

CUTT

A Healthy Ecosystem

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Practicing Efficient Irrigation

Water use will be the dominant issue for the next generation of golf turf managers," proclaimed Professor Bob Carrow, University of Georgia, at the 2003 New England Turfgrass Conference. Following this proclamation Carrow focused the remainder of his presentation not on agronomic aspects of water use, but rather on irrigation system performance.

The Irrigation Association agrees with Carrow and states the details of the attention to irrigation system design, installation and maintenance in their 2002 draft publication, "Irrigation Best Management Practices (BMP)," available at <http://www.irrigation.org>. In fact, four of the five listed BMP's do not involve use of an irrigation system, but rather feature designs for uniform application of water, proper installation and maintenance for optimum performance.

"Water providers have little empathy for superintendents," states Professor Jack Fry of Kansas State University, "who manage inefficient irrigation systems." In fact, Fry discusses the effect of poor water distribution in terms of dollars. He outlines the process used by the city of Wichita, KS where they charge golf courses that stay within the agreed upon water use goal about \$520.00 per acre-foot of water. However,

when courses exceed the use expected, the cost increases to almost \$800.00 per acre-foot.

The mantra of many superintendents who work where rainfall is abundant, is "I'd rather have it dry so I can control the amount of water applied." Yet the best irrigation system under ideal conditions delivers only 80% uniformity values. In the real world, most golf courses do not have state of the art systems and, even if they do, it is not likely they are being used to their potential. What will it take to change behavior and practice efficient irrigation?

More Heads?

The first guideline of the Irrigation Association BMP's for designing an irrigation system states, "Obtain direct knowledge of site conditions and not rely solely on plot plans to generate a design." More specifically, this point is considered in guideline #17, that requires a thorough evaluation of the physical, environmental and hydraulic site conditions, including typical wind patterns before siting sprinkler heads.

It follows then that if site-specific irrigation is synonymous with improved efficiency, irrigation systems will need more sprinkler heads

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Why not invent a sprinkler head that can adjust its geometry and flow? Doesn't the golf industry need a "smart-head"? Consider the idea that one head can be programmed and adjusted to deliver the amount of water at a desired flow rate to a specific area without irrigating the entire complex.

"Soil moisture monitoring is the final frontier in golf turf irrigation," proclaims Paul Roche, the irrigation manager for the S.V. Moffett Company in Rochester, NY and coauthor of the new book, Golf Course Irrigation: Environmental Design and Management Practices.

Efficient Irrigation

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Sensing Water

Will the sprinkler head or irrigation system of the future "sense" where the water is needed? "Soil moisture monitoring is the final frontier in golf turf irrigation," proclaims Paul Roche, the irrigation manager for the S.V. Moffett Company in Rochester, NY and coauthor of the new book, *Golf Course Irrigation: Environmental Design and Management Practices* (Wiley, 2003, 452pp).

Interestingly, in the new irrigation text the authors said, "Soil moisture sensors have not been used successfully in golf irrigation systems." The one paragraph devoted to this issue explains that the obstacles to proper monitoring are the soil differences on a course and at what depth to measure moisture that would represent an irrigated area.

Professor Carrow discussed his current research with colleagues in New Zealand who have developed a system for measuring soil moisture at several depths with a single device. Carrow presents this research at the website he developed, <http://www.turfgrasswater.com>. In addition, the site provides the latest research on irrigating turf and links to important information on irrigation design, maintenance and installation.

The goal of developing and using the soil moisture probes would be to have the capacity

to provide maximum flexibility for delivery. Tim O'Neil, CGCS, the current Secretary/Treasurer of the GCSAA and superintendent at the Country Club of Darien, CT, increased the number of heads from 240 to 1200 when the 40 year old system was replaced in 2002.

Increasing the number of sprinklers has been a growing trend in irrigation systems for the last 15 years beginning with a variety of heads around putting greens. Obviously, the putting green will need to be irrigated differently than the surrounds. Within the surrounds the bunker capes may require additional irrigation due to the proximity of the sand. Also, many courses that grow creeping bentgrass in the southern US have installed "mist" heads dedicated to frequent, cooling irrigation cycles.

Adding up the heads around the greens, one could find in excess of 30 heads. Each head requires some level of care and maintenance when considering its exposure to mowers, particles and poor water. Not only is this expensive to design and install, but to maximize efficiency it must be properly maintained.

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Troubleshooting irrigation systems on a regular basis maintains or improves performance.



to measure at several depths in several different soils. This would permit modeling approaches to predict soil moisture gradients and, depending on your turf root system, determine the need for irrigation across soil types and locations. Ultimately, it would be useful to have as few moisture probes in the ground to minimize cost and care.

Delivery-Minded

When W.A. Buckner developed the first slow-rotating hoseless sprinkler system and installed it at Pebble Beach Golf Club in 1912, it would have been hard to imagine how far systems would come. Yet, as far as we have come with technology using poor quality water and design, there is still a human aspect to delivering water.

"I am always considering how much water the turf can do without," states Mike Saffel, golf course superintendent at the Powder Horn Golf Club, Sheridan, WY. Saffel continues, "I spend the bulk of my time on my course considering irrigation needs so I can use my water as efficiently as possible."

Erick Holm, CGCS, the former Superintendent of the Onondaga Golf and Country Club in Fayetteville, NY (now at Hop Hollow CC, CT) was able to integrate the latest technology (science) with his feel (art) for golf turf irrigation.

Erick went from limited flexibility with irrigation zones and heavy reliance on hand watering to maximum flexibility with less need for hand watering. The old irrigation system had

six heads per zone while the new system provided individual head control. In two summers with similar weather conditions and different irrigation systems Onondaga reduced the amount of total man-hours for hand watering from 290 to 85.

Future

If we agree that golf courses should not be using potable water, then system design and operation are critical. "Improvements and upgrades are the first step," says Ali Harivandi, Environmental Horticulturist for the University of California Extension Service, quoted in the June 2003 *Golf Course Management* magazine. "Salts and other contaminants accentuate problems from poor system performance," he continues, "a complete system audit is required."

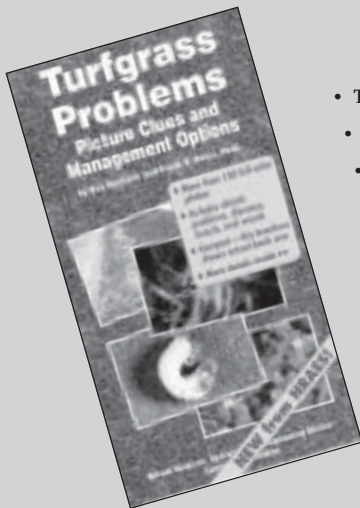
What will it take for all golf courses to embrace the approaches espoused by Saffel and Holm? KSU Professor Fry argues that it might be an economic motivation, some might say it will need to be regulated before widespread behavior changes and still others might become "delivery-minded" because of environmental concern.

Regardless of the motivation, the golf turf industry needs to get out in front on this issue. The demand should resonate from irrigation companies through regulators and down to the end-users. Simply having the latest technology is not a guarantee of efficiency, it is just one step toward a new behavior.

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