are limited, it becomes even more important that every drop of water is utilized to the fullest. The answer to the question, “when and how long to run the irrigation system,” has been based on assumptions and generalizations about sprinkler system performance and plant water requirements. An audit can replace many of these assumptions made in irrigation scheduling. With an irrigation audit, it is possible to customize irrigation schedules based upon on catch can results, site-specific soil conditions and plant water requirements. Rather than using the long time recommendation of “fifteen minutes, three times per week”, it is now possible to adjust run times for individual zones based on a measured precipitation rate.

Determining when to irrigate should be based upon the depth of the plant’s root zone and soil-type. Together, root depth and soil type define the amount of water that is available for plant use. A six-inch clay soil, for example, will hold more water than a six-inch sand. Thus, the number of irrigations per week will be less in clay, though the amount of water the plant needs will remain the same. Root depth also influences irrigation frequency. Shallow rooted turfgrass, for example, will require more frequent irrigations than will a turfgrass with a deeper root zone.

The first step in determining how long to irrigate is to calculate how much water should be applied at each irrigation event. Plant water requirements vary significantly in urban landscapes due to the variety of plant species, maintenance practices and microclimates. Water requirements also vary with climate trends and rainfall patterns. Turfgrass, which is generally assumed to be the highest water user in the landscape, requires up to 1-inch per week during the summer with less in the spring and fall. Due to limited water storage capacity in the plant’s root zone, two or three irrigations per week may be required. Once it is determined how much water (in inches) is needed at each irrigation, the conversion to zone run time is simple. The following equation is used to determine zone run times:

Run Time Per Irrigation = (Targeted irrigation depth / Zone precipitation rate) x 60
Where: Run Time Per Irrigation = minutes
Targeted irrigation depth = inches
Zone precipitation rate = inches per hour

Water conservation involves numerous Earth Kind principals and practices. However, an irrigation system audit is the most effective tool available for reducing water consumption and creating a sustainable landscape environment.

Leaking Valves:
On occasion, sprinkler heads may continue to leak after the irrigation system has turned off. The following are a few common reasons for this problem.

1) The system is draining water out of the lowest head(s). This situation will only last for a short period of time until the pipes on the higher end of the system are empty of water. A check-valve can be installed if this becomes a serious problem.

2) The valve(s) may be partially blocked with dirt or debris, which is preventing it from completely closing. When a blockage of this type occurs, water continues to flow past the valve, even when the system is turned off. If situation occurs, the valve must be flushed out to remove any debris causing the blockage. To do this, manually open the valve using the small bleeder screw (if the valve does not have a bleeder screw, open the valve by turning the solenoid ¼ of a turn). This technique will often flush any debris out of the valve and stop it from leaking.

3) The bleeder screw, on top of the valve, is used for manually turning the valve on and off. Check that the bleeder screw and solenoid are closed (NOTE: the bleeder screw should only be finger tightened. Too much pressure can strip the soft threads). Make sure the flow control is not open all of the way, which can also cause a valve to stick on. If this does not fix the problem, it may be necessary to repair or replace the valve.

4) If this is a recent installation, make sure that the flow direction arrows on the valve are pointing towards the sprinklers. If not, the valve must be removed and turned around.

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