

# Tips and Tools to Reduce Water Use

Golf facilities should follow these basic ideas to conserve water.

BY PATRICK O'BRIEN

Numerous issues challenge the game of golf today, including improving pace of play, growing the game, lowering costs to make golf more affordable, and making the game more fun for players of all types. However, arguably the biggest challenge facing golf is water use. Efforts have long been underway to help reduce water used to maintain golf turf. A goal of the USGA for decades, both through the Turfgrass and Environmental Research Program and Course Consultation Service, has been to reduce the amount of water used on golf courses. Several examples, just to name a few, include breeding more drought-tolerant turfgrasses and promoting sound agronomic management practices.

Water used for golf course turf is now closely examined by regulators and environmental groups throughout much of the U.S. Many golf facilities no longer use municipal drinking water for irrigation but now look to alternative sources. Even these other sources of water are now closely monitored. The prolonged drought conditions plaguing many areas of the country have intensified the importance of water conservation practices. Today, golf facilities must not only provide green space but



*Read your water meter often to track water use and to record data. This is the starting point for any water conservation program.*

also mesh into the community's ecosystem. In addition, golf course superintendents must ensure that water management decisions are well planned to protect our most important natural resource. Superintendents continually seek ways to conserve water as they examine the impact their operation has on the environment. Nonetheless, there is always room for improvement.

This article will examine ways that a golf facility may potentially reduce its water use through several practical tips, primarily directed toward fairways and roughs because these playing areas comprise the largest turfgrass acreage of golf facilities and, naturally, use the most water. Golf courses gen-

erally have 60 to 65 acres of irrigated turf in fairways and roughs, or about 80 percent of the irrigated acreage for an average 18-hole facility (Lyman, 2012). Focusing efforts to use less water in these playing areas will have the biggest impact in a water conservation program. The following five tips are applicable to every region of the U.S. or anywhere in the world where turfgrass is irrigated.

## 1. TRACK WATER USAGE

W. Edwards Deming, a famous American statistician, once said, "You can't manage what you can't measure." This holds true for any golf course superintendent who wants to achieve success with a water conservation program. The first step is to determine your water consumption. To obtain this information, the water meter is your friend. Typically, most pump stations are fitted with either a magnetic or inductive water meter that accurately measures water use.

The next step is to create a water-use report that tracks water use by day, month, and year. Many states require monthly reports from golf facilities to maintain an irrigation permit. As such, water meters are already widely used by most golf facilities today.



*Heavy-duty slicing aerators are ideal to help reduce soil compaction issues for a successful water conservation program. The tines crack and shatter compacted soils to a depth of six inches or more to open new channels for air, water, and rooting.*

## 2. SOIL CULTIVATION/ AERATION USING A HEAVY-DUTY SLICER

Soil compaction is the enemy of an efficient water conservation plan on golf course fairways and roughs. Compaction destroys soil structure, impairs rooting, and increases surface water runoff because soil is less able to accept water. Consequently, compacted soils require more irrigation. Studies by Dr. Robert Carrow at the University of Georgia demonstrated that aerating with heavy-duty slicing tines or blades significantly reduces soil compaction and enhances turfgrass rooting of Tifway bermudagrass fairways by fracturing compacted soils and creating more channels for air and water movement (Carrow, 1990).

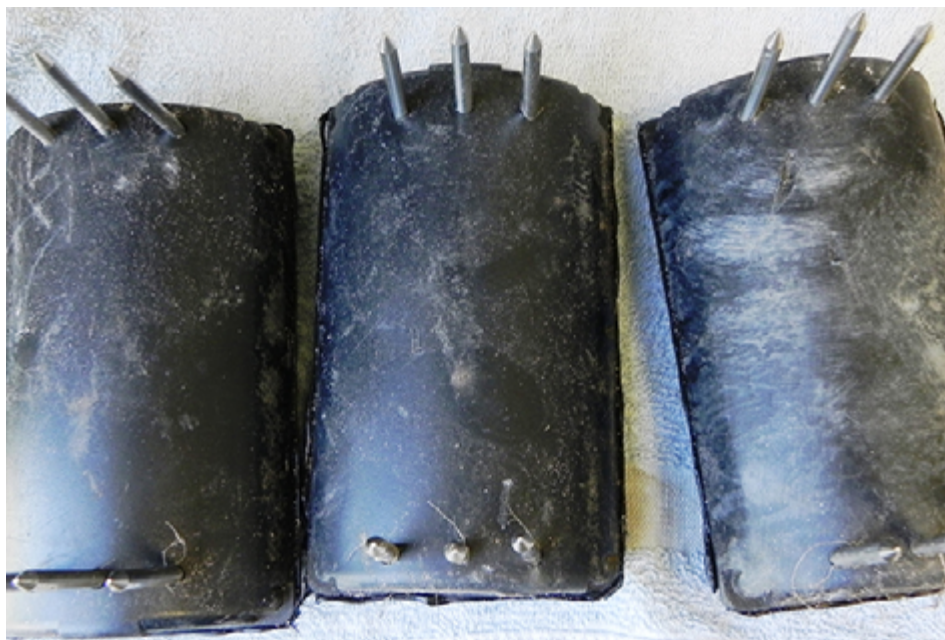
Therefore, using a slicer during the growing season is beneficial because it reduce surface water runoff by improving water infiltration rates and aiding moisture consistency throughout fairways and roughs. This saves water. The combination of better rooting and greater ability to receive precipitation can often allow selected irrigation events to be omitted, which translates into significant water conservation.

## 3. REGULAR USE OF WETTING AGENTS

Wetting agents conserve water by improving water penetration into the soil so that irrigation water is used more efficiently. Wetting agents also achieve more uniform moisture levels across playing surfaces and can even increase the volumetric water content of soils. Research by Dr. Sowmya Mitra at California State Polytechnic University demonstrated reduced water usage when wetting agents were injected into irrigation lines. All the wetting agents in this study helped in retaining higher moisture levels in the soil profile compared to untreated control plots (Mitra et al., 2006).

## 4. USE SOIL MOISTURE SENSORS TO FINE TUNE IRRIGATION SCHEDULING

In-ground, wireless soil moisture sensors are a great way for golf facilities to better monitor soil moisture and extend intervals between irrigation events.



*Wireless, in-ground soil moisture sensors help turf managers with decisions on when and how much to irrigate fairways and roughs.*

Soil moisture sensors more accurately report soil moisture status compared to visual examination. With the information provided from soil moisture sensors, superintendents are able to optimize irrigation scheduling with greater confidence and accuracy.

Soil moisture sensors are now commonly available and, as an industry, we are becoming more proficient in using them to significantly reduce water use on golf courses. These sensors measure the volumetric water content of the soil, and the information provided helps superintendents determine irrigation scheduling. With this knowledge, the major benefit of sensors occurs when a superintendent can stretch the interval between irrigation

events or, better yet, wait for the likelihood of the next rain event instead of using the irrigation system. Typically, due to the cost involved with in-ground, wireless sensors, a few specific indicator sites on fairways and roughs are targeted. Typically, indicator sites should include a dry area, a wet area, and an area of average soil moisture. It is important to select indicator sites so that they are representative of your golf course and can be used to help guide irrigation.

## 5. RAISING AND LEVELING IRRIGATION HEADS

Proper sprinkler head setup and spacing ensures the best delivery of water. A low irrigation head is one of

the most common problems with irrigation inefficiency and requires constant evaluation in the field. When an irrigation head is positioned too low in relation to the playing surface, the trajectory of the water stream is disrupted when it strikes turfgrass immediately adjacent to the head. As the stream of water breaks apart and never realizes its intended path, irrigation coverage is inconsistent, with the turf nearest the sprinkler becoming too wet and the turf farther away becoming too dry. Sprinkler heads sink, or may appear to sink, for several reasons, including soil settling after installation or construction, traffic on top of the sprinkler due to mowers and other turf equipment, thatch buildup around the sprinkler, or regular sand topdressing programs raising the surrounding terrain.

For these reasons, superintendents and staff members are wise to be on the lookout in the field for low, crooked, or tilted irrigation heads. Raising and leveling heads will improve irrigation uniformity coverage and help make the

best use of water. Turf performance and playability will benefit as well.

## CONCLUSION

The USGA has and continues to be focused on reducing golf's use of water. Every golf facility is urged to continue to strive toward optimizing water conservation efforts that are critical to sustaining the game of golf for future generations. The most water savings can be achieved by implementing a number of practices, such as the key ones addressed in this article, and not just one practice alone. I hope this information will be of use to reducing water use and maintaining better playing conditions at your golf facility.

For more information on water issues facing golf and how we can use less water, please see [Proceedings from Golf's Use of Water: Solutions for a More Sustainable Game](#).

## LITERATURE CITED

Carrow, Robert N. 1990. Deep tine aerification and root responses.

Proceedings article. Conference and Show p. 21-22. (TGIF Record **21636**)

Lyman, Gregory T. 2012. p. 14-15.

[How much water does golf use and where does it come from?](#) In:

Harivandi, Ali; Brown, Paul; Kenna, Mike, eds. Proceedings from Golf's Use of Water: Solutions for a More Sustainable Game. s.l.: USGA Turfgrass and Environmental Research Online. (TGIF Record **216335**)

Mitra, Sowmya; Suphantharita, Paitawee; Fam, Magdy; Plumb, Russell. 2006. [Impact on water conservation and turf performance from systematic use of surfactants in soils with only slight evidence of water repellency](#). Abstracts: 2006 International Annual Meetings [ASA/CSSA/SSSA]. p. [1]. (TGIF Record **120275**)

[PATRICK O'BRIEN](#) is director of the Southeast Region of the USGA Green Section, where he conducts Course Consultation Service visits in Georgia, North and South Carolina, Tennessee, Mississippi, and Alabama.



*Are sprinkler heads above or below grade? Level sprinkler heads are essential to optimize water conservation and distribution uniformity.*