

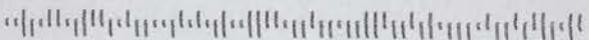
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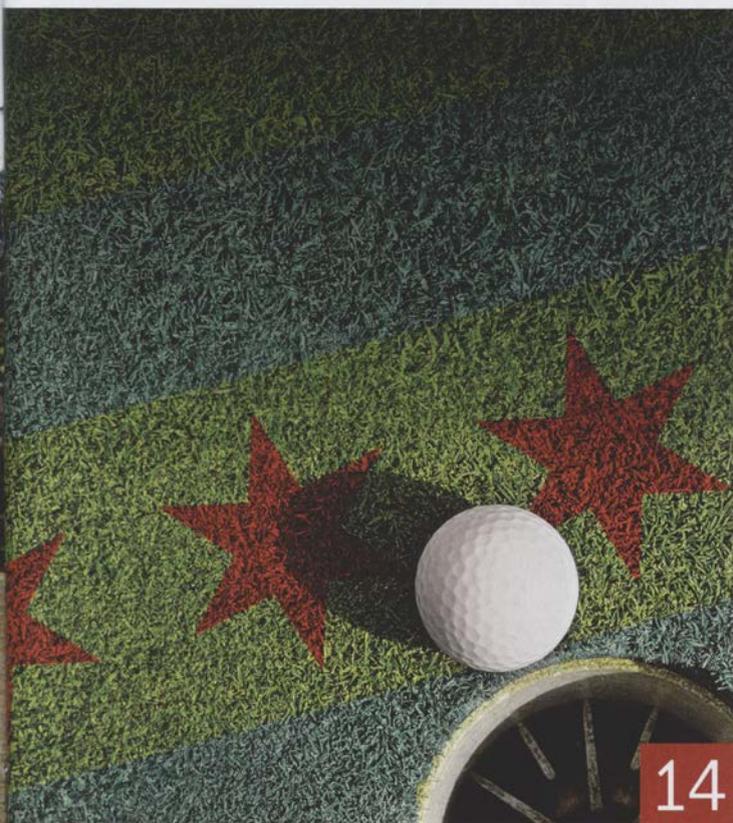
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BIRDIES AND SHANKS

Consuming media while producing media is part of an editor's routine. Here are a few birdies and shanks and why they matter to our segment of this \$70 billion industry.

BIRDIE. David Owen, author of multiple golf books, including "The Making of The Masters," isn't devoting 200-plus pages to the game again. But he recently released a book about a subject that could shape the industry's future – water.

"Where the Water Goes" traces the past, present and future of communities and landscapes affected by the Colorado River. The basin supports \$26 billion of recreational activities. Golf represents a big slice of that total. The seven states in the region support a combined 1,802 courses, according to National Golf Foundation facilities data.

A prominent writer with a golf background exploring an environmentally charged issue provides an external boost to the industry, and his chapter about Las Vegas offers examples of courses reducing water footprints for the greater good. Unlike some writers and scholars, Owen ends his work by presenting solutions to the water dilemma. He's a proponent of city living in resource-starved regions, even claiming water efficiency gains are lost if they are reinvested in sprawl.

Any hack can reveal a problem. It takes a skilled player to help solve one. Owen breaks par with this book.

SHANK. Author Malcolm Gladwell doesn't like golf. He despises it, a point he makes early in his "A Good Walk Spoiled" podcast. "I hate golf," Gladwell tells listeners. "By the end of this you will hate golf too."

So much for objectivity.

Before clicking goodbye on golf-hating media, consider how suffering through 35 minutes of a biased podcast can help golf. We're golf supporters. All of us, theoretically, should believe in the game's economic, spiritual, physical and societal benefits. To fully promote our business, we must understand how opponents view golf.

Gladwell, who uses Los Angeles private courses as the impetus for his assault, views golf as "crack cocaine for rich, white guys" and suggests it creates "inequality and injustice." He also takes a shot at golf course maintenance, telling listeners courses are "drenched in pesticides." Yikes.

How do you counter the negative publicity? Start with numbers. Seventy-five percent of the 15,000-plus golf courses are public facilities. The median green fee was \$37 in 2015. Golf contributed \$3.9 billion to charitable efforts in 2016. Documenting annual pesticide and resource usage helps defend your course, and industry, against unsubstantiated attacks.

Gladwell has accumulated thousands, if not millions of fans/followers, because of his immense writing talents. Unfortunately, attention inflates egos. Agendas ensue, and we're left with a podcast that steals its title from a John Feinstein book.

BIRDIE. I laud officials at Medinah Country Club and The Greenbrier for making members of their respective turf teams prominent parts of recent media events. Director of golf course operations Curtis Tyrell and architect Rees Jones led a media tour of Medinah's restored No. 2 course May 24, while The Greenbrier invited director of golf course maintenance Kelly Shumate's entire team to The Greenbrier Classic Media Day June 5. The work at Medinah is featured on page 14 and the third part of our series about the incredible rebuilding efforts at The Greenbrier runs next month. **GCI**



Guy Cipriano
Associate Editor

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GIE Media, Inc.
5811 Canal Road
Valley View, Ohio 44125
Phone: 800-456-0707
Fax: 216-525-0515

EDITORIAL Pat Jones

Publisher/Editorial Director pjones@gie.net

Mike Zawacki Editor mzawacki@gie.net

Guy Cipriano Associate Editor gcipriano@gie.net

Terry Buchen Technical Editor at-large

Bruce Williams Senior Contributing Editor

GRAPHICS / PRODUCTION Jim Blayney Art Director

Kaitlin Stanaitis Graphic Design Intern

ADVERTISING/PRODUCTION INQUIRIES Jodi Shipley

jshipley@gie.net • 216-393-0273

SALES

Russell Warner National Account Manager
rwarnar@gie.net • 216-393-0293

Craig Thorne Account Manager
cthorne@gie.net • 216-393-0232

Bonnie Velikonja Classified Sales
bvelikonja@gie.net • 216-393-0291

CORPORATE

Richard Foster Chairman

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Maria Miller Conferences Manager

Kelly Orzech Accounting Director

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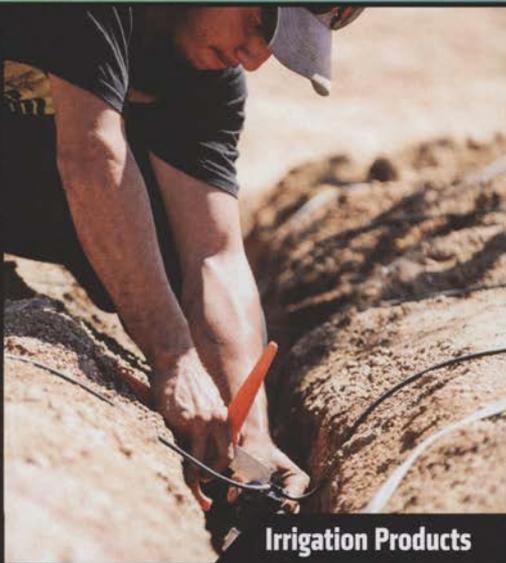
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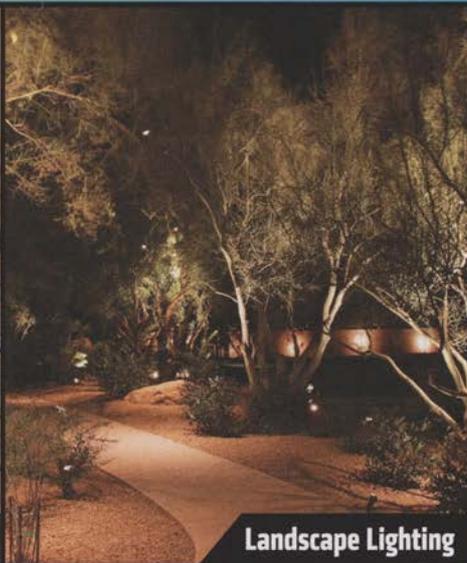
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Walking from old to new

Columbus-area golf course provides a glimpse into the maintenance building development process.

By Guy Cipriano

LET'S TAKE A WALK with a superintendent turned executive of an exclusive private club in a market filled with elite facilities.

Our group consisting of Ohio Turfgrass Foundation members meets Double Eagle COO Todd Voss at the old maintenance building. Before businessman John McConnell decided to build his dream golf course, the light blue structure housed horses. Double Eagle owns a Galena, Ohio, address. Galena was farmland when the course opened in 1992. Today it's considered part of the bustling and expanding

Columbus metropolitan area.

Double Eagle's prominence also has expanded in the last two-and-a-half decades. Those who rank golf courses often place it in their Top 100 lists. Voss arrived at Double Eagle in March 1991 as an assistant superintendent. Twenty-one years later, he ascended to COO. He remains heavily involved in golf course maintenance, and he spends mornings walk mowing greens.

The club moved its primary maintenance operations to a pair of gutterless red structure behind the 14th green and 15th tee in 2013. The

old, blue horse barn still serves a key purpose. It's where Double Eagle stores chemicals, fertilizer and large equipment. Later, in a quiet moment away from the group, Voss is asked why the club kept the structure. Finding a more open and accessible person in the business than Voss might be tougher than landing a tee time at Double Eagle. Voss visited a dozen maintenance buildings when planning the project.

"Most great clubs have about 20,000 square foot of maintenance, whether that's cold storage, whether that's work space, but it's about 20,000 square feet," he says. "With our maintenance buildings, we were adding about 7,000 square feet per building. That still makes us a little bit short. By keeping the old building, it allows us a place to put some of the big equipment that just takes up space – tractors, sprayers,

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NOTEBOOK

backhoes. It also allowed us to now have our fertilizer in a room that has a concrete floor, so that allows a forklift, which is more efficient.”

Do the math: 7,000 + 7,000 = 14,000. That 6,000-square foot difference meant Double Eagle either needed to build a third new building or keep the old one. Chemical and fertilizer storage also factored into the decision. Storing chemicals in the old building prevents Double Eagle from changing current codes and protects the club against potential fire damage, Voss says.

The tour then takes a few detours before visiting the new structures, first stopping at an expansive bentgrass nursery adjacent to the blue building. Native areas, a small pond and trees surround the nursery. The group passes a birdbox – one of 170 –

on the walk to the nursery. Multiple emerging bentgrass varieties are tested here. Researchers, especially those from nearby Ohio State, know this part of the property well.

A left turn around more native areas brings the group to the par-4, 14th hole, where first-time visitors immediately notice an absence of markers on tee boxes. The group walks the hole, learning Double Eagle’s maintenance philosophies along the way. *Poa annua*, in Voss’s words, is “public enemy No. 1 at Double Eagle.” Native areas are left untouched. “What grows in our native areas, grows,” Voss says. Fairways are aerified twice per year; bunkers are viewed as hazards; inputs are limited.

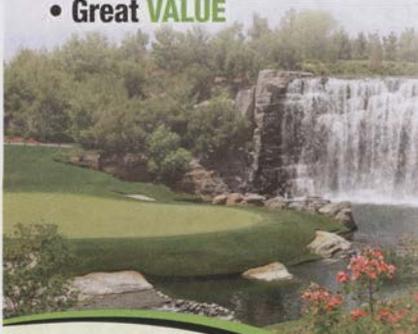
After exiting the 14th green, it’s time to explore the primary maintenance compound. The new

and existing buildings are painted red. Completing the compound required two years of permitting, and Voss asked thousands of questions during the stretch. Stories of maintenance building fires convinced him to place mowers and other equipment in multiple buildings. “Did I really want to put all eggs in one basket?” he says. Riding mowers, utility vehicles, walking rotary mowers and handheld equipment are stored in one of the new buildings. Walking reel mowers, staff offices, the equipment technician’s workspace, parts and breakroom are in the other building.

Perhaps the most exhausting and rewarding part of the maintenance compound project involved constructing a covered wash pad. The permitting process lasted nine months. Voss remained persistent,



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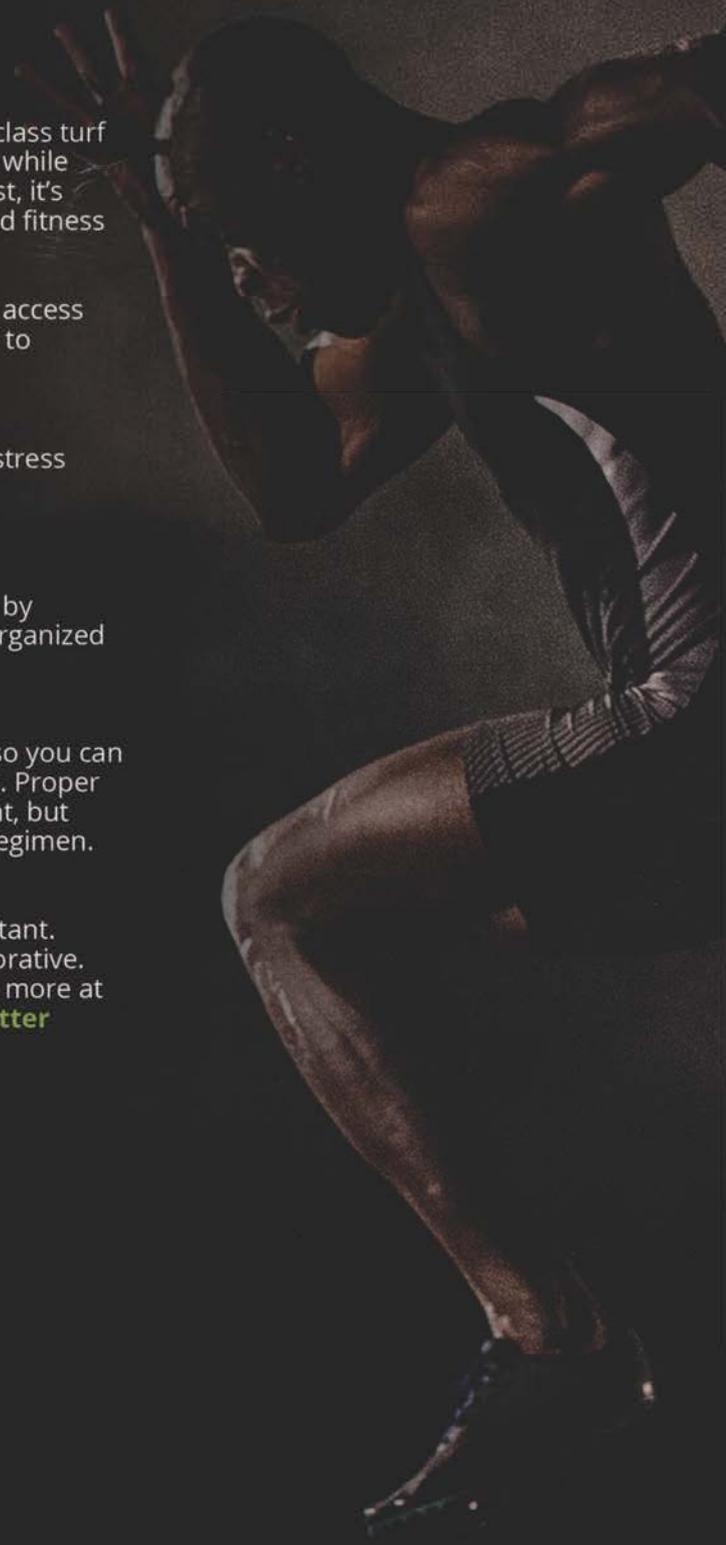
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because he's witnessed too much storm-related untidiness and commotion around the shop in his career. "Just being able to have all the guys wash stuff off at once ... it's time motion," he says. "You can get it done quicker and easier, and it pays for itself."

The remainder of the tour includes a stop at the pump station – "That's our heart," Voss says – the 15th green, a greenside bunker project on the 12th hole and six-acre irrigation lake built in 2007. The two-hour walk ends at the old maintenance building. Voss fields dozens of questions, and he doesn't dodge any turf topic during the tour. His advice for colleagues planning a new maintenance facility?

"Ask around," he says. "If you're not getting the answer you want, you're not asking the question correctly. When you visit places, ask them, 'What do you like about your building? What don't you like about your building?' I took our drawing to every superintendent's meeting and had guys look at it. Maybe you think something is a great idea and somebody goes, 'This is pretty bad. Let me show you why this is bad.' You then look at some of these amazing buildings that clubs have built." **GCI**

Tartan Talks No. 12

We turned to two ASGCA members to explain the three "Rs" of modern golf course architecture.

Restorations, remodels and renovations served as topics as we joined Steve Forrest and Shawn Smith at Hills & Forrest International headquarters in Toledo, Ohio. The pair revealed their definitions of the misunderstood concepts and implemented examples from their work into the discussion. The podcast also offers tips for superintendents seeking to protect the size of their course's greens.

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BUNKER REDUCTION PLANS



Jeffrey D. Brauer is a veteran golf course architect responsible for more than 50 new courses and more than 100 renovations. A member and past president of the American Society of Golf Course Architects, he is president of Jeffrey D. Brauer/GolfScapes in Arlington, Texas. Reach him at jeff@jeffreydbrauer.com.

In both the golf booms of the 1920s and 1990s, courses were built without regard for the possibilities of tougher financial times.

That notion reversed in the harder years of 1930s and 2010s. In the depression era 1930s, famed architect A.W. Tillinghast toured the country for the PGA of America, recommending the removal of thousands of bunkers, including some of his own making just a few years earlier. Alister MacKenzie, who still had a few commissions in the depression, sought economy by minimizing bunkering, with exhibit No. 1 being Augusta National, which opened with 22 bunkers.

This philosophy dominated most of golf course design until the golf boom of 1980-2005, when architects forgot history. A good economy, and the need to build award-winning, highly photogenic, residential-enhancing courses, gave rise to the birth of over bunkering. Sand bunkers proliferated like weeds, but this time, it wasn't just the top architects building courses with innumerable bunkers – most of us did it to literally and figuratively “keep up with the Jones’.” Combined with other trends of bunker liners and imported white sand, sand bunkers were becoming more expensive to build and then maintain.

The Great Recession reversed that trend again. In new design and major renovations, the “average” bunker square footage probably reduced from 80,000 to 125,000 square feet to

40,000 to 80,000 square feet, depending on the course type. There is steady work in preparing sand bunker reduction plans. It's logical to evaluate bunker quantity before installing expensive bunker liners to improve quality.

The question always is, “How do you pick bunkers to remove or reduce in size?” Here are my criteria:

BUNKERS THAT AREN'T NEAR MAIN LANDING ZONES

After the Golden Age, fairway bunkers were strictly placed only “in play” for top golfers, at main landing zones and close to the greens. Gone were aesthetic random bunkering that often looked great, but seldom saw meaningful play. Besides cost savings, the theory was/is that golf is hard enough for mediocre players without fairway hazards, especially if placed over 200 yards from the green, where they are unlikely to reach the green because it exceeds their maximum second shot distance.



BUNKERS THAT RARELY CATCH GOLF BALLS

After 10 years of play at my design at

Sand Creek Station in Newton, Kan., the GM noticed no activity in the outer area of the fairway bunker on the eighth hole, while the inner area was often used. We determined they could eliminate the outer half of the fairway bunker without affecting looks or play.

The image at the start of this section is of the eighth hole at Sand Creek Station. Removing the outer (left) portion of the fairway sand bunker reduced it by half, but it was rarely used and not clearly visible from all tees.



CATCH TOO MANY GOLF BALLS

The flip side of taking out bunkers that catch too few shots is to remove those that catch “too many.” Average golfers have predictable shot patterns – mostly missing short and right. We eliminate many existing sand areas that are short of the front edge of the green, widening the effective fairway approach width. Every yard of width seems to allow one more shot to reach the green in an average foursome.

While on the hook side, converting the front part of the bunker in the above picture to sand reduced the number of time consuming sand bunker recovery shots.

NOT VISIBLE

St. Andrews' original sand bunkers were dug by huddling sheep, and often blind as a result. Modern design theory favors complete visibility of strategic hazards. And, with the current cost of sand bunkers, there is no reason to build sand you can't see. However, portions of many sand bunkers aren't visible to golfers. On a recent project, I was told that the archi-

(BRAUER continues on page 55)

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By **Guy Cipriano**



Chicago CONNECTION

IN ONE OF THE NATION'S LARGEST MARKETS, TWO VASTLY DIFFERENT FACILITIES ARE MAKING BIG MOVES TO SEPARATE THEMSELVES FROM A CROWDED GOLF PACK.



The municipal course and storied country club are separated by five suburban Chicago miles. Their customers hail from different backgrounds, yet they see O'Hare International Airport arrivals and departures when glancing skyward between shots.

For the sake of this story and in the spirit of the behemoth neighborhood airport, we'll use course codes in subsequent references.

The municipal course is The Preserve at Oak Meadows. Code: POM. The country club is Medinah Country Club. Code: MCC.

POM and MCC occupy different spots in the golf hierarchy. POM used to be Elmhurst Country Club. The property's run as a private golf course ended when the Forest Preserve District of DuPage County purchased the land before opening 27 holes to the public in 1986. The name changes again this year as Oak Meadows downsizes to 18 holes and becomes POM.

MCC is the Midwest's best-known golf brute. Ten Chicagoland courses have hosted a U.S. Open or PGA Championship, but none of the other nine possess MCC's major-championship pedigree. The club's resume includes three U.S. Opens, two PGA Championships and the patriotic puncher known as the Ryder Cup. MCC supports 54 holes of golf.

Both facilities are changing, thus a late May visit to the west suburbs. Coincidentally, our flight arrived at MDW. Bad idea. Chicago traffic is a ...

Medinah Country Club has renovated three courses in the last 10 years. Pictured is the No. 1 course.

EVAN SCHILLER



Competing in the Chicago golf market can be as tricky as traveling the Eisenhower, Dan Ryan or Stevenson expressways. The market features 904,000 golfers, the second highest total of the 347 markets studied, according to the National Golf Foundation's 2017 Golf Participation in the U.S. report. New York City leads the

nation with 1.3 million golfers.

The average Chicagoan has more options than anybody in the U.S. The market boasts a nation-high 4,050 public golf holes, according to the NGF report.

The non-geographic link between POM and MCC includes recent decisions to boost current and future positions in a

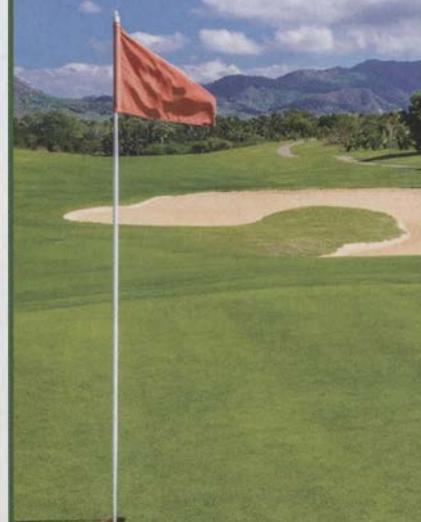
market filled with options. The revamped POM and MCC No. 2 courses debut this summer, and the people involved in each project think others will follow their respective leads.

BIGGER THAN GOLF

On a damp May afternoon, Forest Preserve District of DuPage County director of golf Ed Ste-

venson and golf maintenance manager Eric Ensign wait in a clubhouse stocked with more construction sketches than golf merchandise. Stevenson describes how golf fits into the district's overall mission. The district manages 13 percent of the land in a county with nearly 1 million residents. The total equates to 26,000 acres.

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Top: Forest Preserve District of DuPage County's Eric Ensign, left, and Ed Stevenson.

Left: The Preserve at Oak Meadows is expected to debut this year following a major environmental and golf project.

He says the \$16 million of work on the site is about something bigger than improving a golf course.

"This project was an effort to answer the question: Why would a conservation agency be in golf? And does a conservation agency belong in golf?" Stevenson says. "We feel this project was a resounding yes. We

can do the same things on this property to improve water quality and improve habitat that we would at any other preserve with or without golf and at the same time, marry a use and recreational purpose where people would come into the preserve and get to experience what's on the property."

The district purchased the land primarily for flood control purposes, but upstream development often turned the site into a quagmire, hurting golf businesses. Oak

Meadows, Stevenson says, developed a reputation as "Soaked Meadows." Ensign spent his first four years as a district employee as Oak Meadows' assistant superintendent. He then served 13 years as the superintendent of a nine-hole course owned by the district before receiving his current position in 2015. He dealt with three floods in his first six months back on the property.

While loss of business, turf and staff morale had become accepted, it was also coming to an end. Looking to improve the natural and golf habitat, the district, after a widespread search, hired Illinois-based architect Greg Martin to create a master plan for the site in 2011. Martin challenged the premise that the golf course and preserve couldn't be improved concurrently.

"One of the high points was getting someone like Greg involved who said, 'Wait a minute. Why can't you do something that's better for stormwater, why can't you do something that's going to improve habitat and solve problems for the community, and still make it a world-class experience?'" Stevenson says. "I think the golf industry as a whole looks at projects



Medinah Country Club's Curtis Tyrrell, left, and golf course architect Rees Jones lead a tour of the No. 2 course.

TIPS FROM *Tyrrell*



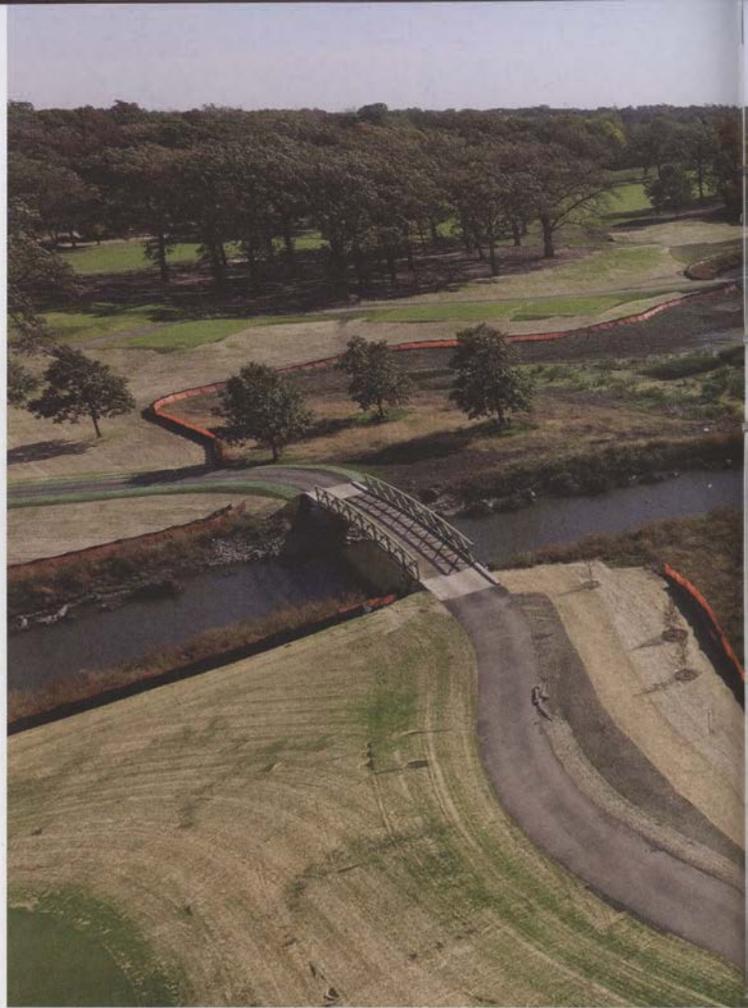
Curtis Tyrrell is one of 25 superintendents worldwide to hold Certified Golf Course Superintendent and Master Greenkeeper certifications. But, after completing his third major course renovation in less than a decade at Medinah Country Club, Tyrrell's legacy might be in the construction segment of the golf industry.

"He probably has as much experience as any golf course superintendent in the nation as far as construction," architect Rees Jones says.

Following a tour of MCC's revamped No. 2 course, GCI asked Tyrrell what advice he would give superintendents pursuing a major project. Planning and leadership are keys to MCC's construction success, according to Tyrrell.

"A lot of times if you kind of tip-toe into it or are not prepared when you meet with the membership, that's when things can get slowed or members don't get fully invested properly," he says. "If you can take the time to put a pre-development plan together that outlines, Hey, we need an architect, we need an engineer, we need some contractors to get in here and price everything before we go and present this to the whole club. If you did it that way in two phases, with a pre-development and pre-planning phase and then the ultimate sales pitch and offering, you have a chance of being on budget. We were on time and on budget with all of ours, but that's because we invested, depending on the size of the project, a \$100,000 or a couple of \$100,000 to develop it right.

"I would also say take the lead. At every club, there are going to be people who are excited that want to know and our job is to lead them down the right road. Within our industry there are tons of guys that you can call. Our network is great. All the information you need is there, so be the leader of the project at your club and prepare."



like this historically kind of like the way we look at healthy foods sometimes: Hey, if it's really good for the environment and if it's good for these other purposes, how good can the experience be for golf?"

Martin's background included extensive work on municipal sites, and he understood the intricacies and methodical pace of the permitting process. Nineteen agencies, including environmental groups ranging from the Sierra Club to DuPage River Salt Creek Workgroup, held roles in the project. Salt Creek represented the centerpiece of the preserve and golf course. Work started on July 7, 2015, when a slew of engineers and biologists started restoring and rerouting the creek. Images of the project's early phases were reminiscent of an ancient civilization textbook. Crews were moving water to make better use of the land for

an entire community.

The work of experts in other fields dazzled those accustomed to golf construction tactics. Protecting against future stream bank erosion and creating additional habitat for aquatic life involved placing root wads along the creek. The root wads at POM consist of 30- to 40-feet of cleared tree bases deemed valuable enough to be reused. Early in the project, they watched a hydrologist direct a machine operator to move a root wad 1 foot, 8 inches from where he originally placed it. Crews duplicated that level of detail as they worked downstream.

"The first year my main job was monitoring what the contractors were doing, reporting to our project engineer," Ensign says. "It wasn't really golf course related. It was all new to me. They are doing things in the creek and I'm going, 'Why



Restoring Salt Creek was a critical part of the work at The Preserve at Oak Meadows.

are you doing that? How is that supposed to turn out?”

Golf construction started August 2016, and a crew from Wadsworth Golf hustled to help meet seeding deadlines. Golf enhancements are numerous: T-1 bentgrass greens, tees and fairways, an irrigation system with 15 miles of pipe and 1,102 tanks, a new pump station and four-tank fertigation system, 54 bunkers featuring the Better Billy Bunker system, 135 acres of native areas, and a strategic course weaving through Illinois savanna, prairie, woodland and wetland settings. POM recently received a new fleet of carts. A new clubhouse is planned for 2019.

Boosting the environment,

though, trumped improving the golf course throughout all stages of the process. The project received \$5 million in third-party money, including \$2.25 million for creek and

more than 100 acres of habitat are among the environmental achievements.

“We could promise a lot of stormwater management, we could promise wetlands, we

then this would be a failure. There was a lot of testing going on in the early stages. Concepts, reviews, doing the math, making sure the hydraulics worked, making sure the volumes through the golf course were going to hold up. The golf course became a secondary matter and making a great golf course was going to be a result of how well we could integrate the environmental stuff.”

The integration is reflected in the new name.

“Part of our mission is to connect people with nature,” Stevenson says. “People kayak, people run, people hike, people bike. But what’s any different about following a trail through a golf preserve? Instead of calling it a golf course, we have been calling it a golf preserve. We think that better describes what we do.”

How will a golf preserve fare in the Chicago market? Ensign

Wacky FINDS



The first major renovation on land supporting golf for close to 100 years can yield some fascinating below-the-surface finds. Consider this trio of findings during work at The Preserve at Oak Meadows:

- A beer bottle from a company that went out of business during prohibition.
- A golf ball author Randy Cochran, a former Elmhurst Country Club caddie and Evans Scholar, describes in his book, “Through the Eyes of a Caddy.” The book is based on Cochran’s experiences at Elmhurst, although he refers to the course as “Clockhurst Country Club” in the book.
- The headstone of a Chicago grocery store clerk who died in 1908.



water quality improvements, according to Stevenson. Restoring 1.23 miles of stream, adding 20 million gallons of storm water storage, removing two dams and improving

could promise all these things,” says Martin, who received input from fellow golf course architects Forrest Richardson, Art Schaupeter and Mark Fine. “But if we failed to deliver,

says a drier course will allow his crew to maintain “more of a country club feel” while providing a natural setting void of daily distractions. Officials are confident that mix

should propel POM into a new place in Chicago's public golf hierarchy when it fully opens next spring.

"We really think there's room for it to be one of the best public golf experiences in Chicago," Stevenson says. "With our proximity to O'Hare Airport, we hope we can be one of those places that become a bit of destination."

HITTING A TRIFECTA

A day later, on a dry, yet dreary morning, Curtis Tyrrell and Rees Jones lead a tour of MCC's No. 2 course. Both men should be exhausted.

Tyrrell, in his 10th season as director of golf course operations, has overseen more than \$15 million of projects while guiding his team through the 2012 Ryder Cup. He experienced the hurried ways of golf course construction before arriving at MCC, joining Jones, who shows no signs of stalling at age 75, on a major renovation at Lake of Isles in Stonington, Conn.

Plan. Pitch. Coordinate. Build. Repeat. Standing on the 18th green of MCC No. 2, a tight par 5 with a wicked slope filtering toward a creek left of the green and unimpeded view of the gargantuan clubhouse, the indefatigable Tyrrell describes the last decade. "I just feel really blessed to be working for a club like Medinah that has wanted to do all of this and has trusted me to lead them through it," he says. "It has been a wonderful experience."

MCC's last decade is one of the most ambitious in private course history. Jones led a renovation of the famed No. 2 course before the Ryder Cup, Tom Doak reworked the No. 1 course in 2014, and Jones



The No. 2 course at Medinah Country Club recently reopened following a restoration led by golf course architect Rees Jones. The course will cater to players of all skills levels and allow the club to offer its "Golf For Life" program to members.

and associate Steve Weisser returned to restore the No. 2 course beginning in October 2015.

No. 2 is now MCC's most egalitarian course, a point Tyrrell and Jones emphasize when the tour reaches the par-3 sixth hole. Seven colored stakes are placed along the teeing corridor, each one designating future markers. The hole will range from 68 yards (orange) to 207 yards (gold). The past also holds prominence on the hole, with a giant "snake" bunker connecting the sixth fairway to the parallel fifth hole. The bunker honors Tom Bendelow, the Scottish architect who originally designed MCC's three courses. The No. 2 course originally opened in 1925.

The future spurred design decisions despite Bendelow's omnipresent spirit at MCC.

The club wanted a playable complement to its other two courses. MCC will introduce its "Golf For Life" program on the No. 2 course. Director of golf Marty DeAngelo describes the initiative as a graduated skills program, and MCC used input from the USGA and U.S. Kids Golf when transforming the No. 2 course. MCC's version of "Golf For Life" not only caters to beginners – it promotes pleasurable experiences for older players with declining distance levels. Tee recommendations are based on handicaps, and the course plays from 1,978 to 6,400 yards.

The system allows MCC's golf professional staff to assess players' strengths and weaknesses, DeAngelo says. This season, which coincides with the course's reopening, will serve as a pilot period. "Some things might work, some things

might not work," DeAngelo says. "But at the end of the season, we plan on having a pretty comprehensive program that will embrace every type of golfer out there. We think it's something pretty neat."

Jones is a proponent of all-golfer movements, including the Longleaf Tee System, a joint effort between U.S. Kids Golf and the American Society of Golf Course Architects. Once widely referred to as the "Open Doctor," Jones says improving courses such as MCC No. 2 provide as much personal fulfillment at this stage of his career as revamping stern championship layouts. MCC is the rare facility where Jones has toughened and softened separate courses.

"My senior years, I want to be the one to promote the health of the game, the growth of the game, the long-term

A MASSIVE *market*



METROPOLITAN AREAS WITH THE MOST PUBLIC HOLES

Chicago	4,050
New York City	3,735
Phoenix-Scottsdale	3,177
Detroit	2,619
Minneapolis-St. Paul	2,565



METROPOLITAN AREAS WITH THE MOST PRIVATE HOLES

New York City	4,194
Miami-Fort Lauderdale	2,205
Riverside-San Bernardino	2,052
Chicago	1,863
Philadelphia	1,575

Source: 2017 National Golf Foundation Golf Facilities in the U.S. report

enjoyment of the game," he says. "I think we emphasize the pro game too much and I think we ought to emphasize what the game does for the spirit."

Wider fairways, shortly mowed areas surrounding greens, fewer trees and shallow bunkers are among the other features that promote positive playing experiences on MCC No. 2. The project prioritized creating angles and shots over adding distance. "Right of the gate we were taking a different approach," Tyrrell says. "It was new, and it was exciting."

Implementing a system with a course playing under 2,000 yards is a bold step for an elite private facility such as Medinah. But having three distinct courses separates MCC from other facilities in a crowded private club market.

The project cost \$3 million, and minimal earth movement, designing fewer bunkers and



The No. 3 course at Medinah Country Club has hosted multiple major events, including the 2012 Ryder Cup. Renovations on the course started the club's frantic decade of golf course construction.

bypassing the installation of a pond allowed the club to control costs, according to Jones. Work not involving tees included rebuilding greens to USGA specifications, rototilling and regrading fairways, installing subsurface drainage, erosion control and white sand in bunkers, creating a continuous cart path, and regrassing greens, tees and fairways with 007 bentgrass. MCC's sand and

grass varieties are now consistent throughout the three courses.

Producing consistent playing conditions is a coordinated task among MCC's three superintendents: Chris Funke (No. 1), Dane Wilson (No. 2) and Jake Mendoza (No. 3). The managers collect a slew of data such as water usage totals and daily green speed readings. The numbers are stored in

annual binders produced for each course, a sign of progressive turf management tactics for an evolving club. "The one thing I think we do more than anybody else is record keeping," Wilson says. "It's an insane amount that we do."

Every number associated with MCC is jarring, including this one revealed before the spring tour: members have approved \$46 million in capital expenditures. It's a bold lead for other private clubs to follow.

"I don't think there's a complex in the nation or the world that has this type of three-course combination of different golf courses that accommodates every skill, that accommodates championship play, that accommodates everyday play and junior play," Jones says. "Medinah ought to be complimented." **GCI**

Guy Cipriano is GCI's associate editor.

Understanding and Reducing Risk of SDHI Fungicide Resistance

By Rob Golembiewski, Ph.D.
Bayer Green Solutions Team



Rob Golembiewski is a technical specialist on the Bayer Green Solutions Team, which delivers best-in-class, solutions-based programs and tools to assist Bayer customers where they live, work and play. E-mail him with your comments at Rob.Golembiewski@Bayer.com.

I recently gave a presentation to superintendents about the new fungicide from Bayer, Exteris® Stressgard®, which contains two active ingredients with different FRAC (Fungicide Resistance Action Committee) codes. When I asked the group if they use FRAC codes when creating their spray programs, surprisingly not a single superintendent responded “yes”. The consensus was that they did not need to consider FRAC codes since they were rotating fungicides. Since SDHI (Succinate DeHydrogenase Inhibitor) fungicides will surpass the DMI (DeMethylation Inhibitor) fungicides as the largest class of turf fungicides, superintendents and manufacturers need to collectively steward this chemistry to maximize disease control today and in the future. The SDHIs (FRAC code 7) currently available for turf use include seven active ingredients and 10 different fungicide/nematicide products.

Year	Manufacturer	Active Ingredient(s)	Product Name
1986	Bayer	Flutolanil	Prostar® 70WG
2003	BASF	Boscalid	Emerald®
2003	BASF	Boscalid + Pyraclostrobin	Honor® Intrinsic® Brand Fungicide
2014	BASF	Fluxapyroxad	Xzemplar®
2014	BASF	Fluxapyroxad + Pyraclostrobin	Lexicon® Intrinsic® Brand Fungicide
2015	Syngenta	Penthiopyrad	Velista®
2016	PBI Gordon	Isofetamid	Kabuto® Fungicide SC
2016	Syngenta	Benzovindiflupyr + Difenconazole	Contend® A
2016	Bayer	Fluopyram	Indemnify®*
2017	Bayer	Fluopyram + Trifloxystrobin	Exteris® Stressgard®

*Marketed and sold as a nematicide only.

Many factors contribute to the risk of fungicide resistance and they can be grouped into three categories: **pathogen biology, fungicide mode of action and fungicide use patterns.**

Pathogens likely to develop resistance have common traits including a short generation time, a high frequency of reproduction and extended periods of favorable conditions for disease development.

Turf diseases that have the highest probability for resistance development include anthracnose, dollar spot, grey leaf spot, Microdochium patch and Pythium blight.

Fungicide mode of action also impacts risk of fungicide resistance. Systemic fungicides (single site inhibitors) are more prone to the development of resistance compared to contact fungicides (multi-site inhibitors). The reason for this difference is that site-specific systemic fungicides act after the fungus has germinated and only a slight genetic modification by the fungus results in resistance. Multi-site contact fungicides do not allow the fungus to germinate so a fungal pathogen would require significant genetic alterations to become resistant. Fortunately, there is variability among systemic fungicide classes with the SDHIs having a moderate risk of resistance. This means SDHI resistance will manifest itself as reduced length of control rather than complete loss of control. While SDHI resistance has not been documented in turf, it has occurred in eight other cropping systems.

Fungicide use patterns are defined as every fungicide application being a selection event. Superintendents should avoid late curative applications at reduced rates as they lead to incomplete control and selection against a larger fungal population. If making preventative applications, the fastest way to develop resistance is repeated fungicide applications of the same FRAC code on short intervals at high rates. Control may be observed for a period of time but eventually a resistant population will express itself.

Many factors should be considered when designing a fungicide management program. With SDHI fungicides, their overarching strength is dollar spot control, which is the one disease that has developed resistance to every major systemic fungicide class. Below are strategies for delaying SDHI resistance and maximizing long-term disease control:

- Implement a strong cultural management program
- Apply no more than 3-4 SDHI dollar spot fungicide applications per year
- Never make more than two consecutive applications of SDHI fungicides
- Alternate fungicides from different FRAC codes
- Use contact fungicides in rotations and/or tank-mixes

Resistance management strategies and proper stewardship are absolutely critical for the SDHIs going forward since there are no new fungicide classes coming in the foreseeable future. SDHI resistance has already been documented in eight other cropping systems so ultimately golf course superintendents, through their actions, will determine how long before we have SDHI resistance in turf.

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LET'S MAKE A DEAL



Henry DeLozier is a principal in the Global Golf Advisors consultancy. DeLozier joined Global Golf Advisors in 2008 after nine years as the vice president of golf for Pulte Homes. He is a past president of the National Golf Course Owners Association's board of directors and serves on the PGA of America's Employers Advisory Council.

Donald Trump described his deal-making motivation in the opening lines of his 1987 bestseller *The Art of the Deal*: "I don't do it for the money. I've got enough, much more than I'll ever need. I do it to do it. Deals are my art form."

Golf course owners, managers and superintendents may not share the president's motivation, but they do share the intended result of his deal-making: the most favorable terms possible.

Everyone wants to make good deals. Good deals make us look better to our boards, our bosses and our members. More importantly, they help us operate our facilities more efficiently and more cost-effectively. In today's thin-margin, highly competitive landscape, good deals may be the difference between an under- or over-budget operation.

The key to making a good deal is learning to be a more effective negotiator. While some are naturals, everyone can learn the basic skills that make for more successful deal-making. No one knows this better than Bill Garcia, the master negotiator and managing partner at TableForce, an international consulting firm expert in negotiation training. Since 1997, Garcia has trained procurement and management professionals who are responsible for transactions exceeding hundreds of millions of dollars.

Garcia's keys to successful negotiations are try, plan and raise the bar.

1. TRY

"The first step is to be committed to trying to negotiate," he says. Many managers who are expected to look out for the interests of their club or course are uncomfortable with conflict or the appearance of being "cheap." According to Garcia, those too timid to try fall short in carrying out one of the major responsibilities of their jobs – being conscientious stewards of their facility's budget.

2. PLAN

Always establish terms and conditions that are agreeable to your side of the bargain. TableForce teaches a four-step method to improve bargaining skills:

Create a deadline. As we've seen with national labor negotiations affecting everything from garbage pickup to the NFL, everyone is more focused as the negotiation nears its end. Establish a clear-cut understanding of the schedule and why it is needed.

Get them to negotiate. Ask the other side questions. Garcia says, "Give them choices; they'll negotiate." When parties share choices, the wants, needs and limitations of each party are revealed.

Understand the market. Good negotiators do their homework and know fair-market pricing and value. It is

difficult to know and understand fair-market value absent market research and the knowledge gained from it.

Determine the budget. State your limitations so you don't waste time on discussions that are unrealistic. Be willing to state what you are able and willing to pay. It helps the other side right-size their offering.

Managers charged with the duty to shepherd the club's resources often make one and sometimes two of the same mistakes. Garcia says that two of the most important pieces of knowledge are (a) who has the final authority? And (b) what is the deadline for a decision?

If you want to improve your own bargaining skills remember a simple two-part tactic. The answer to most bargaining points is either; "Yes, if" or "No, but" Garcia says, "In its simplest form, a plan needs only to list both low-value and high-value items. Then the process of trading begins: "Yes, I'll consider X if you consider Y," or "No, I cannot consider X, but I will consider Y, if you consider Z."

3. RAISE THE BAR

Once the negotiation nears its end, it's time to raise the bar, a process that aims to increase value." Rather than trying to improve the terms or conditions you have bargained, many people become impatient near the end of a negotiation. "People make the biggest concessions as the deadline approaches," Garcia says.

Raising the bar is often called a "stretch request." If the goal is \$100, open at \$110. If the desired outcome is "eight weeks to completion," open at "six weeks." Garcia advises that opening positions should be a significant but plausible stretch from a target; similarly a target should be a significant but plausible stretch from a bottom line. While there are no charts or rules of thumb that can be used as reference, research confirms most people do not raise the bar high enough. **GCI**

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THE

By Anthony L. Williams, CGCS

HEAT

IS

ON

Be safe and grow the game through the people you touch each day. Sail through the summer like a cool breeze with these tips.

T

he toughest part of the golf season is arguably the 97 days or so that we call "The Test."

This is more popularly known as the summer golf season, and in the United States it spans from Memorial Day until Labor Day. It comes each year full of promise and panic. No matter where you are on the map, or what sector of the industry you ply your skill as a golf course superintendent, you know that summer means stress. And a quick glance at the cell phone weather app you know the heat is on – and on the prowl.

So, are you prepared? No worries. Let's take a walk through some strategies to keep you cool and successful even when the thermometer melts and you start thinking that ET (evapotranspiration) is just an old sci-fi movie.

I have worked more than 35 years in two markets: Georgia and Texas. So, I have some first-hand experience in the many ways the heat will test you, your staff, your turf, your equipment and your members. Let's start with the heat that is on you, the superintendent and your staff.

HEAT, STRESS AND THE HUMAN ELEMENT

Often, superintendents place themselves at the end of the priority list, especially in the summer. We justify long hours, high stress, too much caffeine and sugar, emotional outbursts, and general chaos in the operation with words like "driven," "tough" and "resilient." Here is the summer truth I want to pass on more than any other, and I got it from my grandfather during a drought that brought tough times to everyone I knew (I was five years old). Everything in nature has a breaking point. Everything. Usually, what tips the scale to failure is a collection of stresses without time to replenish/recover. The superintendent and his staff are not immune to this law. As integral parts of the golf course ecosystem, they must be aware of the ebb and flow of all the processes and programs. This awareness allows for making sound decisions that ultimately lead them through the stress to success.

PREPARE FOR THE PHYSICAL STRESS

Drink plenty of water (avoid sodas and teas) eight, eight-ounce glasses per day is a good start. Drink more as temperatures rise.

Use sunscreen SPF 30 or higher and reapply often, wear broad-brim hats and lightweight breathable clothes. Take breaks out of the sun exposure. And schedule your yearly physical with your doctor prior to Memorial Day.

TAKE MORE BREAKS

Get out of the sun and rehydrate. Take a status check – both physically and mentally – and then move on to the next task. Remember recovery/replenish applies to people and plants. Watch for signs of heat stress in people – just like plants. We are trained to see the heat stress in turf, slight discoloration, moisture probe readings in the single digits but what about heat stress in people (staff, golfers, vendors/contractors). The symptoms of heat stress and the more severe heat stroke include heat stress – very hot to touch, dizziness, mild headache and heavy sweating; heat stroke symptoms include lack of sweat, throbbing headache, core temperature over 104 degrees, fainting. In both cases call 911 or emergency services and then get the person out of the sun, apply ice or cool water and fan them until help arrives. I have maintained active CPR and First Aid certifications throughout my career and I have been the first responder numerous times, and truthfully 90 percent of these incidents happened in the summer and were compounded by heat stresses. Consider having you and your assistants certified in CPR and First Aid.

REVIEW AND PRACTICE EMERGENCY RESPONSE PROCEDURES

Make sure that everyone in your staff are trained on what to do if they see or suspect heat-related or other emergencies. Time is critical during these situations

Check the MOWERS



One often overlooked area where summer heat wreaks havoc is on golf course equipment. If you have taken any short cuts in preventive maintenance or winter rebuilds, they will certainly come home to roost in the dog days of summer. The reasons are many and include more hours of operation due to active turf growth, physical damage from inexperienced operators, age of equipment, actual heat indexes above 100 degrees. A quality of cut issue that may go unnoticed in the winter can have devastating results in the summer by causing further heat/drought stress or increasing the expanse of certain fungi and diseases. It is never a bad idea to check the mowers. Here are a few quick strategies to keep the fleet rolling this summer.

- Utilize a team approach led by the lead equipment technician or equipment manager to execute preventive maintenance and winter rebuilds for every piece of equipment
- Have a qualified equipment technician inspect and clear each piece of equipment for use daily, and don't forget to include fans for greens (bentgrass in the South)
- Keep accurate and updated equipment operation/maintenance/budget records
- Check oil and fluids multiple times per use, not just in the morning
- Keep air filters and screens clean to keep operational parts as cool as possible, wash each piece of equipment thoroughly after each use
- Check hoses and belts for wear frequently
- Certify trainers and trainees before sending anyone out to operate mowers and large equipment
- Have a detailed strategy in case of a hydraulic leaks or fluid spill to minimize damage to the turf and equipment
- The operator is key, make sure he/she is hydrated and protected from the sun to be able to detect any problems with equipment or turf before they escalate.

and every minute lost can have severe consequences. Place posters or give out business cards with phone numbers and procedures.

KEEP GOOD RECORDS.

Weather data, work assignments and history, budget items, Integrated Plant Management notes and the list goes on. In the summer, it can be tempting to let a few house-keeping chores like record keeping slide but that is exactly when you need to capture accurate data the most. This data will help plan next summer.

SET A GOOD EXAMPLE.

Take care of your business,

guard your assets, especially your staff and members. And just like every airline flight attendant reminds us to put your oxygen mask on first so you can then help others, you are the asset at the club that connects all the parts so take care of yourself.

AGRONOMICS, HIGH TEMPS AND EXPECTATIONS

Our success as superintendents is measured by our ability to bring our agronomic assets (especially greens) through the stresses of summer at or above property expectations but within budget guidelines. Stresses that stand in our way include everything from heat

stress, traffic, budget cuts, water management, disease pressure, mechanical injury or the collective diagnosis of summer turfgrass decline. It can be overwhelming, thus it must be managed so that we are not pushed to our breaking point.

In general terms, the healthier your turf is going into the summer, the better it is likely to perform throughout the summer. An active spring with well-timed aeration, fertilization, weed control and preventive fungicide applications is good insurance toward a successful summer. However, let's say you just arrived on property in mid-summer and there are no records of anything happen-

ing prior to your arrival. Now is the time to rely on the basics of "Summer Turf Survival 101."

First, gather soil and tissue samples to set a bench mark and guide future decisions. Second, test your irrigation water quality to see if there are issues, followed quickly by an in-house irrigation audit. Start with the pump station or delivery system and confirm every part of the irrigation system and its percentage of function including control systems. If you have not already done so, acquire and calibrate as many moisture meters as you feel you need to establish measured benchmarks on how you will be watering greens and other

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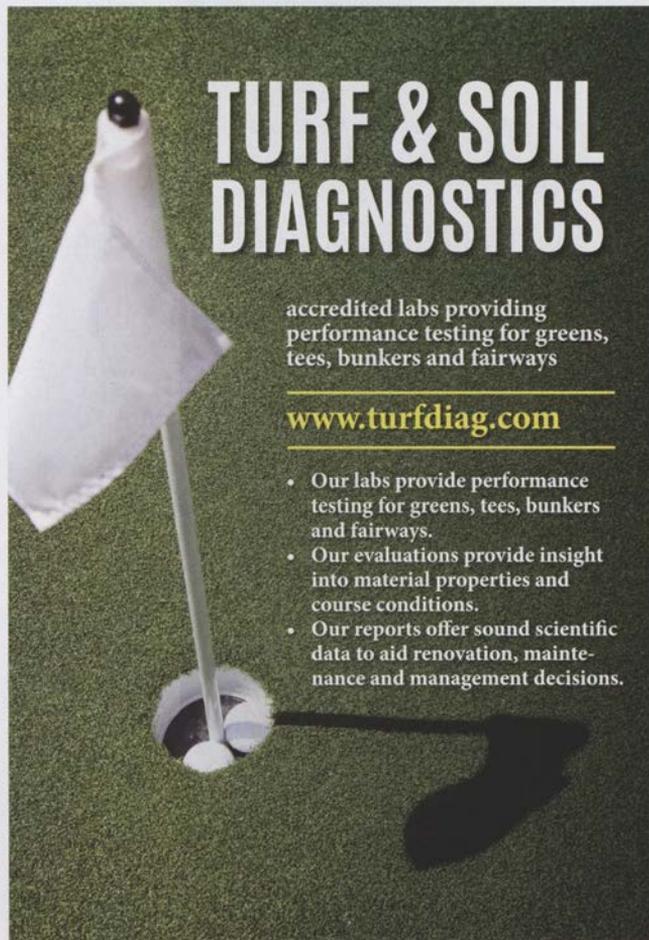
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GOLF COURSE
INDUSTRY

MANAGEMENT

high-value areas. In the heat, it is important to know the difference between watering and misting especially on bentgrass in South. Watering is key and each property will have a complex set of water factors that must be understood and maximized to handle the survival of turf and other agronomic assets on near 100-degree days. That's when a well-placed phone call and a lunch with an established superintendent(s) is priceless.

Gather quality information from reliable sources, trust your instincts and training, and persevere. This information will help you sail

through the summer like a cool breeze. There are few things as rewarding as seeing the arrival of fall after a well-managed summer golf season. Be safe and help grow the game through the people that you touch each day and may you always get rain when you need it, enough to revive you and the turf without washing out your bunkers. **GCI**

Anthony Williams, CGCS, is the director of golf course maintenance and landscaping at the Four Seasons Resort Club Dallas at Las Colinas in Irving, Texas. He's a frequent GCI contributor.



PR and the summer season

Proactive public relations and member/management communication benefits the superintendent during hot and stressful times. It is critical to remain calm and communicate well in good times and bad.

- If the course is good, then say so. If the course is having issues, then say how they are being addressed. Be very visible and speak often to stakeholders and management.
- Use every means of communication available from social media to committee meetings.
- Remember, do the little things like refresh the water coolers, clean the restrooms and empty the trash because everything in nature has a breaking point. For example, if a member is having a bad round, sees some thin turf, an empty water cooler, or a broken toilet at the halfway house and then flags you down to talk, it may require restraint.
- Be a solution, not a problem. Heat makes normally polite people stand up and shout. Be a peacekeeper and tell the everyone about all the good work happening in a way that addresses what is in it for them. "Yes, sir. Here is a bottle of cold water and I apologize for any problems. I am on my way over to fix that toilet ... and did you know it is just two weeks till the club championship and the weather forecast looks perfect, cooler ... We are on budget with all the large projects complete and we just finished our application for the Environmental Leaders in Golf contest that you suggested we enter. The staff has performed exceptionally during a hot, stressful summer and the greens are looking better every day. Thanks again for playing." I have made a lot of friends by listening and passing out strategic cold bottled water and cool towels while on afternoon patrol.



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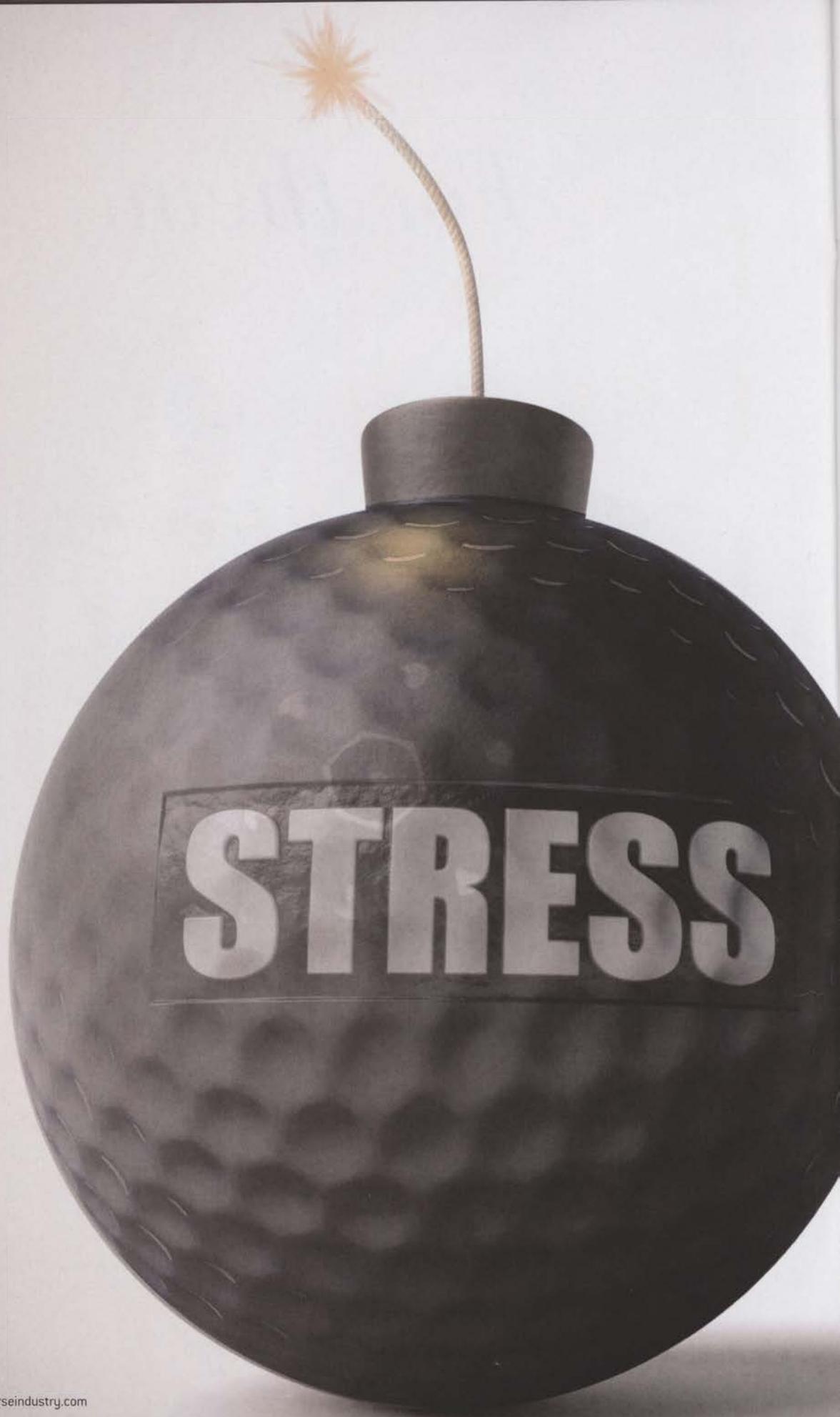
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CUT THE STRESS

EXPERTS PROVIDE WAYS
SUPERINTENDENTS CAN MANAGE
THEIR GOLF COURSE WITHOUT
FEELING BURNED OUT.

By **Andrew Adam**

With summer here, superintendents are focused on course aesthetics and playability, no matter what weather element, human element or disease is thrown their way.

In cool-season turf states, it is generally peak golf season, and prime time for peak turf stress.

“Basically, what happens, people get excited about playing golf, then it suddenly gets very warm,” says Kyle Miller, senior technical specialist BASF Professional Turf and Ornamentals.

OUT

“Cool-season grass gets under pressure with the warmer weather and we get more and more foot traffic on the golf course, and we go from bad to worse almost in regard to maintaining the golf course and keeping stress at a minimum.”

An influx of eager players brings a necessary evil to the golf course – foot traffic. Once turfgrass is damaged, it doesn't return to normal overnight. “Foot traffic, golf cart traffic, it's high wear. And golfers go to the path of least resistance,” says University of Tennessee distinguished professor of turfgrass science and management Dr. John Sorochan. “Those always make for high stress.”

One way to alleviate turf stress is to direct players to take different paths is by simply cordoning off certain sections when turf stress begins to appear.

“Move where golfers enter a tee or putting green, try to adjust that to minimize wear and tear,” Miller says. “Just the pin placements (superintendents) use, they can alleviate some of that stress. Put a pin where it causes people to move in a certain direction, move them away from areas that don't tolerate stress as well.”

Dr. Thomas Nikolai advocates customer satisfaction, and that comes with maximizing the playing condition of putting greens. “We can do that during any stressful time,” says Nikolai, associate coordinator of Michigan State University's two-year golf turfgrass management program. “Most of the focus is on the putting surface. That's where the basic customer satisfaction (starts). When you get that done, then everything else has to be perfect.”

Add summer heat, and superintendents should adjust how they treat their greens. “Under conditions of high heat/humidity and with greens under stress, don't mow the green, roll in place of mowing,” Nikolai says. “On cool-season grasses that applies. It helps relieve other stresses like traffic disease stress.”

In addition to rolling, Miller says superintendents can consider raising cutting heights. “During the summer, your root system is going to fall off some,” he says. “Be ready to comprise a bit because the turf is going to be under stress. We are taught, when your turf is under stress, raise your mower height. Rolling your greens routinely to keep the speed where the golfers want it, and the super is helping out those greens. It doesn't take that much to make a significant difference.”

DEALING WITH DISEASES

Depending on your region and turf type, various diseases may pop up during the summer.

Dr. Bruce Clarke, a specialist in turfgrass pathology at Rutgers University, says universities are ready to help superintendents identify diseases that crop up on their courses. “Typically, if they already know what the problem is (or don't), they send a sample to the Rutgers plant laboratory,” Clarke says. “If it turns out to be a disease, they would tell them how to treat it.”

If there isn't a university by a superintendent's golf course, they can find local laboratories to assess possible diseased turf. Although each region in the United States has its own common diseases, there are plenty of diseases potentially



Being proactive when explaining disease to players can help superintendents avoid potentially stressful situations.

EXPLAINING TURF STRESS TO PLAYERS

When turf stress and disease becomes a problem, it can be a very noticeable sight for golfers on the course. Not all players know what to think when they see disease and may react in various ways.

Superintendents' best strategy is to be open and make people aware of what's happening on the golf course so players are more informed and stay calm if something doesn't look right.

“If you let your golfers know what is going on on the golf course, it truncates the players finding out while out on the golf course,” BASF's Kyle Miller said.

Miller, Michigan State University's Dr. Thomas Nikolai and University of Tennessee's Dr. John Sorochan all emphasized communication from the superintendents to their course community. With social media available, it's easier than ever to get the word out. Whether it's through Facebook and Twitter, a blog or at least having something posted at the clubhouse as players walk in, letting the players know about problems on the course is the best practice. “Try and take away the surprise” Nikolai says.

Many people don't know how diseases are spread, and that is no different when it comes to turf diseases. Rutgers University's Dr. Bruce Clarke says turf diseases purely attack plants and there is no danger to people. Making sure players are aware of that knowledge is helpful to prevent overreaction.

Communication is a key to success for most businesses, and the golf course is no different.

popping up. “There are well over 200 diseases, depending on weather, type of grass and how the grass is being maintained,” Clarke says.

Stress on a golf course can also stem from the beauty of the course such as its trees. “Shade is an area of stress,” Sorochan says. “It blocks the sunlight, stops the area from producing energy. Trees are important for aesthetics, bringing challenges to the game and golfer protection (from the heat).”

Superintendents must manage these areas differently than the areas without cover and how much water reaches all areas, no matter if it's an extremely dry or rainy year. “I prefer the right amount of water,” Sorochan says. “Too much water is more of a burden (than not enough), and it's a waste. It can cause a socially bad image as well as the waste.”

Water is important, but finding the right balance is key. “If you don't have enough water,

it's a real bad problem as well," Sorochan adds. "But grasses don't need as much water as we really think. Providing enough so it doesn't wilt is all that you need."

THE STRESS FOR PERFECTION

Building up relationships with other superintendents so they can trade knowledge and bounce ideas and problems off one another is another suggestion of Nikolai.

"(Good superintendents that I know) they first talk to other supers, which is a great place to start," Nikolai says. "Golf courses have never looked better than they have now. Of course, the closer you get to perfection, the more your imperfections show. Supers are often putting stress on themselves that other people don't even see."

When you take care of a course nearly every day, you see things that players, who might only be there for a few hours a couple of times a week, don't see. Nikolai recommends superintendents don't fret over every little stress they find.

As an example, Nikolai referenced a superintendent he was trying to help with fairy ring. "It couldn't have been more than a foot-and-half circle in front of a green," he says of the problem. "It's the only problem on all of the 18 holes. When I asked, no one ever mentions it to him."

Fairy ring can get dry and mushrooms might appear if not maintained, but that was not the case in this instance. The superintendent simply wanted his course 100 percent perfect, which brings on an in-



Rolling and increasing mowing heights are two ways to combat the stress high humidity places on greens, fairways and tees during the peak golf season.

ternal type of stress. That's not the only person who wants the course looking perfect. Nikolai says stress on superintendents also originates from ownership and the players. "You have a lot

“THE WAY I WOULD TRY TO RELIEVE STRESS IS TO TAKE TIME OFF, GET AWAY FROM THE COURSE, ALLOW EVERYONE TO GET AWAY FROM THE COURSE TIME TO TIME. THIS SHOULD BE ONE OF THE MOST ENJOYABLE PLACES TO WORK. THE MAIN REASON IT ISN'T IS HIGHER STRESS.”

— DR. THOMAS NIKOLAI,
MICHIGAN STATE UNIVERSITY

of people that are uninformed of the dangers of stresses," he says. "I can walk into a maintenance building and can tell in five minutes if there is good or bad management."

A day off now and then may

sound crazy to some superintendents, but Nikolai recommends it. "The way I would try to relive stress is to take time off, get away from the course, allow everyone to get away from the course time to time," he says. "This should be one of the most enjoyable places to work. The main reason it isn't is higher stress."

Nikolai adds that he doesn't think anyone should work more than 13 days in a row. Miller agrees, that if it's possible, a day away couldn't hurt a superintendent. "If you can do it, it's probably not a bad idea," Miller says. "But as a super, it's hard to not to get your mind off your golf course."

Miller suggests a good time for a summer respite might be when a cool front moves in.

"Take a day off, step away and get back on it," he says. "It's hard a thing to do and feel good about doing it. We've had meetings and supers struggle with that even though they might have able-bodied assistants. It's their baby. They don't want to lose their job. It's a tough one."

Scheduling might be a way to ease the stress of supers and their assistants. "There are supers that have gotten innovated with their scheduling," Nikolai says. "They have night crews now, and always have at least two people on the course, just in case something goes wrong. This is as opposed to having one or two assistants there all day long, giving people time off."

In the end, communication, researching and simply taking an occasional breath are three ways superintendents can avoid the agronomic and personal perils of turf stress. **GC**

WATER SOURCES



Brian Vinchesi, the 2015 Irrigation Association Industry Achievement Award winner, is President of Irrigation Consulting, Inc., a golf course irrigation design and consulting firm with offices in Pepperell, Massachusetts and Huntersville, North Carolina that designs golf course irrigation systems throughout the world. He can be reached at bvinchesi@irrigationconsulting.com or 978-433-8972 or followed on twitter @bvinchesi.

Without water, an irrigation system is useless. Many different sources supply that water, including potable, surface, groundwater and waste water (effluent). Saltwater or reclaimed water are also possibilities, but require extensive treatment systems. For several reasons – cost, sustainability and availability – potable water is probably not a good long-term approach to your irrigation water supply needs.

Because it is a limited resource, potable water's cost continues to rise and will never stop. Although water purveyors cannot charge for water – they can only assess charge for the cost of treating and delivering the water – these costs will continue to climb. Depending where your golf course is located, the costs may climb more rapidly than in other areas.

Potable water for irrigating golf turf, landscapes or agriculture is not a solid, long-term irrigation water supply approach. Besides not being a sustainable use of water due to the level of treatment inherent in it, potable water is expensive and may not be available in the quantities required or when you need it. Irrigation is needed most when it is dry. When it is dry, water supplies are most stressed. As a result, water use restrictions are usually applied when the water is needed the most. This is not the best scenario

for your course.

Likewise, it is expensive to develop alternative water supplies. For example, many golf courses use a combination of water sources of which potable water may be one. Others could be ground, surface, waste, reclaimed salt or raw water. The more sources you have, the more time it takes to manage those sources. Automation of the various water supplies can carry an expensive price tag, but may save money in the long run through labor reduction and increased precision. Therefore, use the right source at the right time, especially if the source has a cost associated with it.

I recently visited a 36-hole facility with three ponds and three pump stations – one freshwater and two effluents – and a potable backup water source as well as a raw water supply. One 18-hole course has an effluent pond, and the other nine holes of effluent and nine holes of freshwater. The 18-hole effluent pond can fill the nine-hole effluent pond, but only when not irrigating the 18 it is located on. The 18-hole effluent pond can also dump directly into the freshwater nine wet well, but only when pumping over 1,200 gallons per minute for dilution. The freshwater pond's primary water source is relatively expensive raw water. The nine-hole effluent pond at some point in the past could also be fed from the raw water source. There is also a potable

water source back up that uses the same infrastructure to fill the ponds as the raw-water source.

Confusing, you bet it is! These issues are compounded by the fact that unlike many courses that have too much effluent many times this complex doesn't have enough and must rely on the raw-water source. The raw-water source is not large enough to keep up with the 18, let alone 36 holes.

Unfortunately, the raw water source flows partially through an unlined open channel to the ponds. In the summer especially, but throughout the year, a large percentage of the raw water is lost before it ever gets to the pond, and this is not free water. None of the sources of supply are automated – it's all manual and all must be monitored from a use standpoint. It is a water management nightmare.

This facility is a prime example of why every golf course should have a water management plan. This plan should be documented with narratives, pictures and plans explaining and showing what supply does what, what water goes where, what pump/valve/pump fills what and how do they operate – manually or automatically. That way, you, your staff and someone new can understand the overall irrigation water supply structure. In the 36-hole facility example above, when it was first installed someone envisioned it and understood it, but now after 31 years, and several different management teams, no one is sure how it was all supposed to work originally, never mind now. Understanding it has become a time consuming and expensive process.

At your facility have a plan for managing your future water supplies. If potable, then find alternatives. If it's not, have a documented water management plan for you, your board and whoever comes after you. If you have one source and you never run out of water, be happy – it could be much worse. **GCI**



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123 NUMBERS RACKET



Collect the key irrigation metrics to ensure turf health, practice responsible resource management and take the pressure off your budget.

By John Torsiello

Water is liquid gold these days. More and more states require water-withdrawal permits and water use must be reported annually, requiring proper record-keeping and data management.

However, those numbers have other uses, too, and can be mined for valuable insight to improve the quality of your turf management program and strengthen your budget.

Five key metrics to record irrigation and water usage are evapotranspiration (ET), plant water requirements, soil type, soil moisture and precipitation rate, says Steve Sakurai, data management and irrigation systems for Ewing Irrigation.

"All of these five metrics depend upon each other in the context of irrigation and water usage," he says. "Evapotranspiration showcases how much water is lost during the day due to current weather conditions. You need to determine what kind of turf you are caring for to understand its plant water requirements."

ET is calculated using weather station data to estimate water loss from the plant/soil system, says Dr. Doug Soldat, associate professor in the University of Wisconsin-Madison Department of Soil Science. He adds any factors – such as grass type and course

microclimates – influence the actual water loss from an area, but estimated ET puts a superintendent in the ballpark.

Soldat recommends superintendents set their irrigation to run off ET data, which is a more "quantitative and efficient way" to irrigate than using run times to schedule irrigation.

"At first, some areas will be too wet and others will be too dry," Soldat says. "But by using a soil moisture probe you can find them and percent adjust heads up or down accordingly."

Annual ET, precipitation and irrigation use can be compiled at the end of the year to represent irrigation efficiency. The data is useful for demonstrating the efficiency of irrigation water use on a course and can be used as a target to base future improvements, Soldat says.

Soil type dictates how many cycles a runtime needs to be separated into to achieve a plant's water requirement, Sakurai says. For example, a sandy soil might be able to handle 15 minutes of consistent watering, while a heavy clay soil would require three five-minute watering cycles. The existing soil moisture levels determine how often the soil needs watered.

"A precipitation rate is the rate that sprinkler heads apply water in a given period of time, Sakurai says. "Another factor to be



considered is the distribution uniformity (DU) of the rotor. A sprinkler with a higher DU will put water down more efficiently, saving water and time." He adds these metrics work together, and recording and interpreting the data will make an irrigation system run more efficiently.

Irrigation data collection should focus on the amount of water applied, weather readings, chemicals applied, cultural practices undertaken, and soil moisture and temperature, says Paul Standerfer, product marketing manager for Toro Golf Irrigation. However, he adds these data elements are most likely at the top of most

superintendents' lists, as they all impact each other.

"Turf health and vigor is based on recognizing what Mother Nature is doing and using the tools available," Standerfer says. "At times of the year, the superintendent is very reactionary and at others very anticipatory. With experience and information, you can read the conditions and have the correct action plan."

The time of the year and the length of days have a significant impact on plant needs, Standerfer says, adding measuring environmental components is more important today than ever.

"What we used to think was normal is increasingly abnor-

Seeing is believing

Despite the technical advance in data gathering and analysis, superintendents should also rely on their own senses for collecting information and turning it into useful data.

"Use your eyes and ears," says Carmen Magro, vice president and chief agronomist for Stevens Water Monitoring Systems Inc. "As I instructed students, clients and customers from many perspectives in my career, the No. 1 variable you can monitor is the one you can do with your eyes and ears. Nothing is built to replace that.

"Successful superintendents do what it takes, no matter what, in a timely manner," Magro adds. "That means, seeing problems coming before they do and never waiting to react to a symptom. It requires them to always be symptom, or crisis, preventers. That takes monitoring and knowing what to do with the information."

mal," Standerfer says. "You can no longer time an application or cultural practice based upon

when you've always done it. Soil temperatures are warming sooner. Frost dates are moving.

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Putting down materials at the wrong time is wasteful and expensive.”

Water use per source is another key metric that must be monitored and data collected on, says Brian Vinchesi, design engineer for Irrigation Consulting Inc.

“To manage water, you have to measure it,” Vinchesi says. “Without useful information you are just guessing, or worse, assuming. All water sources should be measured with a flow meter to get the total picture of how much water is used to support the course’s water needs.”

For example, measure pump station water use with regard to the amount of water coming

out of the pump station per cycle and per day, week, month and annually, Vinchesi says. “If you have only one water source, it may be the same as what you measure from the source,” he says. “But, if you have multiple sources, measuring all will show you the inefficiencies inherent in the water supply system. That will allow you to identify the efficiencies and improve overall water management strategy.”

When considering electricity usage the irrigation pump system is “far and away” the largest energy consumer on the golf course. And in some regions, such as the Northwest, variable utility rates can have extreme

effects on course budgets.

“Optimizing pump station use and narrowing a watering window, watering during off peak times, or managing the flow through a modern pump system can impact annual electricity bills,” says Tory Perren, senior marketing manager for Toro Golf Irrigation. “Monitoring metrics like these help a superintendent dial in systems to maximize resources and provide the balance between usage and turf quality, thus lessening overall environmental impact.”

Water withdrawal data is another important element of proper water management, says Ian Williams, national specification manager for Rain

Bird’s Golf Division. Consider that a course’s irrigation activities could draw water from various sources, such as wells or other private sources, municipal water supplies, a reclaimed water source, or natural streams where water must be transported to a holding area by mechanical means. Accurate metering is essential. In many cases, metering may be done by the provider. Sometimes the property is responsible for self-recording. Records of withdrawal quantities can be manually collected or accessed remotely and entered into software to generate reports, he says.

Water usage metering in-

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cludes measuring what is being discharged through the irrigation system, Williams says. To ensure accurate measurements, superintendents must install flow meters on the discharge line of the pumping source according to manufacturer guidelines and calibrated them correctly. While superintendents can collect these values manually, Williams says computer software can also generate detailed reports that include power consumption, hours of operation, as well as detailed pressure and flow values at any time throughout the irrigation cycle.

Understanding the distribution uniformity (DU) of sprinkler heads on a golf course helps superintendents make decisions regarding irrigation system maintenance and upgrades.

“Routine water audits performed by a certified golf course irrigation auditor expose uniformity deficiencies that can lead to over-usage of both water and energy,” Williams says. “Poor-performing sprinklers can, at times, be corrected

inexpensively, which will lead to better performance.”

Soil moisture and temperature – either measured throughout the day by permanently installed soil sensors or periodically by portable sensors – is arguably the most important data used by a turf manager to make irrigation and other maintenance-related decisions, Williams says.

Permanently installed sensors offer data throughout the day at user-defined intervals. Reading and interpreting more data points received throughout the day during periods of plant stress permits the superintendent to document climate and turf-reaction trends.

“Understanding predictive trends in turf grass behavior from the data gives the manager the ability to develop a proactive water management plan,” Williams says. “Understanding volumetric soil moisture content can be used to guide irrigation scheduling.”

Measuring water fraction volume “as the turf sees it,” or more importantly as utilized in the most active region of the



turf system, is vitally important, says Carmen Magro, vice president and chief agronomist for Stevens Water Monitoring Systems Inc.

“The balance of air and moisture is critical for the efficiency of photosynthesis (Ps) and respiration (Rs),” Magro says. “These processes are not givens in turfgrass growth and performance. Each depends on very specific variables, such as the availability of free diffused oxygen in soil solution, available moisture for the plant to take from the rootzone, free exchange of CO2 that comes from the soil, and several other factors including how the turf utilizes nutrients.”

Just because nutrients are present, does not mean the plant will utilize them, Magro adds. An imbalance of moisture in the most dominant upper region of the rootzone will negate any efficient uptake or use of those nutrients, and will hinder the fundamental, basic physiological functions of the turfgrass system.

“The best way to measure water fraction volume is by using scientific grade, precise and accurate moisture monitoring technology designed to be capable of measuring accurately through changing turf conditions over time,” Magro says.

Electro-conductivity (EC) – aka salinity – is very important in understanding what impact free ions have on the turf system, Magro says. “Basically, any ion in solution impacts EC as the turf sees it,” he adds. “Understanding what the turf

sees on a consistent basis from day to day and throughout the year will indicate the health of the system from a salinity perspective. Since higher EC levels indicate higher salinity levels, and because salts are very good at stealing moisture from the plant and making any available moisture harder to take up, EC has an impact on water management. Everyone and anyone managing turfgrass, irrigation and/or nutrition (all turf managers) should be mindful of EC so that they not only know the consistent (or lack of) availability of nutrients to their turf and to understand the impact these (salts) have on the availability of moisture to the turf.”

In golf irrigation, most inefficiencies are in the database that is operating the system, Vinchesi says. For example, the database’s data assumes the installed sprinklers are operating at a specific pressure and at a specific spacing and it then uses that information to calculate the sprinkler precipitation rate and the operating time which effects water use. If the database has the wrong sprinklers, nozzles, pressure or spacing, it will most likely use more water.

“To be efficient with water and to keep your use minimized, database management is essential as it operates the system and keeps the superintendent feedback to make decisions,” Vinchesi says. GCI

John Torsiello is a Torrington, Conn.-based writer and frequent GCI contributor.

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Facility Name	Facility Street Address	City	State	Zip	County
Customer Name	Customer Telephone	Customer Address	Customer City	Customer State	Customer Zip
Source Name	Source Type	Well Depth	Min Rate	Max Rate	Water Withdrawal Category
Source Name	Source Type	Well Depth	Min Rate	Max Rate	<input type="checkbox"/> Agricultural
Source Name	Source Type	Well Depth	Min Rate	Max Rate	<input type="checkbox"/> Irrigated - Stock Water
Source Name	Source Type	Well Depth	Min Rate	Max Rate	<input type="checkbox"/> Commercial
Source Name	Source Type	Well Depth	Min Rate	Max Rate	<input type="checkbox"/> Environmental
Source Name	Source Type	Well Depth	Min Rate	Max Rate	<input type="checkbox"/> Industrial
Source Name	Source Type	Well Depth	Min Rate	Max Rate	<input type="checkbox"/> Institutional
Source Name	Source Type	Well Depth	Min Rate	Max Rate	<input type="checkbox"/> Municipal
Source Name	Source Type	Well Depth	Min Rate	Max Rate	<input type="checkbox"/> Mass Dewatering
Source Name	Source Type	Well Depth	Min Rate	Max Rate	<input type="checkbox"/> Oil - Gas Production
Source Name	Source Type	Well Depth	Min Rate	Max Rate	<input type="checkbox"/> Power Production
Source Name	Source Type	Well Depth	Min Rate	Max Rate	<input type="checkbox"/> Fossil Fuel
Source Name	Source Type	Well Depth	Min Rate	Max Rate	<input type="checkbox"/> Nuclear
Source Name	Source Type	Well Depth	Min Rate	Max Rate	<input type="checkbox"/> Other Fuel
Source Name	Source Type	Well Depth	Min Rate	Max Rate	<input type="checkbox"/> Public Water Supply
Source Name	Source Type	Well Depth	Min Rate	Max Rate	<input type="checkbox"/> Recreation
Source Name	Source Type	Well Depth	Min Rate	Max Rate	<input type="checkbox"/> Golf Course
Source Name	Source Type	Well Depth	Min Rate	Max Rate	<input type="checkbox"/> Snow Making
Source Name	Source Type	Well Depth	Min Rate	Max Rate	<input type="checkbox"/> Other Use
Source Name	Source Type	Well Depth	Min Rate	Max Rate	<input type="checkbox"/> Other

For additional source listings, check the box and go to page 2. If an "unknown business" occurs, check the box and go to page 3.

2010 In-Site Withdrawal: 2010 Out-of-Site Withdrawal: 2010 Potential Withdrawal:

Submitted by: Date: Time:

Buttons: Report Form, Print Form, Submit by Email

Footer: If you do not wish to submit this form via email, you may fill it out, then print and mail it to the address shown at the top of the page. Don't forget to fill out pages 2 and 3. Please include the \$50 fee if applicable.

Completing withdrawal forms is an important part of the irrigation process as water becomes a more scrutinized resource.

BEING THE BOSS TO A NEW GENERATION



Tim Moraghan, principal, ASPIRE Golf (tmoraghan@aspire-golf.com). Follow Tim's blog, Golf Course Confidential at www.aspire-golf.com/buzz.html or on Twitter @TimMoraghan

Every year it gets harder to identify and hire good assistants, interns and crew members. Blame the work ethic of millennials, rules against hiring immigrant labor and an overall poor public perception of the game, if you like. But don't forget that growth potential in this business is limited and the work we do is hard.

Which means that when you do find good people, particularly good young people, it is extremely important to encourage and engage them. To get the most out of the best, you must let them think outside the box, propose new ideas, and push the boundaries.

But maybe more important, change the way you think and act. So, it's time to take an honest look at your habits and practices as the boss and see if you are allowing and pushing your people to be their best.

Do you pressure your staff to do what you do and think the way you do? Do you establish strict rules and practices or do you allow them freedom?

Are you a micromanager? Good workers hate that. A good leader tells his staff what is expected or what the overall goal is. Then they step back and let them get there. Giving step-by-step directions for every little task is a waste of your time and your crew resents it.

Do you only want "yes men"

around you? The correct answer is "no." A good leader encourages debate, brings his staff in to talk about strategy, and is comfortable asking for and accepting other options.

Think about the last time someone on your staff offered a truly new idea. How did you react? Did you listen with an open mind? Did you encourage debate? Were you willing to give it a try? Unless you're a "yes man" to all those questions, you're not a good boss.

I'm the first to admit that it's my generation—50 and above—that seems the most locked into doing things the same safe way and won't change. We're slow to embrace the newest technologies, preferring the tried and true, or call it experience. At this age, we're very comfortable and satisfied and, frankly, we're always worried about losing our jobs. One of the most harmful truths I've learned in this business over the years is that many are scared about being unemployed that we stop being creative, repress our true identities and smother our strengths. When that happens, everyone suffers, including the golf course.

But I'm also pleased to note that it's the superintendents in their 30s and 40s who are the most open-minded to doing things differently. So, there is hope.

What about the next generation? I fear that they feel in their 20s the way

I did when I was starting my career and pressed to conform to practices and procedures established by those I worked for. It was made very clear to me that there was only one right way to do every job. Variation would not be tolerated.

We must change our collective and individual mindsets if we are going to engage young people. We must eliminate the "we don't work that way here" mentality. At the very least, think about when you were starting out and your first bosses: Did they encourage your creativity or restrain you to the same old way of doing things? How did we learn from your own early experiences?

I don't mean to say that every superintendent out there is doing things wrong. I often run across those who are open to bringing new perspectives to the table. From watching and working with them, I've gathered some ideas for hiring and leading the next generation.

HIP TO BE SQUARE. Don't confuse being open-minded with being hip, cool or that you're 28 again. You're not! Real twentysomethings will see through your act in a heartbeat. They don't want a contemporary, they want a boss, one they can learn from and emulate, but also someone who will listen to them, who wants to hear their ideas.

LEAD BY EXAMPLE. Don't be afraid—or worse, above—to cut a hole, jump on a mower, spray or fix an irrigation break. I recall one well-known superintendent who had no problem grabbing a broom and brushing the greens along with the crew at a U.S. Open.

ASK FOR THEIR IDEAS. If what you hear is really crazy, explain why but don't condemn the thought. Applaud a willingness to speak up and push the envelope. During my early years at the

(MORAGHAN continues on page 55)



PLAYING CONSISTENCY IS THE NAME OF THE GAME

at Victoria National Golf Club



Victoria National Golf Club, in Newburgh, Indiana, is ranked 43 in Golf Digest's 100 greatest golf courses in America. Best Sand, a proven, well-known brand of Fairmount Santrol, is trusted throughout the country. Together, Victoria National and Best Sand continue to create repeatable experiences with playing consistency for members, guests, and professionals at the nationally acclaimed course in southwest Indiana. "When you're on a national stage, your course must be as consistent as possible whether you're talking about the hazards, tees, or greens," said Kyle Callahan, director of Agronomy for Victoria National.

Preserving the design

Callahan and his team have a primary goal: to preserve the 418-acre course designed by Tom Fazio, the award-winning golf course architect. The team rakes 58 bunkers over two acres five times per week. Besides raking, Callahan's team edges and weeds, in addition to removing silt and shifting sand into proper places after checking depth and firmness totals. Bunker maintenance, other than raking, accounts for three full weeks each

season on this course. Annual offseason enhancements include replacing some of the bunker sand. Since 1998, the team has filled them with Best Sand's bunker sand. The sand ensures consistent conditions for championship play and the everyday golfer.

Maintaining the consistency

High-quality sand is the name of the game. Callahan understands the finer points of sand selection to maintain playing consistency. "At a higher-end club, consistency is a big thing with players, especially when you're hosting an event," he said. "When you play one bunker that's soft and one that's firm or you have a soft green and a green rolling faster, that's really where you would be ridiculed as a superintendent or director."

That's not the case at Victoria National where these experts keep everything on course. Presenting a clean, white appearance that accentuates the Fazio design also factors into the sand selection. Best Sand's Tour Grade Signature Blend enables the bunkers to keep their desired appearance following rain. "Obviously, the sand color is vital," said Callahan. "How well does the sand hold color? This is an important point in

such a widespread natural area. White sand really makes the course pop."

Supporting the customer

In addition to the sand's consistency of play and color, Callahan compliments Best Sand representatives for adapting to his schedule. The professional relationship with Terry Gwinn, Best Sand's sales manager, allows Callahan to meet the all of the job's demands, including preparation for the United Leasing & Finance Championship each spring at Victoria National.

Gwinn also enjoys working with Callahan and his team at Victoria National because of their skilled approach to work and interest in high-quality sand. Best Sand is the only bunker sand that can be found on 30 of the top 100 golf courses in the US. Professionals and everyday players appreciate the championship-level look.

Callahan values the outstanding product and customer service. "That's probably the biggest thing about our network: Can you respond to a crisis? With Terry, I call him and say, 'Can you help?' He jumps through hoops. That's always big for us."





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CATCH MY

DRIFT

The information you need to prevent your pesticide applications from going off target and doing unintentional damage to your course.

By **John Torsiello**

The movement of turf pesticides to non-treated areas of a golf course can have potentially disastrous implications for non-targeted turf or ornamentals. Foliar or root injury to turf and other species that are sensitive to certain pesticides could result in plant death on highly desirable turf surfaces, such as putting greens, or damage to ornamentals in highly visible areas on the golf course.

With proper information on short-term weather conditions, knowing what is going on underneath your turf,

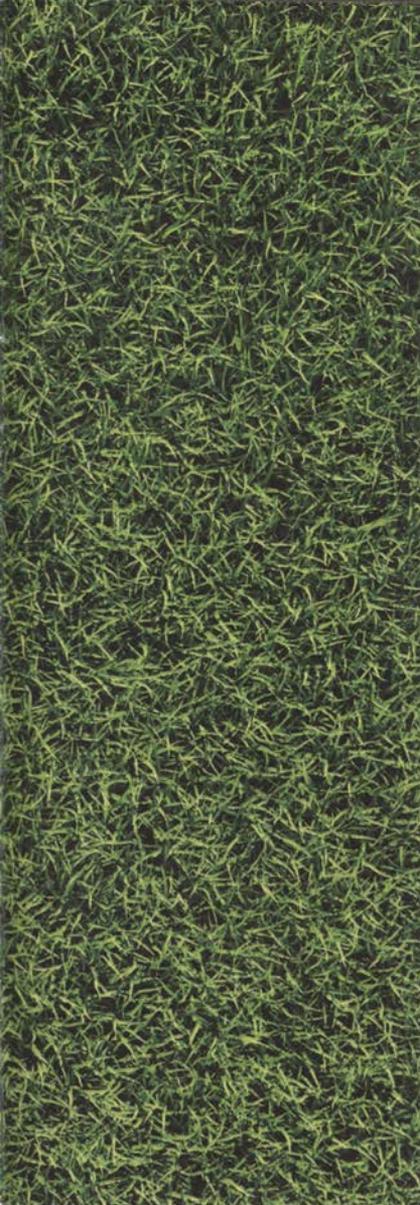
paying close attention to and following pesticide labels, and proper timing of applications, pesticides will impact only the area that needs treatment and not damage adjacent turf or other plants.

“Application technology in the form of nozzles and GPS sprayers have improved the superintendent’s ability to place pesticide products where they want them,” says Kyle Miller, senior technical specialist for BASF Professional Turf and Ornamentals. He adds pesticide chemistry has improved formulations and lowered application rates to mitigate drift scenarios.

Yet, it still happens, says

Cam Copley, golf/national accounts manager for Nufarm Americas. “Despite being very careful, pesticides can move off target through water movement, foot traffic or mechanical traffic,” Copley says. “It is more common than it should be, but the most common cause would be not allowing enough a reentry timeframe into the area.”

Off-target pesticide movement takes many forms depending on how sensitive the off-target species is and what type of rate was applied. Additionally, pesticide symptomology can be highly varied depending on the pesticide’s mode of action, says Dr. Jeff Atkinson, SePro’s portfolio



leader, turf and landscape.

"In the case of a herbicide, off-target movement can range from transient phytotoxicity to total plant death," Atkinson says.

When applied according to label directions, superintendents can limit unintentional or off-target movement of pesticides. However, accidents, unforeseen weather and other events can lead to unintentional effects, says Dr. Zac Reicher, technical specialist for the Bayer Green Solutions Team.

Most unintentional consequences typically occur during mixing or application. And most of these problems can

be avoided by taking a little more time in preparation and getting a second set of eyes to check the calculations and products to be mixed, Reicher says. "This is easier said than done with the hectic golf course schedules, but extremely important given the cost of each application as well as the potential costs of a misapplication," he adds.

Understanding the biological and chemical properties of a pesticide is the compliment to understanding the mode of action of a pesticide, Atkinson says. A pesticide's ineffectiveness often results from the inability of the pesticide to reach the target, he says. Or in the case of an herbicide, the inability of the herbicide to penetrate the target's cuticle to reach the active site within the plant.

"Understanding pesticide chemical properties will help an applicator decide if and what type of surfactant would improve efficacy and what other types of products the pesticide can be mixed with," Atkinson says. "There's a tremendous amount of information available on pesticide products today. Taking advantage of university extension programs is a great way to access this information. Within the last several years, university turf programs around the country have done a great job of improving the accessibility of information on their respective websites. Often, that's a great place to start. Manufacturer and distribution technical specialists are also great resources for specific product information."

Before applying product, superintendents and turf managers must understand pesticide volatility, water solubility,

Read the label

Make applications when wind speeds are within the range on the product label, says Kyle Miller, senior technical specialist for BASF Professional Turf and Ornamentals. If products need to be watered in per the label, it is best to do this soon after application to eliminate or minimize off-target movement. Pay attention to buffer areas when applying pesticides. "If a label states keep a minimum of 10 feet from a putting green or 30 feet from a pond or creek, heed those statements," Miller says.

Two factors that impact the fate of pesticides in the environment - volatilization and runoff. Pesticide suppliers write labels to circumvent off-target movement of pesticides, says Dr. Michael Agnew, field technical manager for Syngenta. If the label is followed, off-target movement should not be an issue.

For example, if a pesticide label states it is toxic to fish, there will be directions and restrictions on how to avoid contact with fish under the environmental hazards section of the label, Agnew says. If the product has the potential to drift or transform into vapor and move off-site, the following statement would likely be on the label: "Do not apply when weather conditions favor drift from target areas." If the product has the potential for runoff, Agnew adds the following statement may appear on the label: "A level, well-maintained vegetative buffer strip between areas to which this product is applied and surface water features such as ponds, streams, and springs will reduce the potential loading of the active ingredient from runoff water and sediment. Runoff of this product will be reduced by avoiding applications when rainfall is forecast to occur within 48 hours."

Another factor to consider is soil condition. The potential for runoff is greater on poorly drained soils, especially if the turfgrass stand is thin or non-existent. "In these conditions, it is best to leave a buffer strip to intercept runoff prior to entering water," Agnew says. "An example of how this might be stated on the label is: 'Do not apply this product within 50 feet of a water body (lake, pond, river, stream, wetland, or drainage ditch).'"

The most important thing to understand about a pesticide application is to read and follow the label, adds Cam Copley, golf/national accounts manager for Nufarm Americas. "Years of research and trials have gone into these labels, and everything the superintendent needs to know is on that label," he says. "Some products need to be watered in, some need to stay on the leaf. Some products must be applied during certain times of the year, others must be applied during certain temperature ranges. If the label says it, do it like the label requires."

residual and other vital characteristics, Miller says.

"While these might all be desirable attributes in most situations, not being aware of these could result in unintended damage to desirable turf or ornamentals," he adds. "It's very important to attend your local university field day and find out for yourself what the experts are saying with regard to efficacy and overall use and

performance of products in your geography. In addition, keep in touch with your fellow superintendents to find out what they are saying."

Weather plays a critical role in pesticide efficacy and avoiding off-target intrusion, Copley says. For example, some products need to stay on the leaf for a certain amount of time, so a rain event will ruin that application. Some chemistries re-



Chance for rain

Weather is a critical factor for many pesticide applications.

Chemical drift is not an unusual scenario.



For example, a wind gust can quickly move a spray application off target, or an unexpected heavy downpour will wash product down a slope, says Kyle Miller, senior technical specialist for BASF Professional Turf and Ornamentals. However, it is preventable if turf managers monitor weather conditions prior to and during spraying.

Rainstorms following a fungicide or insecticide application can move the pesticide off the leaf, and depending upon the pesticide solubility, it can move it below the target zone into the roots.

"Understanding this possibility is important when treating for diseases such as summer patch and take-all patch," says Dr. Mike Agnew, Syngenta field technical manager. "Timing a pesticide application prior to a rain event may actually be the right thing to do, especially if the product needs to get into the soil for optimum pest control. Avoid making applications if the forecast is heavy rain in a short period of time."

quire a temperature range because at low temperatures the plant will not respond to the product, and at high temperatures the product can cause damage. Wind is also very important because windy conditions can result in products moving off the desired site, Copley adds.

Golf courses in regions that manage cool- and warm-season grasses adjacent to each other can be negatively affected by off-target movement of pesticides, says Dr. Travis Gan-

non, assistant professor pesticide/trace element fate and behavior at North Carolina State University.

"There are bentgrass greens even in places like Florida, so this can be a problem in a number of regions," Gannon says. "Especially where there is a good deal of slope in the areas around the green complex, off-target pesticide movement can prove problematic."

Gannon advises superintendents to understand soil moisture content when applying pesticides to prevent sub-surface, off-target flow. Also, they should pay close attention to short-range weather forecasts to avoid treating turf prior to thunderstorms or other large, impactful rain events that will lead to the unwanted movement of pesticides on the course.

In other words, know what will happen above the ground, what is going on below the turf, and then time pesticide applications accordingly, Gannon says.

Low-mowed greens are usually most susceptible to damage, and thus why many pesticides are prohibited from use on greens, Reicher says. "Young turf can be very susceptible to herbicides," he adds. "Extra care should be taken on courses with warm-season grasses with immediately adjacent to cool-season grasses since herbicides used on one can be damaging to the other."

Annual bluegrass greens may be the most vulnerable to disease damage. This can be exacerbated by poorly drained soils, wet conditions, the growth habit of annual bluegrass and the multitude of diseases that attack an annual bluegrass plant. Annual bluegrass roots will typically grow near the soil surface during periods of summer

Bullet Points

Dr. Zac Reicher, technical specialist for the Bayer Green Solutions Team, offers some tips on how to prevent and avoid off-target pesticide movement:

- Maintain sprayers, check nozzles, etc.
- Calibrate regularly
- Select the right product for the task
- Use a jar test to confirm compatibility in the spray tank
- Mix products in a pre-mix tank or five-gallon bucket prior to adding to the spray tank
- Limit the number of products going into the spray tank; every additional product dramatically increases the chances for incompatibility and/or potential turf damage
- Maintain rotary spreaders used for pesticide applications
- Check the distribution pattern and calibrate for each product and spreader

Pest App Do's & Don'ts

DO'S:

- Read the label.
- Follow label instructions.
- Know the weather forecast.
- Know how the pesticide will affect target and non-target species.
- Keep thorough records of pesticide applications. If off-target injury does occur, or even if great results occur, thorough records will help you understand why.

DON'TS:

- Apply a pesticide before reading the label.
- Apply during windy conditions.
- Apply to saturated soils.
- Apply before the pesticide has a chance to dry.
- Make an application that is prohibited by the label.

— Dr. Jeff Atkinson, *SePro's* portfolio leader, turf and landscape

stress. Because there are diseases that affect the foliage (dollar spot), crown (anthracnose) and roots (summer patch), pesticide applications need to account for what effect weather may have on fungicide efficacy.

"Areas that are heavily sloped are especially vulnerable as pesticide products can be moved off target, especially if the product is highly water soluble," Miller says. "Thin turf areas are also vulnerable because there is little vegetation for the product to become adsorbed to."

All grasses/areas are vulnerable if an applicator is careless, Atkinson says. Therefore, it's better to approach it as everything is equally sensitive to an off-target pesticide application.

This approach prevents an applicator from overlooking common application pitfalls that may result in off-target pesticide application, he adds.

Experts at regional universities, sales professionals, company representatives and other superintendents are all vital resources to learn what works best for an agronomic situation. "Also, the superintendent should do their own research about how that class of chemistry works and how the mode of action will respond when they make the application," Copley says. **GCI**

John Torsiello is a writer based in Torrington, Conn., and a frequent GCI contributor.

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RAKED
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(OR WERE
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SURVEYING THE SCENE



Larry Hirsh, CRE, MAI, SGA, FRICS is the president of Golf Property Analysts based in Philadelphia, and a frequent GCI contributor.

Change is one of the most frequently used words in our society. Presidential and other elections are often won or lost on the promise of change (or none). We change clothes routinely each day. We change the sheets on our beds periodically. We change how we cook the same foods in order to add variety to our lives. Some people change the color of their hair on a regular basis.

In the golf world, there are some changes which happen quite rapidly. For instance, golf equipment has changed dramatically and quickly in recent years to allow golfers to hit shots farther, and some would argue with more consistency than previously possible. The golf ball has changed and now flies farther than the old balata-covered wound balls. These are generally considered examples of positive change, though, there is discussion about restricting the golf ball.

Change comes to clubs and golf courses very slowly. Golf is a sport steeped in tradition. At many clubs, the prospect of change can be frightening to members, some of whom have been at the club for many years. In other instances, the financial cost of change can grind even the best of intentions to a halt. There are situations where change is good and others where it's bad.

In recent economic times, with

“At many clubs, the prospect of change can be frightening to members, some of whom have been at the club for many years. In other instances, the financial cost of change can grind even the best of intentions to a halt.”

the golf industry still struggling in many markets to absorb the course building boom of the 1990s, change at many clubs has come in the form of inclusive, rather than exclusive membership. In many cases, this is positive as clubs formerly restricted to certain groups have become more diverse in their membership. Change occurs at some clubs as capital reinvestment for facilities enhancements or renovations to keep up with competing clubs. Again, if well-conceived, these are examples of good change.

One of the biggest changes we see today is the number of member-owned clubs selling out to for-profit management firms. This too can be good or bad. For some clubs, it's the right solution. For others, maybe not.

The private club world is evolving. However, change – technological change and otherwise – in the private club industry often lags behind other industries. Many clubs

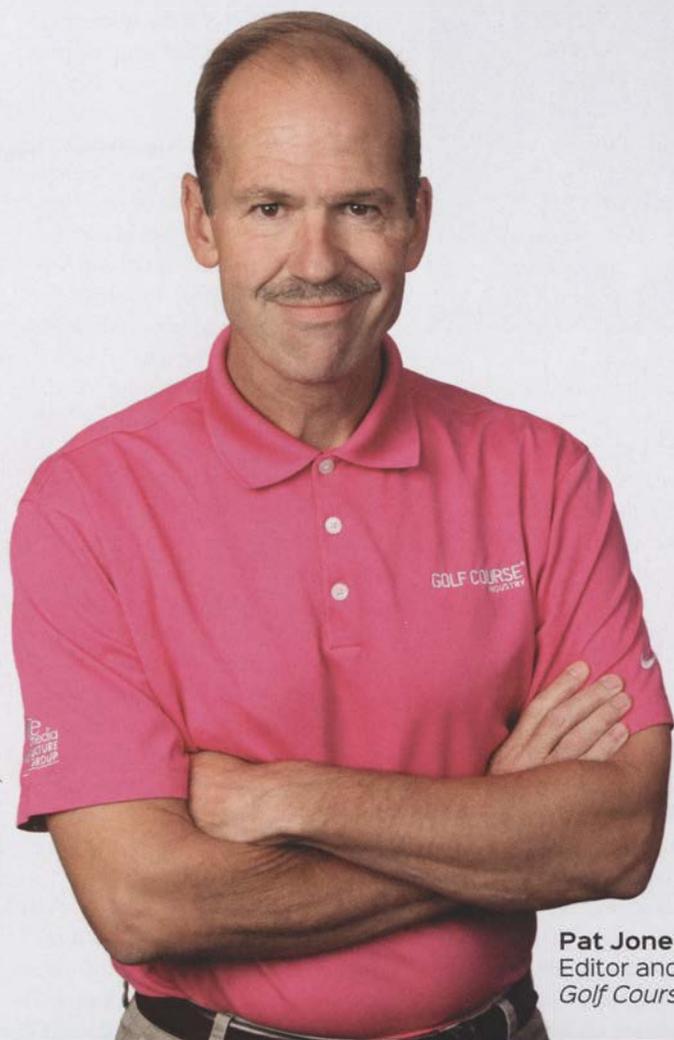
that resist necessary change, and in some cases, have been left behind – or even failed. In an environment where boards, members and management are skeptical of change, the “status quo” often carries the day, even if it leads to catastrophic failure.

Conversely, one thing we see far too often at clubs (just like the rest of society) is change for the sake of change. This is bad. Too often, clubs change general managers, golf pros or superintendents each time a new leadership regime is elected. At those clubs with frequent leadership changes (a new president every year or two), this can be deadly and lead to a lack of the stability that is so crucial to success. Often, this type of change is the result of what is known as “micro-management,” where club leaders end up obstructing the key management and staff from doing their jobs efficiently. At some clubs, in order to reduce spending, leadership eliminates the position of general manager and takes on that role themselves often leading to more “management by committee.” It often doesn't end well.

We've observed many clubs that change when it's not needed (if it ain't broke, don't fix it) and make “unforced errors” which can lead “downhill.” More often than not, I see clubs that need change that are unwilling or unable to implement responsive policies or actions that will turn their fortunes before it's too late. I've observed many clubs fail for this reason, including my own, which resisted change simply because it was different.

The bottom line is that change is both good and bad. Each change has to be considered in the context of the impact it has on the club and the club's goals and mission. Thorough (and often independent) evaluation and analysis is useful. Depending on the situation, change might be good or it might be ill-advised. **GCI**

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FLASH, FAIL, FALLS



Paul F. Grayson is the Equipment Manager for the Crown Golf Club in Traverse City, Mich., a position he's held for the past decade. Previously, he spent 8½ years as the equipment manager at Grand Traverse Resort & Spa. Prior to that, he worked as a licensed ships engine officer sailing the Great Lakes and the oceans of the world.

There was a bright flash and a tremendous noise, followed by smoke oozing out of things.

Nope, it was not a lightning in the distance. This was up close and personal. I was in the underground concrete vault where the waterfall power distribution panels are with barely any room to jump back, up or sideways. There was nothing much left to do at that point except shut off all the breakers and leave the hole in the ground by ladder trying to stay ahead of the smoke cloud that was slowly filling the space.

What had happened took a while to piece together. Eventually, we discovered we had lost two of the three phases and the third phase was suddenly very high voltage. We will never know exactly what the chain of events was leading up to this adventure, but on their side the power company replaced



the three transformers on the pole that provided the power to the deep-well pump house and, in turn, the waterfall pit. On our side, the waterfall motor disconnect switch for the waterfall blew apart and needed to be replaced along with several fuses. It was also discovered that the deep-well pump for the irrigation system got fried.

The well people needed us to remove the part of the well house roof that allows their crane to pull the deep-well pump out of the aquifer. It is this deep-well pump that fills the pond near the clubhouse. While it looks like a pond, cattails, ducks, and fish, and all, its true function is to be the irrigation systems reservoir. Without the deep-well pump running, the irrigation system cannot run. The whole course is only two-and-a-half days away from drying up and dying without the irrigation system.

Luckily, heavy rain has given the repair crews a little breathing space. Everything should be back to normal by mid-day tomorrow.

As a bit of relief from the adrenaline rush, the flying saucer blueprint framed on the wall in the maintenance shop is a good reminder that there are other maintenance shops that work on things that are not mowers or turf equipment. The day-to-day operation there is probably not much different than in my shop, there are shop supplies to order, parts to order, maintenance actions to schedule, "emergency" repairs (every repair is an emergency), urgent matters, less urgent matters, paper towel dispensers to be refilled, you know, the regular stuff it takes to keep a shop running – no matter what the shape or color of the vehicles are in the motor pool.

PRIORITIES

So, what will I be working on tomorrow? I have a very long list of "important" things that need to be done but as time has proven, I need to select the six most "critical" things and hope I can get three of them done between the "must do immediately" things that will pop up during the day.

Here is what I have planned:

1. Check the cut and set of the greens mower;
2. Sharpen the blades on the rough mower;
3. Paint patio furniture one table at a time.

Things not on the list but becoming urgent because of how long they have been waiting to be done: clean the floor, speed up the superintendent's utility vehicle, repaint the parking lines and space numbers in cold storage, erase the days "to-do list" from several weeks ago, take the asparagus out of the refrigerator, you know, the regular day to day stuff.

Wait a minute, the beverage cart just stopped in to get some gasoline. It has a broken windshield bracket and the engine is out of oil. Let me get some oil for it before the engine melts down. **GCI**



Terry Buchen, CGCS, MG, is president of Golf Agronomy International. He's a 41-year, life member of the GCSAA. He can be reached at 757-561-7777 or terrybuchen@earthlink.net.



Travels with Terry

Globetrotting consulting agronomist Terry Buchen visits many golf courses annually with his digital camera in hand. He shares helpful ideas relating to maintenance equipment from the golf course superintendents he visits – as well as a few ideas of his own – with timely photos and captions that explore the changing world of golf course management.

IRRIGATION PARTS STORAGE

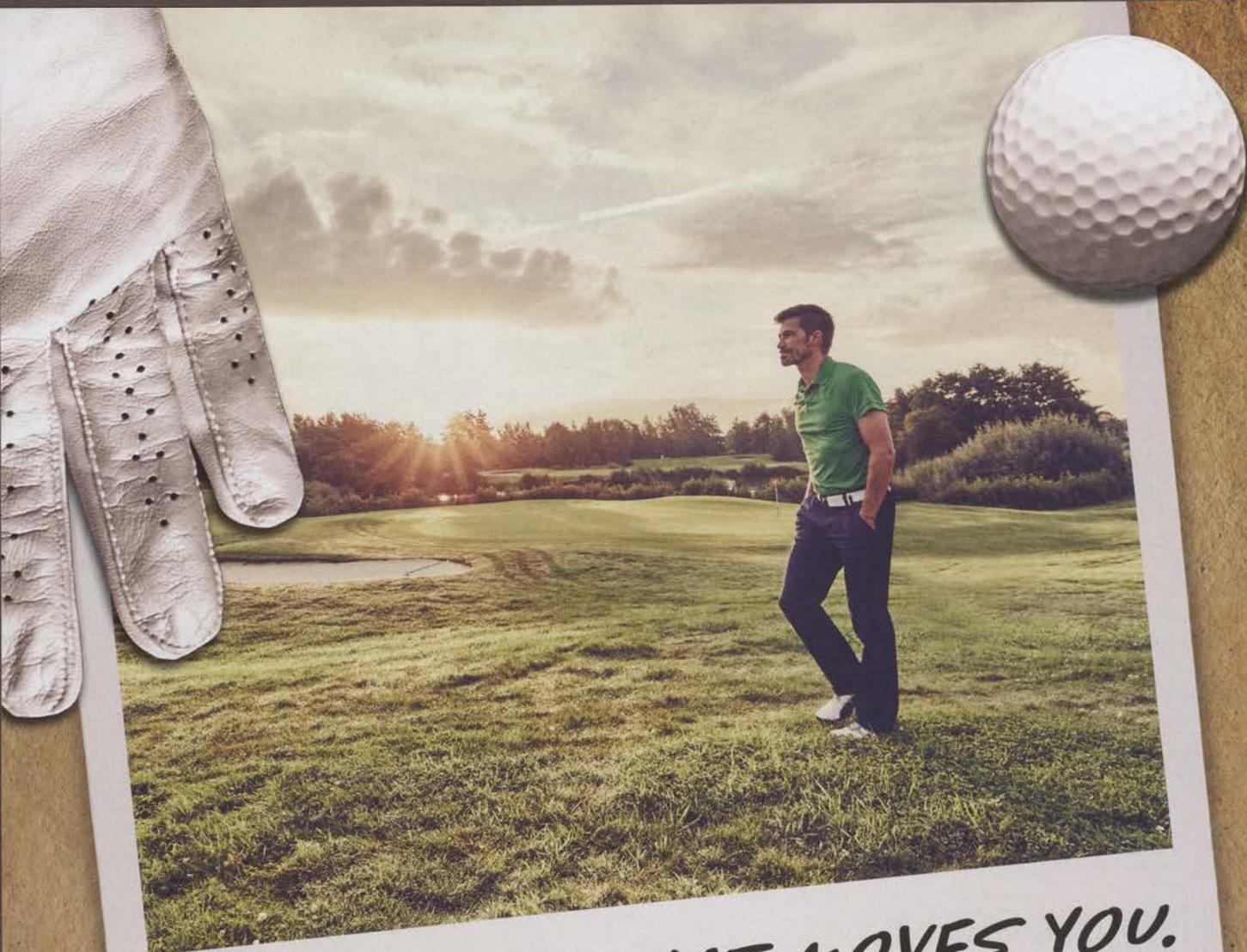
These 22 buckets and lids were acquired from Lowe's for \$3.58 each and \$1.38 each, respectively. Grass seed buckets could also be used. They are attached to the wall on two 4-foot by 8 ½-foot thick sheets of plywood using two ¼-inch diameter lag bolts for each bucket. The lids are snapped into place and they are cut into an easy opening for access while still allowing room for ample storage within. Each lid has a computer-printed and laminated labels — for water and wear protection — stapled to the lid. It took Brandon Crim, superintendent, at the Boise (Idaho) Ranch Golf Course, about three hours to build and mount this project.



TRIPLEX GREENS MOWER BRUSH

This brush assembly, mounted to a 2004 Toro GM 3150, is used to work-in sand topdressing on the greens approximately two to three times every two to three weeks. Each push broom is 30 inches long placed end to end and bolted to two 4-inch by 4-inch by 31-inch long boards placed 5 inches apart. That is then bolted together to the 1 ½-inch square tubing. The side arms are 2 inches by 20 inches by ½-inch thick with a 1-inch square stock "plug" that fits inside the 1 ½-inch OD by ½-inch square tubing that is part of the mower's grass catchers mounting brackets. Everything was then painted red. The brush assembly easily moves up and down automatically as the cutting units/grass catchers are raised and lowered. It took Brandon Crim, superintendent, and David Cantrell, equipment manager, at the Boise (Idaho) Ranch Golf Course, about six hours with \$20 in parts to build and mount this project.





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(BRAUER continued from page 12)



Bunker	Existing Size	Unit	Proposed Size	Unit
12	2,754	sf	1,476	sf
13	3,723	sf	1,305	sf
14	983	sf	218	sf

tect's style was to make a large bunker look like several smaller ones, but it was probably careless design or faulty construction, with the bottom of their "turf tongues" too low to be seen as designed. The solution is to convert that big sand bunker into two (or three) round bunkers without changing visibility. The cluster of smaller bunkers saves sand and may ease

mowing by eliminating tight turns on capes and bays of turf.

With many bunkers, only the flashed-up sand near the back slope is visible. Converting the front part (or some blind side areas) of sand bunkers to grass usually has no effect on visibility/aesthetics from the landing zone (as seen in the photo above right).

Proper construction for maximum

visibility requires simple front lips, fill to build above surrounding grade and building the entire bunker base at a gentle 3 to 7 percent up slope, rather than flashing the back of the bunker at steeper slopes. We either raise it, if practical, or convert the bunker into an example of how much sand can be removed.

We reduced the bunker size at this green by 40 percent without changing the visual character. As I stood in the landing area, I realized bunker 12 was visually "too far" from the green and could be reduced. The left side of bunker 13 had become hidden behind maturing trees since opening. Converting the right edge of bunker 13 opened up the fairway to the green, speeding play. The base of bunker 14 was hidden behind bunker 13 and looks the same as before.

Our charge in renovation planning is usually to find ways to increase course attractiveness (because it sells greens fees) while simultaneously reducing costs. Using these techniques, we have reduced total sand bunker area by 10 to 25 percent, helping cost conscious courses achieve both. **GCI**

(MORAGHAN continued from page 43)

USGA, an executive director often said during a meeting, "this might be a crazy idea, but..." This made it OK for others to offer their ideas, crazy or not.

SAY WHAT? Speaking of meetings, if the only voice being heard is yours, you have a problem.

BEWARE YES MEN. If all you're hearing from your people is agreement with what you're saying, that's another problem. If that is the case, it is not enough to keep saying you want to hear new ideas, different thoughts, creative approaches. Prove that you mean it by actually listening to and trying some of their out-of-the-box

suggestions. You have no idea how much respect and good will you'll get by saying, "Let's try that here." In the words of General George S. Patton Jr., "If everyone is thinking alike, then someone isn't thinking."

KNOW YOUR STRENGTHS, AND KNOW YOUR CREWS', TOO. It takes many different people, and talents, to form an efficient, effective team. If you're a good manager but not as good building or repairing equipment, find those talents in someone else and make that person know that those skills are important to you and the rest of the team.

But discovering an employee's

strong points can take time and effort. Think about rotating a new employee through several different tasks for the first few months, giving you the opportunity to determine what he's good at. Then nurture and help to further develop those skills.

- A job description is not carved in stone. Employees need to know what is expected of them. But a job description should have some flexibility and room for creativity.
- Tell people what needs to be done, not how to do it. Explain the task and you'll likely be surprised by their ingenuity in handling it. Finally, always be willing to offer support, praise and respect. **GCI**

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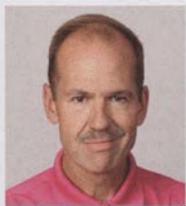


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TURFHEAD AT THE TOP



Pat Jones is editorial director and publisher of *Golf Course Industry*. He can be reached at pjones@gie.net or 216-393-0253.

I met Mr. Bob Moore not long after my start in this wacky business 30 years ago. He was a jovial, white-haired fellow who would talk your ears off about the science of water management. If prodded, he would confirm he'd pioneered the invention of a product we all know and love today: the turf wetting agent.

Mr. Moore was the founder of Aquatrols and the father of the concept that surfactants and other technologies could promote better distribution of water to grow turfgrass. He was also quite literally the father of the next generation of Aquatrols leadership including Tracy Moore Jarman, Andy Moore and Demie Moore. The family became a fixture in our industry, growing their company, supporting the profession and continuing to innovate with products like Dispatch and Revolution.

As a privately held company, the Moore family appointed a half-dozen outsiders to ensure they had a variety of insights and ideas to guide the company, and they offered me a seat. I served for six years in the mid-2000s and it was awesome. In exchange for perspectives I provided about the golf business, I got to see a family-run company from the inside-out as they dealt with business changes, brought new products to market and coped with Mr. Moore's retirement and later passing.

Like many family businesses, Aqua-

trols grappled with the future. Should they keep the business small and focused on golf, make a big expansion into agriculture, acquire other companies or try to find the right buyer who would continue the company's name and legacy? Those discussions went on during my time on their board. With no "next generation" of the Moore family ready to take on the leadership, something had to give.

There'd been lots of interest and offers to buy the company, but it took a group led by industry legend Roger Underwood to put the right offer together. He had recently sold his company, Becker-Underwood, to BASF and was looking to invest in strong, tech-driven green industry companies. And, he had a turfhead in mind to run the business.

That turfhead is Matthew Foster, a Midwesterner who planned to be a commercial pilot but got sidetracked into the golf biz by a friend who was in the Mississippi State program when Jeff Kranz and Mike Goatley were there in the '90s. After graduation, he was superintendent at Timberton GC in Hattiesburg and worked multiple grow-ins back when we were building courses like crazy. Despite the success, he still had the urge to do even more: "I've always been the type to have an eye on my career path," Foster told me. "I wanted to build and manage something in the business and I genuinely felt like I could make

a difference by being a great supplier."

So, Foster became a field rep for the old ProSource organization in 2001 and earned an MBA from Tulane. After solidifying his career in sales, he moved to FMC in 2009 where he got experience on the ag side. He was appointed FMC's Global Director for Plant Health working with biopesticides, seed treatments and micronutrients. When the call from a headhunter looking to find new leadership for Aquatrols in late 2015, he wasn't looking ... but he was intrigued. He soon realized this was a chance to take a very cool company to new places ... and return to his turf roots.

He spent a year-and-a-half in a transitional role as COO learning the ropes. Now, as CEO, he has a remarkable opportunity to build on the Moore family legacy and grow Aquatrols to new places. How?

"Near term, we've got to get closer to the customer – and that includes both our channel partners and suppliers," he says. "We're expanding our sales force and hope to have 15 reps eventually. We're going to grow by offering a higher level of service.

"We're also going to tighten up our portfolio and launch new brands. Yes, people see Aquatrols and all they see is golf. Golf will always be our flagship business, but it's only about half of what we do. We also plan to continue to grow in soil media, sports turf and the specialty ag side."

Right off the bat that means building up the company's actual manufacturing capabilities and continuing to leverage Aquatrols' research capabilities to include the broader topic of soil/water interactions: "We want to grow an organization that is seen as the green industry's leader in soil solutions. To call us a water management company doesn't do it justice."

And what does he think about getting back to his roots? "The thing about the golf business is you come for a job but you stay for the people. I'm thrilled to be back among friends." **GCI**

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