



## SENSING MOISTURE

As legislative pressure to limit water usage increases, soil moisture sensing systems are becoming the go-to tools for smart water practices. By John Torsiello

**W**hen you are living on the edge you'd better know just how close you are to that edge.

It is estimated that more than 15,000 golf courses in the United States demand about 2.7 million gallons of water a day. Faced with increasingly stringent water usage regulations, superintendents are looking for ways to fine tune their irrigation systems to squeeze every last drop out of daily water budgets. Those superintendents that don't face rigid water-usage guidelines nonetheless know water is a precious and costly commodity that they are wise to conserve.

A small number of golf courses in the U.S., by some estimates around 100, have installed soil moisture

sensing devices, basically small electronic probes that are placed into the soil in various locations around a course that provide valuable end-user data to help determine when and when not to water turfgrass. Several companies in the marketplace sell subterranean wireless sensors that monitor moisture, temperature and salinity in the soil and feed data back to a software network a superintendent can access remotely via a laptop, a handheld device or a desktop computer.

Of course, there are many traditional computerized irrigation systems available

to superintendents. Some are used to control pumps and traditional multi-head zone systems, and others are capable of controlling each irrigation head individually. Superintendents monitor various areas of the course for signs of drought and make adjustments to the heads in areas that may be too dry or too wet. However, it requires quite a bit of time to visually scout the course and then make adjustments.

Most courses will use sensors in the long term, says Bruce Williams, director of business development (West) for Valley Crest Golf Course Maintenance headquartered in Calabasas, Calif. "Water is a precious resource and any tools that better help us manage it and provide healthier and more playable turf will be critical to the future of the game," he says. "I have no doubt that one can better manage water and provide more consistent playing conditions with moisture sensors."

Lee Bladen, superintendent at Old Palm Golf Club in Palm Beach Gardens, Fla., has UGMO on three



Bladen



## SMART IRRIGATION

greens, two tees, and one fairway and is getting ready to expand to a couple more greens.

"I look at it as another tool," he says. "Being cognizant of what moisture it takes to grow quality grass changes how the super waters and manages his turf." UGMO charges Bladen a fee to monitor the moisture through their technology and internet. "The readouts from the sensors, while not without error, are very accurate," he says. "Placement in strategic locations can be a big help in water/moisture management."

Accuracy is one of the most crucial elements of a moisture sensing systems. Therefore it is vital to properly install and use, as well as maintain, the sensor's "stems" for maximum benefit. The larger number of probes placed in the earth – generally at between 5 inches and 5 feet in depth – the more comprehensive the pic-

ture becomes for the superintendent. However, placing a large number of probes in the ground is labor intensive and impacts a system's return on investment. In addition, regular inspections, maintenance, as well as the occasional replacement are required to keep the system running smoothly.

A system that includes 18 wireless sensors, three routers and gateways, software and technical assistance from the supplier can run around \$12,000. But if a facility saves several hundred thousand gallons of water or more a year as a result, the savings versus investment and upkeep is quite impressive and quickly noted.

Todd Bohn, superintendent at Creekmoor Golf Club in Raymore, Mo., has the Toro Turf Guard system set up on three greens and it allows him to see what is going

on below the surface. It reports to him when a green reaches a certain moisture level and whether he needs to add water to keep it from wilting. "Water costs for me aren't a huge thing because I have a 118-acre lake that catches all the runoff from a sub-division and surrounding areas," he says. "But the sensors help us to be a little bit smarter on our water consumption and only use it as we need it instead of wasting it."

Bohn believes moisture sensing equipment will play a greater role in the near future. "It won't be that long before we are all under water regulations of some form," he says. "This equipment is a way I can show my watering practices aren't wasteful, and I can track the temperature



Bohn

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and moisture levels in my greens at the same time.”

Superintendents should make sure their sensors communicate and are free of obstacles – such as trees, houses or mounding – that could inhibit information transmission. Most manufacturers have equipment that, for an added cost, will troubleshoot these problems, Bohn adds.

Michael Swing, CGCS, Visalia Country Club, Visalia, Calif., has a few reservations, such as: How long will the sensors last; how much sensitivity is lost over time; what is the cost of replacement and the labor cost of replacement; how does deep tine aeration affect the sensors; what are the difficulties in troubleshooting failures; will adding sensors add to potential rebates from state and utility companies?

“Most if not all of these questions will be answered by golf courses that

are currently using these devices over a period of time,” he says. “To rely on promotional material is a big risk because much of the information is largely overstated and of no value. Even with a proven product, you still deal with different soil profiles, exposures, traffic patterns, elevation changes, to name a few. Sensors are tools, much like our on-site weather station.”

Cost is a factor as well as placement as it relates to cultural practices, such as aeration. “Some operations will be able to integrate this type of system very easily,” Bladen says. “Others will simply gather the data and still use the old soil probe and seasonal watering cycles they have used for years. This is not a one-size-fits-all



Swing

technology and I have several concerns about removing too much of the human element away from the cultivation of quality golf turf.”

Scott Sewell, CGCS, Emerald Bay Golf Course in Destin, Fla., anticipates purchasing sensors in the near future. “I manage two golf courses that are three miles apart and it would be a great tool on days when I just can’t see everything on both courses,” Sewell says.

“I want to irrigate only when I have to and the sensors would be very instrumental in helping me do that,” he adds. “My courses are on reclaimed water, but it is not unlimited in amount, so I need to use it wisely. Knowing moisture levels throughout the course would help me save water and energy.” SI

*John Torsiello is a freelance writer based in Torrington, Conn.*

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