

water, Whitlark believes testing once or twice a year is enough to be able to make decisions on the quality of that water and whether or not you need to treat it.

As far as the testing itself goes, Whitlark advises superintendents to send a sample to a local lab. Samples should be obtained at the source or incoming pipe, if it's accessible. If you have multiple irrigation lakes, a sample should be obtained from each. A sample should also be taken from a quick coupler or sprinkler furthest away from the pump station.

“Poor water quality, at least certain constituents of it, may not manifest itself to the casual eye, even the superintendent’s, until things reach a tipping point.”

– Jeff Bowman,
Irrigation Consulting

“You want to get an idea of the source, what’s sitting in the lake and ultimately what’s going out on the turf, because in some cases the quality can be very different,” Whitlark says. “It could mean you’re collecting salt somewhere in the irrigation lake, and typically that’s what happens.”

Because irrigation is considered a non-potable use of water, it can have a certain level of bacteria in it, so when taking a sample you don’t need to use a sterile container, according to Bowman. A lab will test it for the constituents that could make a difference in turf health – because there are a lot of constituents that wouldn’t make a difference. Also, the average well or pond wouldn’t need to be tested for bacteria, but a lab would want to test effluent water for it.

Once the results are in, you can do your homework and interpret them yourself and or have someone else do it.

“It depends on how much time you have to educate yourself,” Bowman says. “There are many good resources available via the Web. Extension services and universities have publications on interpreting water quality data. If you don’t want to do it yourself, then consultation is something you should consider.” **GCI**

Jason Stahl is a Cleveland-based writer and frequent GCI contributor.

Mythbusters: Golf Edition

The word “myth” tends to have a negative connotation, and rightly so. For example, the idea that carbonates and bicarbonates by themselves will cause soil- or turf-related problems is one myth Brian Whitlark, agronomist with the USGA Southwest Region, claims is widespread. As such, courses will use acid or expensive acid systems for the sole purpose of reducing carbonates and bicarbonates.

“I see a lot of people make that mistake,” says Whitlark. “They tend to blame bicarbonates and carbonates for whatever reason and make management decisions that cost the facility money based on the bicarbonate numbers in the water. The point I would like to make clear is that bicarbonates and carbonates themselves are not the problem. They are really only a problem when the water contains elevated sodium levels.”

If the sodium levels are high, Whitlark explains, the carbonates and bicarbonates will render calcium and magnesium less active; thus, they’re not able to improve the soil or exchange in the soil for sodium.

“Calcium and magnesium are the good guys in the soil because they have really strong flocculating power,” Whitlark says. “Sodium is the opposite in that it’s a very poor flocculator of soil. So when water that contains high sodium and low calcium hits the soil, it tends to run the soil structure or disperse the soil. In such cases, if the water contains high carbonates and bicarbonates, it will make that condition worse. But if sodium is not a problem in the water, then bicarbonates and carbonates are not an issue.”



Whitlark advises superintendents to send a water sample to a local lab for analysis.

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John E. Kaminski, Ph.D. is an associate professor, Turfgrass Science, and director of the Golf Course Turfgrass Management Program at Penn State University. You can reach him at kaminski@psu.edu.

COMBINING THE ART WITH THE SCIENCE

Coming off an amazing trip to the US Open, I can't help but think of what would have been had the rains stayed away and the course truly firmed up. The announcers wouldn't have asked Merion's director of grounds, Matt Shaffer, about the possibility of players shooting 17 to 19 under par (which Matt immediately laughed off by saying "That's not going to happen."). Instead they would have probably asked whether the winning score would have been par.

As it turns out, Merion got over six inches of rain during the week and was still able to fend off the best golfers in the world, leaving Justin Rose the winner at an astounding 1 over par. Had it been dry, the winning score may have embarrassed most of the pros, as well as the USGA.

Regardless of the US Open outcome, water management is probably one of the most important aspects of turfgrass management. More importantly, it's not just about how to add water, but how to remove it as well.

At universities across the country, we all share the same mantra of "deep and infrequent" when it comes to the application of water to turfgrass. We sometimes talk about replenishing the system to a set percentage of the ET. We may even go into detail about the current techniques and technology that allows for rapid movement of water through soil profiles.

While overviews and generalities (along with some hard facts) can be offered to students, the practice of adding water as well as removing it is as much of an art as it is a science.

I often hear of students coming back from their internship stating how they "dragged hose all summer." My initial reply is, "Wow! That must have been a great internship." When I say this, I am not being facetious. Most

superintendents I know in the cesspool that is the mid-Atlantic region of the U.S. trust only their best employees to chase wilt on the greens.

As with many agronomic practices, there's no one right way to irrigate. Every golf course is different and in some cases each putting green may react differently to moisture. Some superintendents rely on their overhead irrigation to replenish the system. While not an ideal solution (hand-watering and syringing is generally a better practice), economics and limited staff often make it impossible to micromanage your moisture.

In the past (and currently for many seasoned veterans), the right time to water or syringe is often left to non-scientific methods such as pulling soil cores, watching for "foot-printing", or a variety of other methods learned through years of experience.

The science of water management on a golf course, however, is slowly evolving. In-ground moisture sensors can provide real-time readings of volumetric water content. The use of handheld moisture meters continues to increase and many superintendents are having staff use these to assist in determining water requirements.

While there's no doubt that these tools are improving our ability to limit our water use (remember, overwatering probably kills more grass than anything else), there are still subtleties among greens and even areas on greens that require the operator to make some judgment calls.

One question I often get when I pull out a moisture meter is "What should my percent moisture be?" The answer is "it depends." It depends on the soil type (sand vs. native), the species (creeping bent vs. annual bluegrass), the specific areas on and around the green and other factors. While some putting greens may not

begin to wilt until percent volumetric water content dips into the single digits, others may wilt in the upper teens. There is no universal number everyone can use to determine water requirements at their course.

Water management isn't only about putting supplemental water into a system. In the case of Merion last month, it was about getting the water out. Merion was constructed in the 1800's and has excellent surface drainage. Leading up to the U.S. Open, the club also installed internal drainage to help remove excess water from the greens.

A variety of practices were implemented on the greens leading up to the U.S. Open, including drill and fill, dryjecting, conventional coring and use of the grade. According to Shaffer, "installation of the XGD was the ticket" when it came to moving water through the greens.

In addition to the practices implemented on the greens, fairway programs were critical to keep the course playable during the storms. Beginning in 2005, Shaffer solid tined the fairways twice a year and applied 15 tons of sand per acre after each coring. An additional 20 tons were applied annually in a series of "dustings."

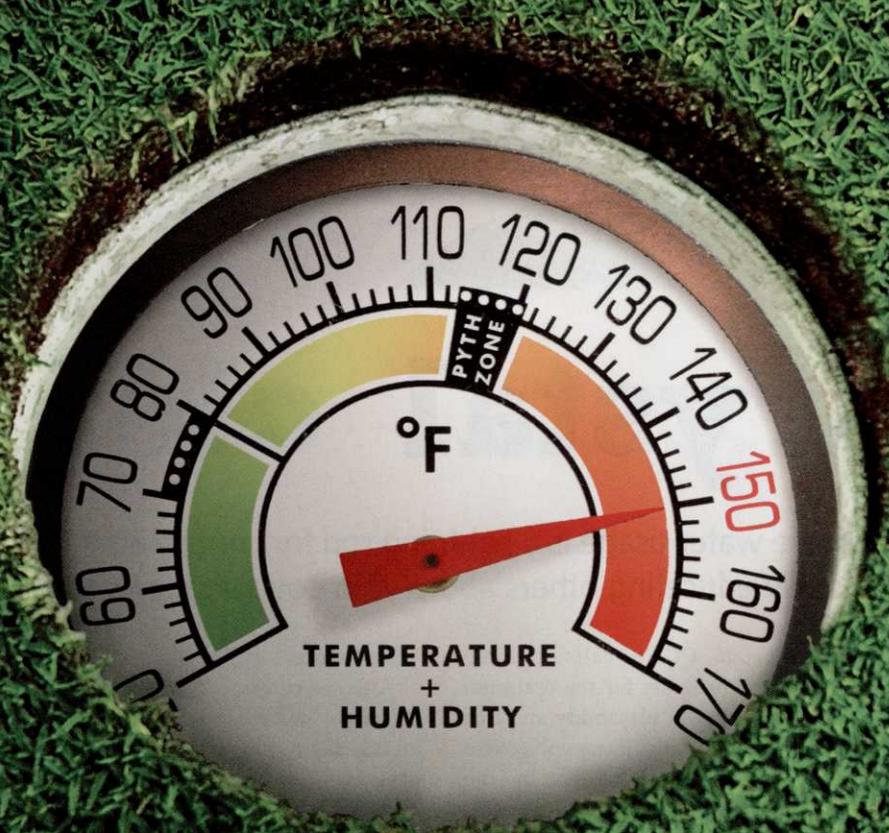
One of the biggest saviors for the fairways during the Championship was the use of the fairway rollers to squeegee water out of the fairways. "I'm not sure if this would be considered a sound agronomic practice, but it helped the fairways dry out faster," said Shaffer. These decisions for the greens and fairways allowed his crew to stay within their planned heights of cut and cut or double cut at least once a day, despite the periodic rains throughout the week.

The combination of internal and surface drainage, the many years of

(KAMINSKI continues on page 79)

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Crystal clear

By Jason Stahl

Golf course water usage is a lightning rod for controversy. Tips for successfully educating others about your course's water strategy.

Mark Esoda, CGCS, calls applying water to turfgrass for the optimum combination of playability and turf health "insanely difficult" to do. Every golf course superintendent on the planet knows that, but the trick is getting members to grasp that concept.

"They get enlightened when you tell them how many sprinkler heads you have and how much control you have and how often you scout and change and adjust each day," says Esoda of Atlanta Country Club. "It becomes a real eye opener for any layman who doesn't manage water for a living."

Esoda says the conversation at committee meetings at his club typically revolves around playability, with members expressing their preference for drier conditions. Esoda and his crews will then make

adjustments to achieve those conditions.

Another common concern among Atlanta CC members is whether the course has enough water. In this day and age when everyone falls under restrictions at some point or another, this is becoming a frequent worry.

"Our general response is, 'Yes, we have enough for the grass, but not for the aesthetics,'" Esoda says. "And we tell them you can't pump water just to keep a lake full; you have to manage your volume and how much you use. That tends to turn people into supporters where they'll say, 'Hey, it has been really dry and I can't believe the course is so good!'"

The key is to communicate early and often so members are kept apprised of what's going on. A monthly newsletter goes a long way in this regard;



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CONSTRUCTION

the July edition will often talk about water conservation and how members can play their part by restricting watering at home.

“The regulatory community likes for us to pass along information to our constituents to help them understand to not use irrigation as a toy but as a limited resource,” Esoda says.

Esoda says he has a good relationship with the local homeowners association, so for

the most part they understand the course’s water needs. Their main concern is not the club’s water use but the flooding that occurs in the lower parts of the course near the Chattahoochee River. If a resident did accuse the club of stealing water out of a pond, they could put an article in the homeowners association’s magazine to clear things up.

“If you start your relations early and use



them, you’ll have a better chance of getting people on your side when there are issues of completely dry lakes and the fingers first get pointed at the course when all my neighbors are actually pulling the water out and not me,” he says.

Esoda also encourages superintendents to join water associations as a way to spread the truth about golf courses’ water use. He belongs to the Georgia Association of Water Professionals and the Chattahoochee Riverkeeper. “The message to the community is that we are a business and have unintended benefits to them: green space, wildlife habitat, etc,” he says. “And we support the community through jobs. The difference between the grass in your front yard and my course is jobs – it doesn’t need more water or fertilizer, we just mow it more. When we’re attacked and our water use is called ‘non-essential consumptive,’ we say imagine going to dirt. The unintended consequences would be worse: runoff, silt, loss of habitat, etc. It’s better to encourage good management, use and conservation then cut somebody off. Then what do you do with those people now out of work in this economy?”

Ken Gorzycki, director of agronomy at Horseshoe Bay Resort in Horseshoe Bay, Texas, also finds it pays off to be involved in local water associations. He serves on water conservation and water management committees of the Lower Colorado River Authority.

“Staying involved allows you to handle things on a proactive rather than reactive basis,” he says.

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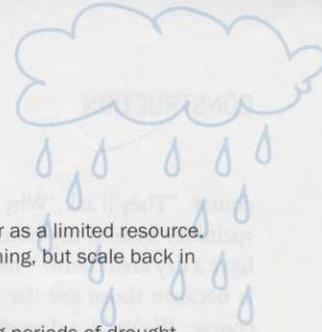
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Key points

- Remember, most people have no idea what goes into managing water as a limited resource.
- Be up front and honest about why decisions are made to water one thing, but scale back in other areas.
- Be proactive and get involved in your community.
- Maintain constant communication about water issues, not only during periods of drought.
- Keep your emotions in check when discussing water-usage policy. Advise members to do the same if they engage in water-usage conversations with community members.
- When appropriate, dispel the stereotype that golf courses are water hogs and pass along the positive story of how the golf industry is a responsible steward of water resources.
- Stick to layman's terms when discussing water-related issues



Top Left: Drilling a well at ACC. Above: Adding wire for more stations for greater irrigation efficiency.

That proactive approach – and keeping emotions out of the conversation – has helped him avoid battles with the members and community when the topic of water comes up.

“I just stick to the facts,” Gorzycki says. “I let it be known that we all need to be conserving water, not just on the course but on home lawns as well. I keep reminding members and area residents that we’re in the middle of a drought and we all need to do our share to get through it.”

Gorzycki tells people that he uses mostly reclaimed water, and he only supplements it with raw water out of the lake when absolutely necessary. Like Esoda, he believes the golf industry has a good story to tell when it comes to using water.

“We’re perceived as being this big, huge water hog, but in fact we only use half of one percent of the available water, and any good water conservation plan is looking for a 10 to 20 percent reduction at minimum,” he says. “We don’t need to apologize for our water use; we need to take credit for the things we’re doing well with water conservation.”

The question Gorzycki gets most often from members regarding water has to do with their own personal lawns versus the

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course. "They'll ask, 'Why don't you run that sprinkler behind my house more because I have a dry area there?'" he says. "My answer is because those are the perimeters of the course. We're in a drought, so we're maintaining more down the middle of the course, and the perimeters will scorch some during the heat of summer. We will put some irrigation [on the perimeters], enough to keep them alive but not enough to keep it lush. We need to be reducing our irrigated area, not increasing it."

Another frequent request from people is to put water into near empty streams behind their houses to flush them out, but Gorzycki must again put on his water steward hat.

"I explain to them that it's just not a good use of the water," he says. "I tell them that when we get a rainfall, it will flush those streams out and make them healthy again to support wildlife. It's not a good perception in the community either to see water running down a creek to flush it out."



Mark Esoda: "The message to the community is that we are a business and have unintended benefits to them: green space, wildlife habitat, etc."

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“If you start your relations early and use them, you’ll have a better chance of getting people on your side when there are issues of completely dry lakes and the fingers first get pointed at the course when all my neighbors are actually pulling the water out and not me.”

– Mark Esoda, Atlanta Country Club

Even the mayor once asked Gorzycki if he could put water in certain areas he felt could use it, and he had to remind him that they were still in a huge drought and that wouldn’t be a smart use of water.

“A lot of people get tunnel vision. Our golf course community has a constant level lake, but the lakes that feed it are not constant level. Also, we have a power plant on our lake that has to maintain a certain level. Because our lake is full, they forget that other lakes are below 40 percent capacity. You have to keep reminding them that just because our lake is full doesn’t mean we have unlimited water to use.”

Gorzycki gets the word out to members via a weekly email that features a column written by him, and a monthly newsletter.

“Even during cooler, wetter times when water use is not much of a focus, I keep trying to remind them that we still need to conserve water even though we just got a rain a few weeks ago because we’re still under a drought,” he says.

John O’Keefe of Preakness Hills Country Club in Wayne, New Jer-

sey, says his members for the most part understand his water strategy, but they do often ask why his crews are still “pulling hoses” after installing a \$1.4 million irrigation system 10 years ago.

“Then I go into a dissertation on how they still don’t have many irrigation systems with a set of eyeballs, and you don’t want to turn on a head that will irrigate a 120-foot diameter circle when you only need to water two or three spots on a green,” he says.

Once in awhile, members will also ask general watering questions, and O’Keefe will explain to them in layman’s terms why a plant sometimes needs help.

“I use the analogy of working out. If you’re really starting to get hot and sweaty, what’s the first thing you do? You take a light drink of water. A plant is no different. If it’s a hot day out there, the plant is trying to keep up with its cooling process and it just doesn’t do enough, so you have to give it a light shot with a syringing.”

One question O’Keefe doesn’t receive is, “Why aren’t you putting more water down?” Like the members at Atlanta CC, his members prefer dry conditions for more roll.

“They don’t want to see the whole place golden brown, but they would rather see it a little firm with a little wilt here or there or off color rather than lush green and really wet,” he says. “We try to provide that the best we can. I have three assistants, and we’re out there watching the course on a daily basis.” GCI

Jason Stahl is a Cleveland-based write and frequent GCI contributor.



Rain water harvesting at ACC.

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