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GOLF COURSE INDUSTRY

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THE DEBUT **GCI TECH CONFERENCE** PRESENTED A **CANDID LOOK AT THE NEXT DECADE** — AND OFFERED **CONCRETE WAYS TO ENSURE LONGEVITY IN THE INDUSTRY.**

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ON THE COVER
Freelance illustrator Matthew Laznicka created this month's cover design.

VOL. 28 NO. 6

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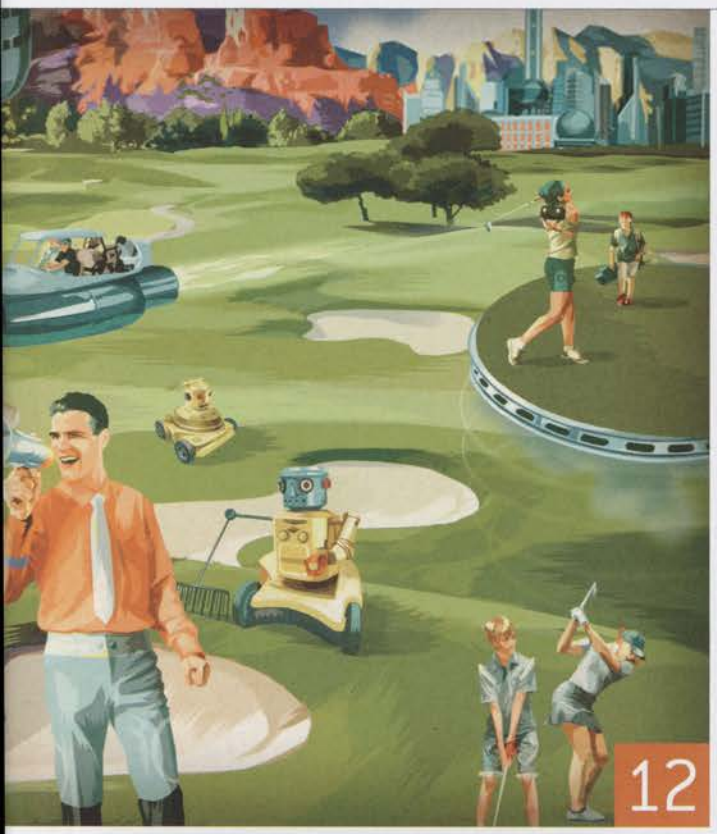

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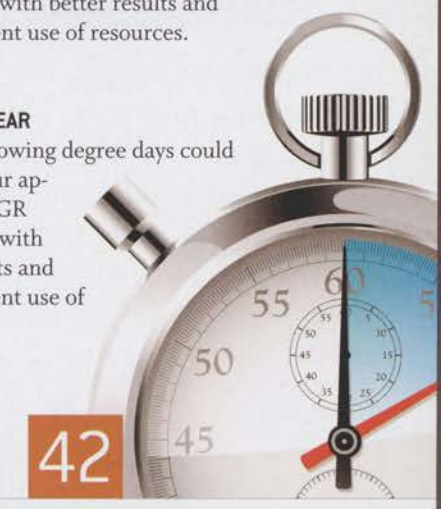

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SPREADING KNOWLEDGE

If you've ever been in one on my seminars on effective communications, you may remember I preach the incredible power of a brief handwritten note. Think about it: in an age when you get 200 emails and 50 text messages a day, aren't you always surprised and delighted to receive a little handwritten snail-mail note from someone?

Pat Jones
Editorial director and publisher

Let me give you a case in point. A week or so after our "GCI Tech: Forecasting the Future" conference in Charlotte, I grabbed my usual pile of office mail, opened a neatly hand-addressed envelope and found this from a top super from Virginia who'd attended the event:

"I wanted to thank you and the entire GCI staff for a great event. In my 20 years of attending classes and seminars, I would have to say this was the most beneficial and educational event I have participated in. Golf is changing and I am glad you are trying to help us stay ahead of the curve."

We received a lot of wonderful comments and emails and had great scores on our attendee satisfaction survey, but that note will stay on my bulletin board for a long time.

The other thing that will last a long time is my gratitude to our sponsors, Toro, Syngenta and Smith Turf & Irrigation, and our hosts, the Carolinas GCSA and Carolina Golf Club. Y'all went above and beyond expectations, and I particularly want to thank Matthew Wharton, CGCS/MG, and his team at CGC for their warm hospitality.

> **"How could we possibly top this year's event? Where will we go next? Stay tuned..."**

What did we learn from the event? Well, read Guy Cipriano's cover story and you'll find the answer is "a lot." We covered a ton of ground in eight hours and probably the only complaint I heard was that it was a little exhausting trying to keep up with the brainpower in the room. That was the best backhanded compliment ever, I think.

From my perspective, the most important thing I learned that many other folks – including our speakers and plenty of our attendees – are optimistic about the future for superintendents and clubs that are willing to take 100 percent

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ownership of their destiny. Waiting and hoping is not a business plan. Taking charge of planning, operations, marketing, P&L management and making a total commitment to hospitality and customer service is a business plan.

We were delighted to receive some serious and semi-serious invitations to host future events around the globe (Australia may have to wait a few years) and we will definitely do GCI Tech 2 in 2017. How could we possibly top this year's event? Where will we go next? Stay tuned…

So, you're probably all bummed out that you missed the inaugural event and all the great info that was shared by our amazing lineup of speakers, huh? Well, cheer up because we videotaped everything and by now it should all be posted on the GCI website. Enjoy! **GCI**

Superintendent Matthew Wharton greets golfers before the GCI Tech golf outing at Carolina Golf Club. Proceeds from the outing benefited the Wee One Foundation.

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TORO **Count on it.**

AQUA-AID business manager Scott Thompson participated in a volunteer trip to Honduras to drill a clean water well and educate residents about basic hygienic tasks.

Digging for something deeper

One of the industry's leading water companies brings awareness to a reality facing residents in developing and remote parts of the world.

By Guy Cipriano

Water efficiency is a golf industry conundrum. Water deficiency is a worldwide conundrum.

AQUA-AID business manager Scott Thompson received a glimpse of the plight when he volunteered to visit Honduras, a Central America nation with limited access to clean water. "Ever since then I have been thinking about what AQUA-AID can do as a company to conserve water and to get that water to the people that need it the most," he says.

The need can be startling. Living Water International – the group that organized the trip to Honduras – estimates 2.4 billion people lack access to modern water sanitation. Securing safe water in the Honduran village Thompson visited involves capturing supplies in a river during the nation's rainy season. The water then must travel six miles in a small pipe to reach villagers. During dry times, residents use water resting in deep, dirty ditches. Water consumed from the ditches can have a fatal effect. More than 840,000 people die each year from diarrhea caused by unsafe water, according to Living Water.

"It was very eye-opening to think that people had to drink that type of water or bathe in that type of water," Thompson says. "I can step outside of my office and go to a water fountain and drink clean water every five minutes if I want to. These people get clean water two or three months out of the year."

Thompson and fellow volunteers from his North Carolina church used their time in Honduras to a dig a well and educate residents about the value of basic hygienic tasks such as washing hands and maintaining a clean well. The experience convinced Thompson to explore a relationship between AQUA-AID, which manufacturers soil surfactants, biosurfactants and wetting agents, and Living Water.

AQUA-AID is donating 20 cents for each hand-watering pellet it sells in 2016 to Living Water. Thompson, though, says a broader goal exists. The company envisions a team of employees, distributors and end users participating in a volunteer trip to drill a well in a remote area. Living Water performs its work in Central and South America and Africa.

"Being a surfactant company we preach all the time utilizing water more efficiently," Thompson says. "We are putting water on to try to get grass to grow. But there are people that don't have access to water to drink that are trying to keep themselves alive. Let's conserve water here and let's provide water for people that don't have access to water. What we are conserving hopefully will provide for somebody else."

SUPERINTENDENT RADIO NETWORK

Super work for veterans

Mike Blackwood hasn't let hectic days leading the maintenance operations at a 36-hole public facility impede his ability to use golf for a greater good. Blackwood, the superintendent at Black Hawk Golf Course in Beaver Falls, Pa., organized a second annual outing benefitting Vietnam War veterans May 21.

The date of the outing coincided with Armed Forces Day and attracted more than 300 players to Black Hawk. Blackwood joined Superintendent Radio Network to discuss the outing's evolution and how superintendents can be catalysts for similar events at their respective facilities. Enter bit.ly/221dryw into your web browser to listen to the podcast.

Key USGA Green Section figure retiring

Jim Moore's 32-year run with the USGA ended June 1 when he retired from his position as director of the Green Section's Education Program. His primary responsibility in the leadership position included providing golf course management information to various segments of the industry. Adam Moeller, an agronomist for the Green Section's Northeast Region since 2008, will replace Moore.

To read more about Moore's career and his thoughts on retirement, enter bit.ly/1sH7QSc into your web browser. Moore's wife, Kay, the office coordinator for the Green Section Education Program, retired on the same day as her husband.

From
THE FEED

Slick greens sent scores soaring during the third round of The PLAYERS Championship at TPC Sawgrass. The double-cut, double-rolled greens left indelible impressions on many, including our turf-centric followers..

Albert Wong
@wongturf
Perfect course set up and identifies the best player in the field on one of the hardest golf courses.

Patrick Reinhardt
@gasoutherngcm
Fair. Kuchar said it best. Greens were holding irons fine, just very fast. If balls weren't holding, might be different

Blake Barden
@BBarden615
Considered 5th major for a reason. Looking back at past few years. Course always toughens as the wkend begins. Great challenge

Sean Anderson
@CSGC_GCS
I believe Mr. Duke(-7) and Mr. Matsuyama(-5) appreciated today's conditions. Great golf is rewarded.

Jamey Davis, CGCS
@jamey_davis0
I think fine. Greens received shots fine. Some putts were a little wobbly but, everyone played the same course.

Sean McNerney
@mcnerney_sean
Hats off to the staff, LATE night bc delay and still able to increase/improve difficulty for today

Dan McCoy
@Precision_McCoy
For the prize money they play for, it works for me

SHOULD YOU GIVE BACK?

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

There's a lot being written and said these days about volunteering, giving back to one's community, charities and professional organizations. Both giver and receiver can benefit from this mutually agreeable arrangement and I strongly believe that we should all give of ourselves and work for the greater good.

But I've noticed a double standard at golf clubs when it comes to letting employees get involved with associations. It's OK, even encouraged, for the general manager or golf pro to volunteer in their industries. But the superintendent? Most clubs want him at the course at all times, seemingly chained to the turf.

In recent months, I've sat with a number of club boards thinking about their future plans. More than once, it's come up that the current employee has spent too much time with his local chapter of the GCSAA or another trade association. But if the pro wants to get involved at the local, sectional, regional or even national level of the PGA of America – or play in tournaments – the board and members are all for it.

Clubs want their supers on property and visible (but not too visible), their hands and boots dirty. If you're thinking of volunteering at any level, that's great. But be careful. I love that you want to get involved, but I also love you getting paid and putting food on your table, and those should be your priorities. We're in a "buyer's market," with many good candidates waiting to take your job if you slip up. Not being available when the greens chairman or his buddy has a question can quickly become a big problem.

Volunteering is not always a good fit, or a smart idea, for the mainstream superintendent. Nor is it smart for every club to let its superintendent run for office or serve on a committee. But the club might not be willing to say that out loud, so it's up to you to carefully assess your situation.

Therefore, before you give your time, give the following close attention:

• Start the process early, and before doing anything with the organization, shore up things at home. Be visible and stay in front of the members. At the same time, work on your speaking (and listening) skills: Learn to present a point, stand up for what you want and debate your side of a position.

• If you are going to participate, make it good for the club – not just for you. This may be hard to do, but it's probably the most important point to remember. Your club, members or customers, and board must be your first concern.

• Get involved for the right reasons: to educate yourself, interact with fellow supers and to put your club in the spotlight. Your service should eventually move your club into circles where it hasn't been by giving it recognition and prestige.

• Before spending time away from the club, make sure you have a good relationship with the general manager and golf pro. They may be jealous of your time away and if you aren't on good terms, they could hurt you with the board, members and your crew.

• Start slowly. Serve for a year then assess the impact on yourself, your family, your staff and the golf course.

• Remain very visible to your crew and members. And with your crew, don't be so absent that they forget who's boss.

• Who's covering your butt when you're gone? You need a strong, quality No. 2 (this is true whether you volunteer or not) who has your total support and can run things when you're away. And give him/her the proper credit.

• If you are volunteering to advance your career or gain status in the industry, think again. These are the wrong reasons, and will almost certainly produce the wrong results.

• Remember, you're not only representing yourself, you're the face of your club, too. If you come to a meeting wearing flip-flops, or use the meetings simply as an excuse to play golf and drink beer with your buddies, you're wasting your time. Superintendents don't get enough respect as it is, and you're not doing yourself or the rest of us any favors.

• If volunteering and working for an organization involves lots of time and exposure on the Internet and through social media, be careful. While it's important to be socially and technically savvy, there is such a thing as being too visible. Many clubs won't welcome the exposure.

Again, giving back is admirable. But know the perils and pitfalls – to yourself, your job, your family, your club and course – before you get involved. The job you have is tough enough; spread yourself too thin and you might not have that job much longer. **GCI**


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By **Guy Cipriano**
Illustration **Matthew Laznicka**

PACE OF CHANGE

THE DEBUT **GCI TECH CONFERENCE** PRESENTED A CANDID LOOK AT THE NEXT DECADE — AND OFFERED CONCRETE WAYS TO ENSURE LONGEVITY IN THE INDUSTRY.

Think being a golf course superintendent in 2016 is tough? Wait until you hear what 2026 could bring.

Golf Course Industry conducted its debut technology conference April 12, and anybody looking for hints the future will be easier than the present left Carolina Golf Club in Charlotte, N.C., disappointed. The next decade could be unlike any period experienced in the golf industry as more uncontrollable factors creep into the business.

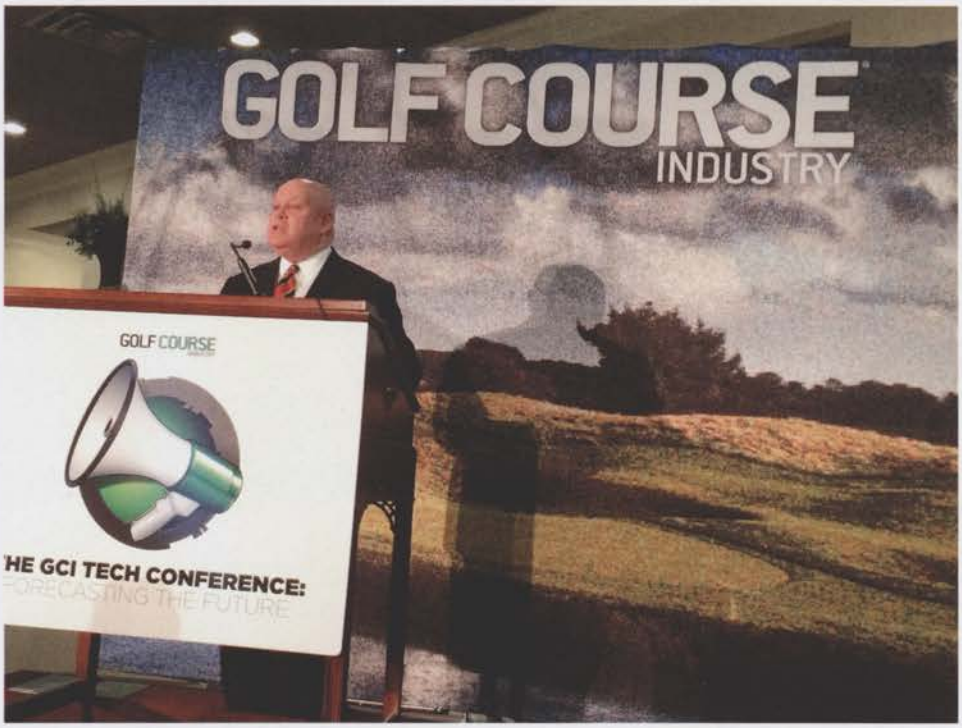
The six GCI tech presenters – Global Golf Advisors principal Henry DeLozier, Aspire Golf principal Tim Moraghan, Toro veteran Dana Lonn, Syngenta technical representative Dr. Lane Tredway, retired Atlanta Athletic Club superintendent Ken Mangum and The Club at Mediterra director of agronomy Tim Hiers – used more than combined 240 combined years in the business to provide frank assessments of what awaits. Everything from customer demands and demographics to the water dispersed on turf will suggest being a superintendent, or anybody else invested in the industry, in 2026 isn't for the meek. "It's a tough business for all of us," Moraghan says.

And it's a changing business. What works for your facility in 2016 might

be obsolete, or perhaps even regulated, by 2026. So, on top of maintaining turf, managing people, crafting budgets and communicating with customers, superintendents wishing to remain in the industry must also be multitasking prognosticators willing to adapt on short notice.

"America is changing and you're living in the midst of it, and if you don't change, you are going to get left behind," DeLozier says. "We in the golf business have done a poor job of changing, except when it comes to hitting a golf ball further and coming out with a solution to help us make a putt every now and then. We have to change at a more rapid pace because change is engulfing us."

Below are five themes emerging from the conference and how superintendents can position themselves to handle what awaits.



Global Golf Advisors principal Henry DeLozier opened the GCI Tech Conference by addressing seven factors that will shape golf's future. Visit www.golfcourseindustry.com to watch presentations from DeLozier and other GCI Tech presenters.

WOMEN POWER

The global communications firm Fleishman-Hillard Inc. released a study in 2012 estimating women will control two-thirds of the consumer wealth in the U.S. by 2022. Similar studies suggest golf operators and investors must begin catering to mothers and grandmothers instead of fathers and grandfathers.

Women present a gigantic opportunity. Females account for only 23.9 percent of the nearly 24.1 million golfers in the U.S., according to the National Golf Foundation. "No one quality will cause golf to grow more dramatically than our capability of including more women," DeLozier says.

Enduring qualities such as safety, comfort and camaraderie make golf an appealing option for females. DeLozier, though, warns females set higher expectations for family and social experiences – and it has little to do with course conditions. They want a tidy place where they feel welcomed.

Introducing more women to golf's benefits seems like a heady task. But little things such as ensuring comfort stations are stocked with paper products, pleasant exchanges when encountering female customers, establishing wildlife friendly natural areas and providing regular course conditions that aren't overly difficult can boost a facility's standing with females. "If I can make the women on my golf course happy, that's where I'm going first," Hiers says.

DONT WAIT FOR MORE WATER

The water situation doesn't appear as dire as it did in 2015, especially considering California will place water conservation goals in the hands of local agencies. But irrigating your course like it's 2016 could lead to major problems in 2026.

Water is becoming a more scrutinized resource, and competition for usable supplies will be fierce as the world population swells past 8 billion in the next decade. "Water, no doubt in my mind, is the top issue," Lonn says. "It's something we have to deal with it. It's the resource of the century. We can't drill a hole and find more water. It's not there."

Judicious usage and measuring every gallon dispersed are tactical ways to prepare for the water rush. Lonn compares irrigating a golf course to refueling a gas tank, and superintendents must determine the lowest amount of water turfgrass can receive to remain healthy. Soil moisture sensors, Lonn says, are critical in determining this amount. "I would rather have one soil moisture sensor than a weather station, because I can do a way better job of irrigating with one soil moisture sensor," he says. "Weather information doesn't help you decide how full that tank is."

Perception will also separate winners and losers in water tussles. Instead of becoming enraged when an outsider questions your water usage, view the interrogation as an opportunity to provide science- and economic-based reasons to explain irrigation practices. Hiers views himself as a "watershed manager" responsible for knowing the ending point of everything placed on property he maintains. The approach has allowed him to successfully represent golf in potentially hostile

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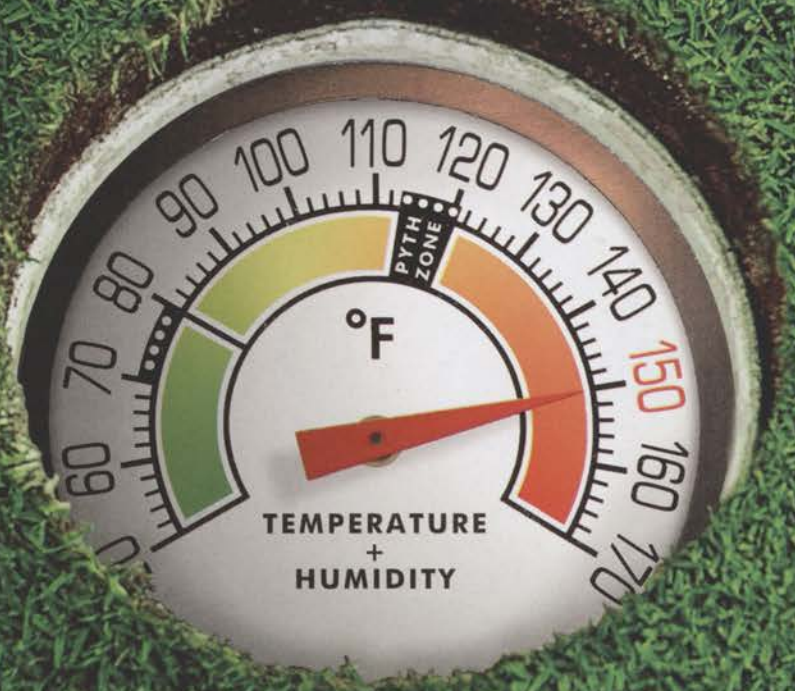

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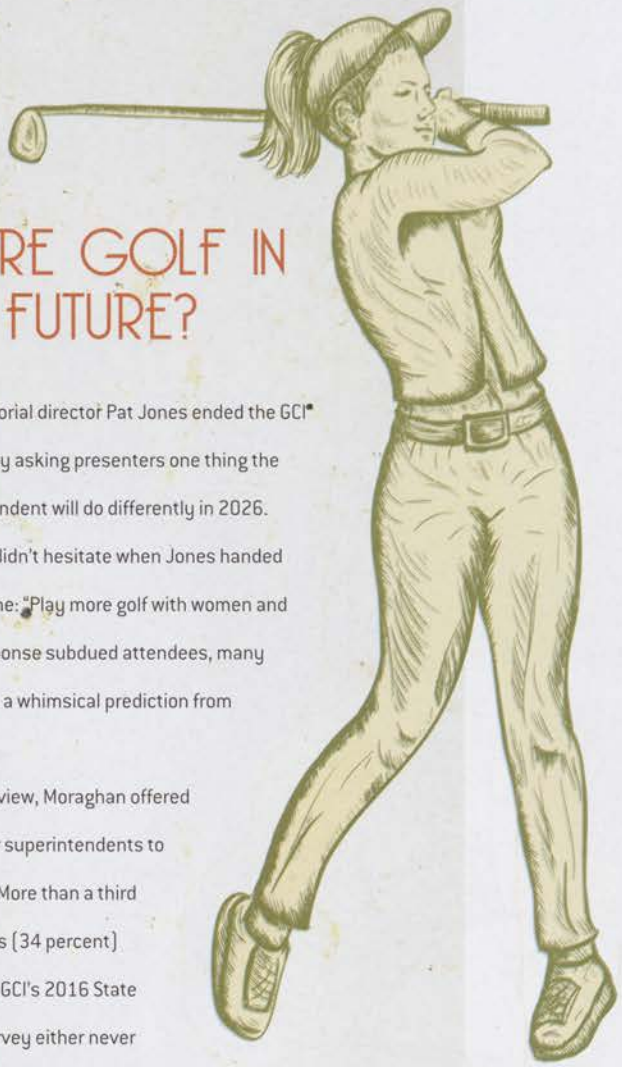


IS MORE GOLF IN YOUR FUTURE?

Publisher and editorial director Pat Jones ended the GCI Tech Conference by asking presenters one thing the average superintendent will do differently in 2026.

Tim Moraghan didn't hesitate when Jones handed him the microphone: "Play more golf with women and children." The response subdued attendees, many of whom expected a whimsical prediction from Moraghan.

Upon further review, Moraghan offered an elegant way for superintendents to ensure longevity. More than a third of superintendents (34 percent) who responded to GCI's 2016 State of the Industry survey either never play golf or play less than once per month. Superintendents who fall into that category are missing opportunities to boost their standing with customers.

Ken Mangum considers the ability to sell a big part of his longevity at Atlanta Athletic Club, and he says playing golf is an important part of the selling process. Mangum, like Moraghan, advocates superintendents playing more golf.

"What does playing golf do for you?" Mangum says. "It gives you knowledge for the game. It opens the door to the golfers' world. That's really the key — you are one of them. It gives you confidence with your members and board members. The big thing is that it earns you a lot of respect and credibility."

water-related discussions.

"If you don't know a subject, how are you going to vote on it?" Hiers says. "You are going to vote no. This isn't a story we tell one time. It's a story we live and show and show and show. Like new green committee members, there are new people in the public coming in. And if we don't work with them, we are not going to get our fair shake."

KEEP ROBOTICS ON YOUR MIND

It's near the top of FIQs (Frequent Industry Questions): When will robots be mowing greens, fairways and tees?

Nobody is setting a firm date for widespread robotic mower usage. Soaring labor costs – California and New York solidified legislation to increase the minimum wage to $15 – and increased autonomous research by megacompanies could expedite the move to robotics in many industries, including golf, DeLozier says. "I believe you will find yourself much sooner than you may think relying on a non-human workforce," he adds.

Lonn calls automation a "hot topic" for Toro. Current finances don't look appealing for facilities exploring robotic mowers. RTK, GPS and other technology needed to produce a robotic mower double the price of the unit, according to Lonn.

"Can you make the economics work if you double the price?" he says. "What's the process of you making the decision and selling to your greens committee that it's going to cost twice as much? What do you have to prove to feel comfortable with that?"

Still, what's unaffordable now could be within your budget in a decade. Personal computers, after all, were once an item enjoyed exclusively by the ultra-wealthy. When encountering an emerging technology with the potential to improve a golf course, superintendents can benefit from learning more about it, no matter how distant widespread implementation seems. Plus, understanding technology yields club cred.

"Think about technology," Moraghan says. "Organize your thoughts around technology, and you will come up with something that will lead your business and your career."

SPEAK THEIR LANGUAGE

Forget anonymously riding a cart or mower around the

Syngenta's Dr. Lane Tredway, Toro's Dana Lonn, retired Atlanta Athletic Club superintendent Ken Mangum, The Club at Mediterra's Tim Hiers and ASPIRE Golf's Tim Moraghan joined Henry DeLozier (not pictured) as presenters at the debut GCI Tech Conference.

course, sending calls straight to voicemail and ignoring emails. A timeless quality – the ability to connect with others – will continue shaping the careers of thousands of superintendents.

Communication has become more splintered since 2006, and it's poised to splinter even further by 2026. Know the forms your owners, board chairs, members and customers prefer. Speak their language – Moraghan says finances are a good starting point – instead of making them learn your jargon.

Mangum enjoyed a 27-year run at the Atlanta Athletic Club by relating to three groups – those above, equal and below him. Failing to reach one group will likely cause problems with the other two. Mangum enjoyed strong relationships with AAC's other department heads, and turnover in leadership positions remained low because of a common goal. Realizing the club's needs trump all departmental needs is a route to maintaining your current job in 2026.

"We learned to cover each other's back and always do what's best for the club," Mangum says. "It's easy to protect your turf, but in the end you have to do what's best for the club."

PROMOTE SYNERGY OR WITNESS THE UNEXPLAINABLE

More regulation, unpredictable approval processes, volatile global agriculture markets. And that's not even the biggest challenge facing companies trying to help superintendents maintain healthy turf.

Even the industry's top scientific minds don't have the "complete" understanding of turfgrass pathogens and pests needed to make precise applications, Tredway says. "The research isn't being done at a rate that equals the rate at which the turf industry evolves," he adds. "We are always figuring out our diseases after the fact."

Proper diagnosis is required for precise applications, but Tredway succinctly says "the turfgrass industry doesn't value diagnosis." The devaluation of diagnosis has created a shortage of talented pathologists. Superintendents can help the industry move toward making precise applications by supporting the remaining reliable pathologists.

Collaboration represents a major post-GCI Tech theme. Superintendents seeking solutions to complex issues such as participation rates, labor, water and turfgrass diseases must be open with suppliers, distributors, researchers and colleagues.

Now consider your own place in the industry. Unless you possess herculean qualities, you needed the help of others to enter the business. A daunting decade awaits, yet think of where being archaic, guarded and complacent might land you in 2026. **GCI**

NOT INVENTED HERE

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.

Do you know the acronym NIH? It stands for "not invented here." Those who manage their teams and organizations with disdain for anything not invented here – or worse, not invented by them personally – risk stifling innovation and growth.

Many who ascribe to the NIH philosophy defend their stubbornness with the attitude that no one knows their business, their members and their customers as well as they do. Maybe not, but let's open our minds for a few minutes and see what we can learn from some people who have never run a golf course or been responsible for 150 acres of turf.

FRIEDMAN: CQ + PQ > IQ. Superior intelligence often will tip the scales in your favor. But Tom Friedman, the bestselling author of "The World is Flat," argues that IQ is less important than the combination of Curiosity Quotient (CQ) and Passion Quotient (PQ). Friedman encourages us to "always be in beta-test mode." Being flexible to try new things and being curious keeps your mind fresh and active. It helps you be more observant. It opens new worlds and possibilities. It keeps you young and your ideas fresh. And, it makes your life more interesting.

Do you bring real passion to your job on a daily basis, and are you transferring that passion to others on your team? If you're not, you owe it to yourself, your staff and your facility to find something that will ignite the fire in your belly. Life is too short to try to try to fake sincerity or passion.

GLADWELL: PUT IN THE TIME. Author Malcolm Gladwell introduced the "Rule of 10,000 Hours," which posits that mastery of one's chosen field requires a commitment of at least 10,000 hours of diligent and repetitive practice. One achieves mastery when one merges tireless practice and repetition with the lessons learned from failure and near-misses. Want to be masterful in your job? Put in the time. Do the work. And don't be afraid to fail.

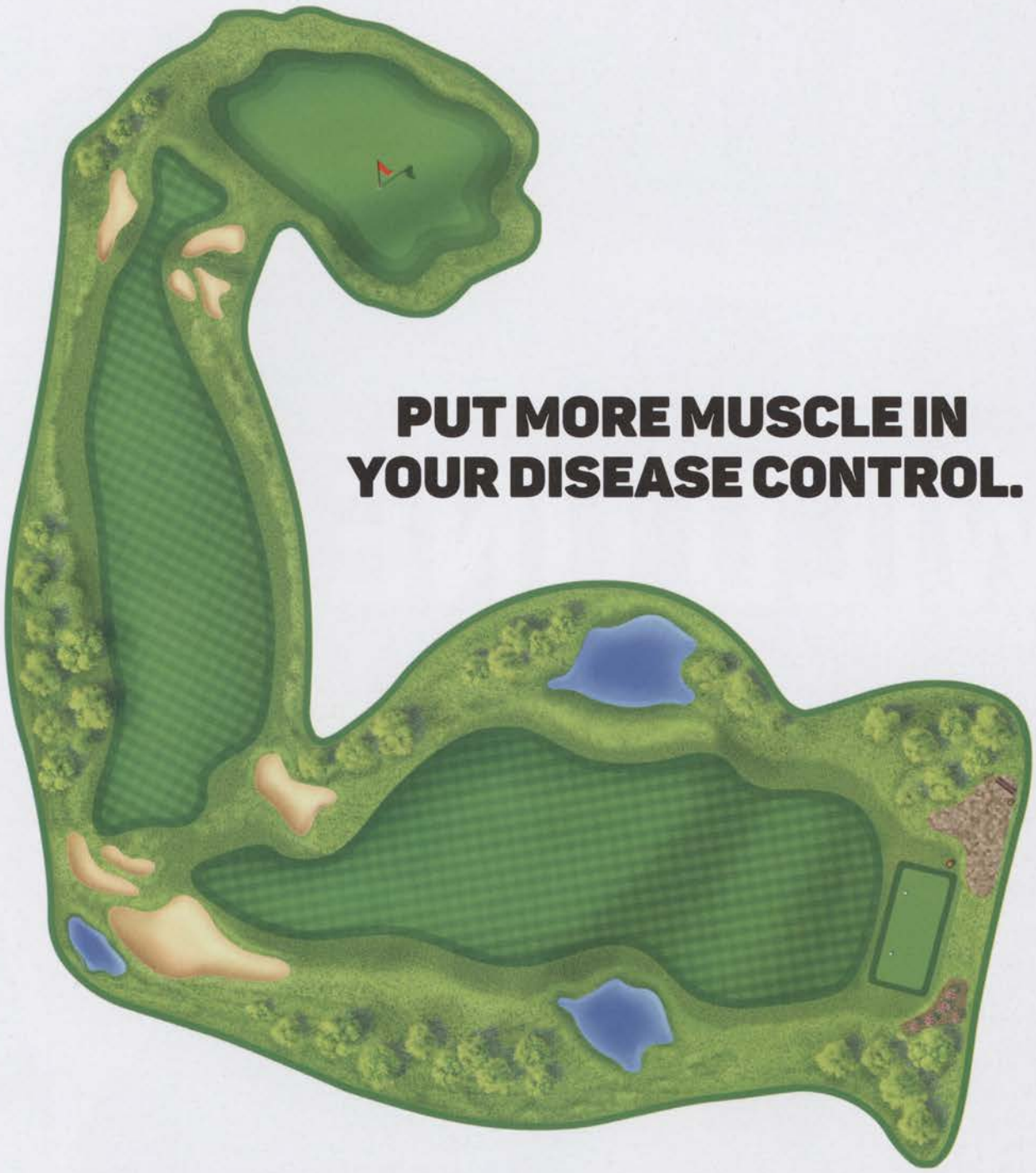
OLD MASTERS: BE ACCOUNTABLE.
Highly skilled European artists painting before 1800 are known as the "Old Masters." Michelangelo, Rubens, Gainsborough and others of that period were happy to sign their work product and acknowledge responsibility for what they produced. In a highly unaccountable world, those who take responsibility for what they produce – and fail to produce – are distinctive. Demonstrate your passion for your facility and profession in the finished quality of your work. Embrace the privilege of being accountable in a manner similar to the old masters and your club will be better for it.

AL AND LAURA REIS: OWN IT.
In their book "The 22 Immutable Laws of Branding," marketing gurus Al and Laura Reis define a brand as the small piece of real estate that companies own in the minds of their customers and consumers. In your world, maybe it's the quality of your greens, the professionalism of your staff or the thickness of your steaks. Whatever it is, if you truly own it, if no other competitor can honestly claim the same degree of excellence, this is your competitive advantage. It must be guarded, nurtured and protected at all costs.

KEN BLANCHARD AND SHELDON BOWLES: DELIVER THE UNEXPECTED. In their thought-provoking 1993 parable called "Raving Fans: A Revolutionary Approach to Customer Service," authors Ken Blanchard and Sheldon Bowles told of an age-old and trusty bit of advice: Give people more than they bargained for and they will sing your praises. They called it the "plus one percent" factor. You can call it a baker's-dozen or lagniappe, as they say in Louisiana. By whatever name, receiving unexpected value is a sure way to create raving fans.

Unexpected value is also guaranteed way for staff to win the appreciation and gratitude of those they serve. When they do, just watch as their PQ (passion quotient) soars. Employees desire a higher purpose than simply executing job functions. They want to know that they provided happiness and purpose through their efforts. Doing more gives more to all involved.

The challenges inherent in managing a successful golf operation in today's economy, where consumers wield ever-increasing expectations, are too complex for any one person to have all of the right answers. NIH is an acronym and a philosophy that has no place in today's world. Embrace the wisdom and experience of others, and you'll find your SQ (success quotient) reaching new heights. **GCI**



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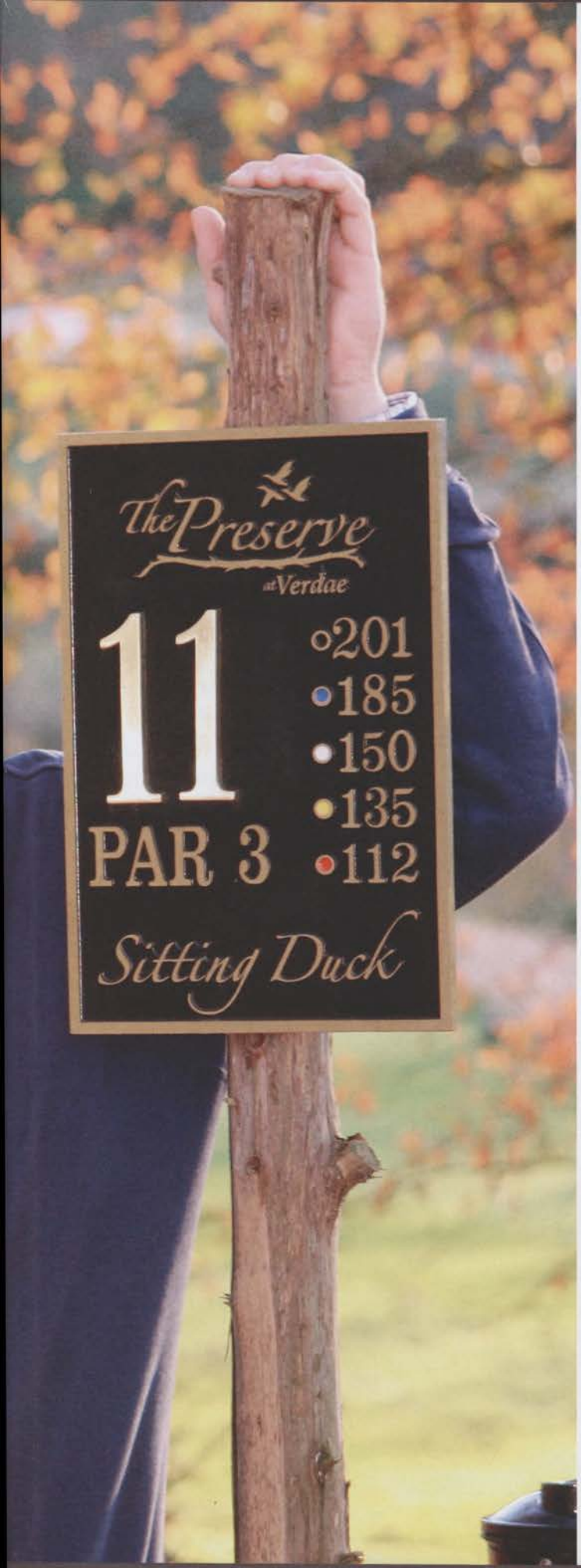
THE WILD ONE

SUPERINTENDENT ADAM CHARLES CHALLENGED GOLFERS RAISED ON DECADES OF WALL-TO-WALL CARPETING TO NOT ONLY ACCEPT, BUT PREFER A PURELY NATURALIZED LOOK AWAY FROM THE MIDDLE AT THE PRESERVE AT VERDAE.



By **Trent Bouts**

As one of the sharpest minds hovering over a microscope in golf's best interests these days, Frank Rossi gets around a bit, sees some things. When he's not on campus at Cornell University, he could be pretty much anywhere ... in the world. He's taught from Sweden to Slovenia and treks back and forth across this country with regularity. It takes a bit to raise his eyebrows.

Consider his following email then, the result of an impromptu glimpse at the work of Adam Charles, superintendent at The Preserve at Verdae in Greenville, S.C. Rossi was in town speaking at a small event on behalf of Corbin Turf and Ornamental Supply at the adjacent Embassy Suites. Filling time waiting for the airport shuttle, Charles gave Rossi a quick spin around the golf course.

A few weeks later, Rossi wrote to Charles: "I have still not completely digested my experience with you. Hard to believe you don't feel that what most would call a golf course in a 'weed patch' is anything revolutionary...if it wasn't revolutionary, why the hell do we use so much labor and chemical inputs in these areas on courses..."

That's a question being asked at more and more facilities struggling to get by. Why take resources from tees, fairways and greens to maintain a polish on areas that simply aren't in play? But if some are dipping a toe in that water, promoting a native area here or establishing a no-mow area there, Charles did a full-on belly flop. Hence, the splash that Rossi felt.

By contrast, Charles views himself as anything but a revolutionary. "I'm thinking most of this isn't all that new or terribly exciting," he says. But Rossi sees a far greater breadth of how golf courses are maintained nationally. So if he considers Charles as some kind of superintendent radical, he's probably a better judge than the man himself.

See what you think.

Starting in 2011, Charles "naturalized" roughly 35 percent of the golf course, essentially handing those areas back to the whims of Mother Nature. Now just 65 of the 176 acres on the entire property could be considered maintained turf. He didn't just let the rest go and grow. He actively promoted wildlife corridors, creating linkages or at least minimizing gaps. He encouraged plants that offered cover as well as food sources and virtually eliminated pesticide use.

"We have done it differently in allowing areas to naturalize over time, rather than planting masses of ornamental grasses or seeding fescues. We are not your typical golf experience in the region," he concedes. "It's not for all golfers. Some do perceive it as a bunch of weeds. But others encounter wild turkey, ducks, snakes, hawks, deer, raccoons, skunks and even the occasional coyote. Amongst wildflowers and native flowering plants that all gives you a different emotional connection. There's a wonderment, a peace, that's provided by that. And I would guess that makes it more fun."

So do better playing conditions. In that regard, Charles says going natural saves him as much as $40,000 each year. "The best part is that ownership didn't take that money away from me,"

he says. As a result, he aerates, verticuts, topdresses and mows a lot more than he used to, activities that directly affect the actual playing of the game. "So we've changed the quality of the playing surfaces dramatically," he says, compared to when he arrived in 2007 and "everything was trimmed properly, creek lines, shore lines, no natural areas, everything was mown and serviced weekly."

While the economics might make obvious sense, there is no doubt that reduced maintenance – even away from tees, fairways and greens – remains a cultural hurdle. It's a challenge getting golfers raised on decades of wall-to-wall carpeting to accept, let alone prefer, a wild look away from the middle. Highly visible ventures like the retrofitting of Pinehurst No. 2 help but they remain exceptions rather than the rule.

"It was tough," Charles recalls, when he first stopped mowing around tee boxes on what is now the third hole. Steeply sloped, there was about an acre that was not only out of play but also dangerous to maintain with rough units or too time-consuming with anything else. "So that was an easy spot to pick, because of the safety aspect," he says. "When people started asking, 'Why aren't you mowing this area?' I could say, 'Because we can save money by not mowing, reducing inputs and at the same time keep our employees safer.'"

After a few months, some of the native plants like lovegrass began to re-establish and offer an aesthetic interest. "It became to look like it was intentional rather than 'why are there weeds there' and 'why aren't you mowing them.'"

But as he mimicked that test plot in other areas of the course some of the previously curious became closer to cantankerous. "We had members who had been around since the course was built in the '90s and they just didn't feel like it was their golf course anymore," Charles says. "I had emails, complaints from the pro shop, face-to-face encounters –'Hey Adam, when are you going to cut those damned briars down so I can see the green?' We lost some members but gained three or four times that many since."

Around 32,000 rounds annually may not be any improvement from the pre-recession days, but Charles is confident the pro-natural approach has played a significant part in getting play back after the economic crisis.

Improved course conditioning also helped spawn new interest but Charles was not content to let the golf course speak for itself. He did some explaining, with signage at the clubhouse and around the course and with regular appearances in the pro shop, snack bar and on the driving range. That helped some golfers turn from "shaking their head to, 'OK, now I get it.'"

Perhaps even more importantly, Charles worked hard to convince his employers at the time. The course is now owned by Atrium, LLC. With the help of his irrigation technician, Ben Long, a graphic design graduate from nearby Clemson University, Charles created the very identity by which the course is now known, including its mission statement, name and logo. "We designed it sitting right here at my desk,"he says.

Previously, The Preserve at Verdae had little to distinguish itself from any other inner-city layout, which was one reason the owners wanted a name change. "But they didn't have any plan – no great name, no great mission and purpose," Charles says. "They were looking at names like Greenville National, nothing terribly at-

> "It's not for all golfers. Some do perceive it as a bunch of weeds. But others encounter wild turkey, ducks, snakes, hawks, deer, raccoons, skunks and even the occasional coyote. Amongst wildflowers and native flowering plants that all gives you a different emotional connection. There's a wonderment, a peace, that's provided by that. And I would guess that makes it more fun."
>
> *—Adam Charles, The Preserve at Verdae*

Communing with nature is one of the benefits related to the naturalized philosophy at The Preserve at Verdae.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The Preserve at Verdae's Adam Charles reuses fallen or harvested trees for tee markers, rope stakes and signage.

© TRENT BOUTS

tractive or distinctive."

Charles didn't want to just change the course's name without any explicit purpose. So he and Long created as 10-page PowerPoint presentation to sell a vision for an overhaul that made sense economically and environmentally and would be marketable, as well.

Today, with the owners' backing, The Preserve at Verdae is striving for harmony between golf and nature. "They have been 100 percent supportive and that has allowed us to be so much more effective," Charles says.

Apparently the wild turkeys are similarly grateful. "They're not so wild anymore," Charles laughs. "I'm not saying you can walk over and pat one but they'll let you get within 15 yards or so. I think that's really neat and so do our golfers. They appreciate that. We're not making money hand over fist. But we are getting by in a market that is still saturated with supply."

Charles' efforts to enhance the facility's relationship between golf and nature have been recognized nationally. The course is a member of Audubon International and he is a past winner of an Environmental Leaders in Golf Award from the Golf Course Superintendents Association of America and Golf Digest.

He also recycles at every opportunity. Beyond the usual paper and plastic, he reuses fallen or harvested trees for tee markers, rope stakes and on-course signage The course is dotted with bird houses and wildflower plots to sustain bees and butterflies. Irrigation controls, pump station upgrades and the use of wireless soil sensors are aimed at conserving water.

"Providing habitat was a major reason we made the changes we did," he says. "With I-85 along one side and so much development going on over the

other side of the property, we began seeing more and more wildlife pushed towards us. We decided we were going to give those animals a place to go."

The resultant habitat is very much the "distinctive contrast to highly maintained playing surfaces" that Charles foreshadowed in that PowerPoint five years ago. Indeed, it "adds interest and beauty to the round of golf" and "enables the golf course to showcase the nature of the game." Charles concedes there is a little quid pro quo involved with the natural areas. "If you hit it in there, you might find a golf ball, but it probably won't be yours," he says.

Charles may have his ideals, but his brand of environmentalism is not driven by ideology. He simply loves the land and the game. He grew up in rural Rogersville, Tenn., where McDonald Hills Golf Club served as his day care as a four- and five-year-old. "Way back then it was just nine holes carved out of a pasture, nothing extremely exciting," he says. "It was golf, it was a swimming pool and it was family. That's where my love for the game started."

After graduating from Clemson, he worked for Will Holroyd at Musgrove Mill Golf Club, an Arnold Palmer design on the banks of the Enoree River, essentially in the middle of nowhere about an hour from Greenville. Adjacent to forests, adorned by waste areas and native areas with only the occasional farm house in the area, Musgrove Mill confirmed for Charles that the interests of golf and wildlife were not mutually exclusive. He thought then, particularly in urban environments, how the game could be an ally for nature.

"We have not applied insecticides in three years," he says. "Our fungicide use is largely curative except for fairy ring and spring dead spot. I'm not going to lose my job over it. If we need to spray something, I have it on the shelf. But I am concentrating on feeding the soil rather than treating the plant."

He knows his program is not for everyone in every situation. But he is excited by the thought that more superintendents are at least asking the question: "If I'm a superintendent anywhere else and someone walks up and says, 'Hey, you can stop maintaining 35 percent of your turf over the next couple of years, you don't have to put any fertilizer on it, you don't have to put any chemicals on it, you allow it to naturalize, you plant food plots, and you see deer and turkey and create wildlife habitat, for me personally, I think that'd be just as cool as heck... to have that opportunity."

Trent Bouts is a golf writer and editor based in Greer, S.C., and is a frequent GCI contributor.

PRODUCTIVITY: THERE'S AN APP FOR THAT

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

In my last article I bragged about how efficient I had become and how my productivity had increased using fewer hours in the week. I'm sure much of that fell on deaf ears. So in part two of the series on being more productive, I figured I would give some concrete tools I use to stay organized. I do caution you, however, this is a workflow that works for me. You will definitely need to fine tune yours to make it as efficient as possible.

GOOGLE CALENDAR. I used to use Outlook for all of my scheduling and it was a good system, but the lack of integration with other services had me yearning for a better system. I have committed to exclusively using Google Calendar for all of my scheduling. I previously mentioned how I color coded all of my appointments based on the specific area or task (teaching, research, email, travel, etc.). As an academic, this has been useful for year-end reviews where we are expected to document our time spent in various areas of our job.

Another area of the calendar I like is the full integration with scheduling within other Google apps. When I create a Live YouTube broadcast of the "Tom and John Show," the event is automatically added to my calendar. When I accept a meeting from someone else, it is automatically added to my calendar.

Google Calendar also integrates with third-party apps like Calendly (www.calendly.com). Where in the past I would use a Doodle Poll to schedule meetings, I now use this free web-based app. Calendly allows me to designate times I'm available throughout the day. The beauty is that Calendly integrates with my Google Calendar and eliminates any timeslots with conflicts.

GMAIL. As part of the shift for better organization and integration, I migrated all of my email to Gmail. This wasn't an easy process from a technical side, but I managed to figure it out. Now my psu.edu account is forwarded to Gmail where I can take advantage of the organizational scheme and integration of Google's apps but I am still able to reply as if I was sending the message from my Penn State email. This was particularly important for me because I wear many hats. I have my consulting email, photography email and several others that I want to send from specific accounts. Now all of these are set up through Gmail. For organization, I create filters that automatically label each email so when I'm done with them I can archive them into specific folders that are neatly organized.

SOCIAL MEDIA. This is an area I continue to struggle with, but one that I am getting better at managing. One tool I found to be useful is Hootsuite. Although the basic free version of Hootsuite didn't meet my needs, I found that the Pro Version ($9.99/month) was just what I needed. With this desktop and mobile app, I am able to manage all of my social media accounts from Twitter to Instagram to Facebook to YouTube.

A primary function of the app is to schedule outgoing posts in an efficient manner. I can now dedicate 30-60 minute blocks of time to write a series of posts or tweets and have them automatically scheduled to be released at specific or even random times. This means I don't have to open each app individually throughout the day to stay active.

Below are brief description of other apps I use to stay organized.

TRIPIT. Tripit organizes all of my travel plans into one trip. It builds an itinerary around my trips and maintains confirmation numbers for my airlines, hotels and rental cars. The app even scans my Gmail and builds the itinerary automatically.

NATIONAL/MARRIOTT/AMERICAN/STARBUCKS. I'm loyal to these brands when possible and I use their mobile apps a lot. I can easily book or change a reservation, check-in online prior to leaving and skip the long line by ordering coffee on my way to the nearest Starbucks. I bet these combined save me at least an hour each week and likely even more when I'm traveling.

FINANCIAL APPS. While security is going to have to constantly be met for online banking and mobile apps, I am still a fan of them. I use mobile check deposit to cash checks from the comfort of my own couch. I use Google Wallet and Apple Pay to pay for items without pulling out my credit cards.

STORAGE AND FILE ACCESS. I use apps like Google Drive, Dropbox and Box to store and access all of my files in the cloud. I can easily make changes to files while on the road knowing that when I get back to the office the changes will be updated. **GCI**

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PUSHING THE PANIC BUTTON

Forecasters envision a long, hot summer, which turf pathologists warn are prime conditions for **Pythium outbreaks**. Vigilance, monitoring weather, keeping a close eye on the playing surface, and adjusting cultural and chemical management practices quickly if needed help you stay ahead and prevent the diseases.

by **John Torsiello**

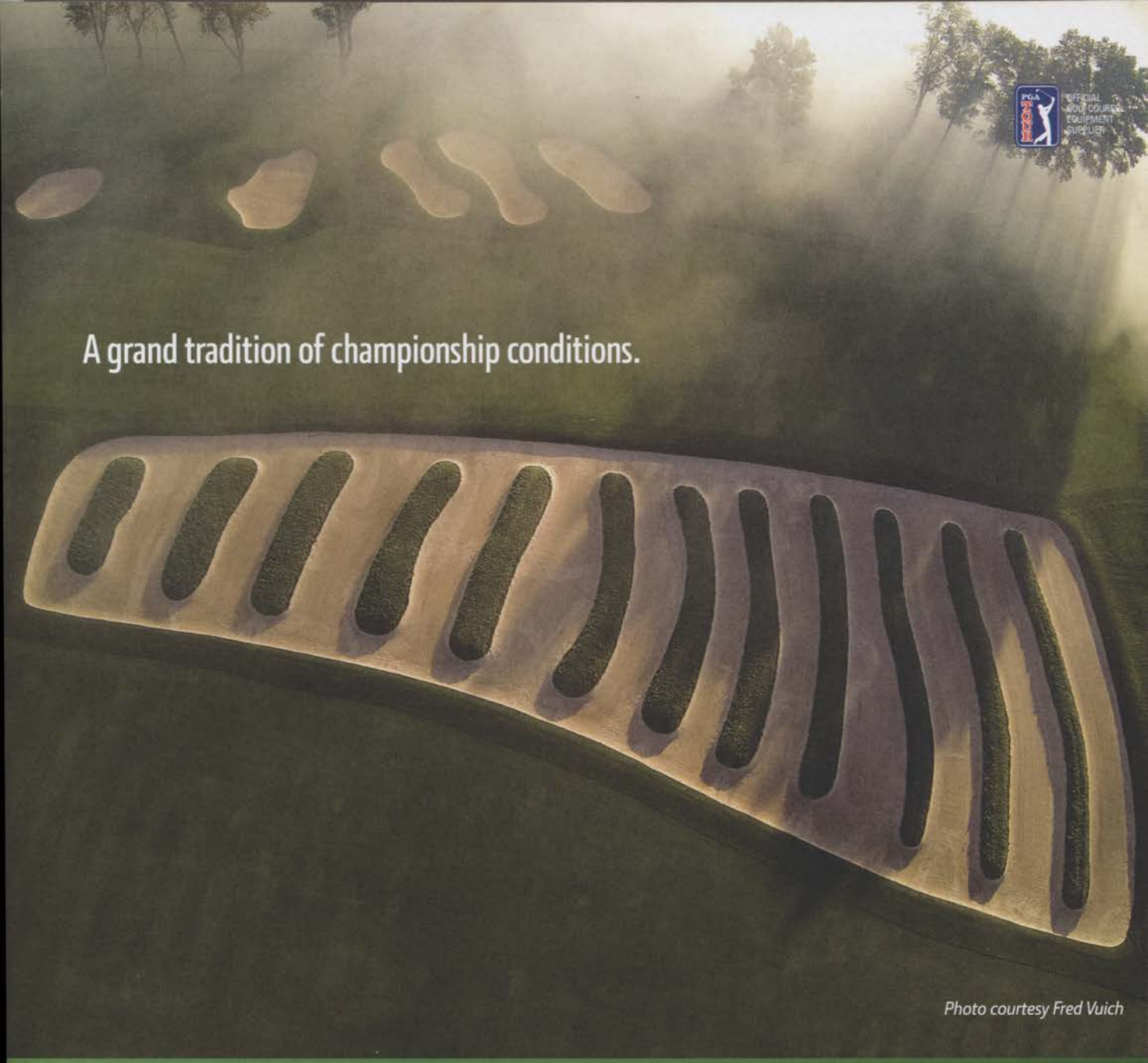
Image courtesy of Brandon Horvath: As damage becomes severe, entire plants are killed, and putting surfaces become uneven.

Superintendents better have their antennas up as forecasters predict a hot summer for most of the United States. Northern courses are in line to experience above normal temperatures, conditions ripe for Pythium.

So how can superintendents prevent Pythium diseases this year? Being proactive is, of course, the most important weapon to thwart Pythium diseases before they take hold of your turf.

Pythium is a dreaded and troublesome turf disease. Pythium is actually a complex group of many species, and as a group they cause foliar blights, crown rots or root rots across a broad range of temperatures. What they all have in common is their need for water. In fact, "water mold" is a common name for these organisms.

Hot, humid weather conditions,



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coupled with high surface or root moisture, make turf ripe for a Pythium invasion, says Dr. Brandon Horvath, assistant professor in the University of Tennessee's Department of Turf Sciences. "Hot summer conditions with thunderstorms are one of the greatest concerns," he says. "Superintendents should pay close attention to the daily and weekly weather forecasts to determine if they should protect themselves from a potential outbreak." Typical conditions for disease development are daytime temperatures of 85 to 100 degrees and nighttime temperatures above 68 degrees.

Excessive nitrogen fertility, poor soil drainage and poor air movement contribute to the problem, says Dr. Rob Golembiewski, a Bayer Green Solutions Specialist. In turf, Pythium symptoms appear as sunken, greasy black patches and streaks on turf that can take on a reddish-orange to dark gray color. Affected turf is often matted and has a water-soaked appearance. White, cottony mycelium may be present in the early morning on affected areas, or after incubation of samples overnight in a moist chamber or plastic bag.

Vigilance is important, says Cam Copley, golf national accounts manager for Nufarm Americas. "Pythium can move rapidly and damage can be severe," he says. "Misdiagnosing or a lack of awareness in these situations can be catastrophic."

Measures to prevent an outbreak should be swift and comprehensive. Controlling moisture is one commonality when dealing with the different species, says PBI-Gordon product sales specialist James Goodrich. "Since Pythium is a water mold it makes sense to reduce or remove the water," he says. "The environment for the disease is then less desirable for growth."

Besides high temperatures and high humidity, poor drainage, highly compacted soils and overwatering are turf management issues that increase the chance of a Pythium outbreak, Goodrich says. Pythium is usually pres-

© DR. JIM KERNS

Typical conditions for disease development are daytime temperatures of 85 to 100 degrees and nighttime temperatures above 68 degrees.

ASK THE EXPERTS

It's happened. Your turf is suffering from Pythium disease. Now what? Several experts discuss the subject.

"The best curative action depends on the specific Pythium disease and pathogen, so it is crucial to have an accurate diagnosis to select the best course of treatment. A systemic Pythium fungicide, such as Subdue Maxx or Segway, is commonly recommended for curative control of Pythium blight or Pythium root rot. In the case of Pythium root rot, it is often recommended to apply a contact fungicide like Terrazole as well. Pythium root dysfunction, on the other hand, is most effectively controlled by a QoI fungicide, like Heritage Action or Segway."

— ***Dr. Lane Tredway***, *Syngenta Technical Manager*

"Investigate the cause of the disease. In other words, be sure that an irrigation head did not run too long during the evening or some other overwatering did not occur. Curative control is best achieved with high rates of the products such as Segway, Subdue, Stellar and Banol. Another excellent product is Terrazole. However, the longevity of this product is limited so it will require follow-up applications of Segway, Signature, Appear, Banol, Stellar and Subdue."

— ***Dr. Jim Kerns***, Assistant Professor and Extension Specialist of Turfgrass Pathology at North Carolina State University.

"The superintendent should apply a quick knock-down fungicide like Banol to get the Pythium under control and at the same time, minimize stress on the turf by implementing appropriate cultural practices."

— ***Dr. Rob Golembiewski***, Green Solutions Specialist for Bayer.

"I would say the best way to get it under control is a Terrazole application followed in three to five days with Segway. Then use a rotational program for the rest of the season to allow the turf to recover and keep the disease at bay."

— ***James Goodrich***, Product Sales Specialist for PBI-Gordon Corporation.

ent in all soils, but if superintendents do things culturally to minimize a growing environment they can stay a step ahead of the disease.

"I don't want to preach to the choir, but one of the best ways to get ahead of these diseases is to improve surface and subsurface drainage and really monitor the amount of irrigation you're putting out," he says. "So if you can reduce the water, you can minimize your chances of an outbreak."

Good core cultivation, effective water management, and minimal nitrogen fertility give turf the best chance to resist a Pythium outbreak, says Kyle Miller, senior technical specialist for BASF Professional Turf and Ornamentals. "This still may not protect your turf, thus the reason for a properly timed preventive Pythium fungicide program during peak disease periods," he adds.

While cultural practices are often disruptive to a course and its members, they are vital to mitigating outbreaks, Copley says.

Cultivation is key for preventing Pythium diseases,

says North Carolina State University assistant professor and extension specialist of turfgrass pathology Dr. Jim Kerns. Pythium species require water to grow and spread. Therefore, irrigation management is paramount. For putting greens, it is essential to use a TDR meter to measure soil moisture. Keeping the putting greens as dry as possible can help prevent Pythium diseases. Sand topdressing is also critical, as it improves the surface characteristics and dilutes organic matter that naturally builds up in the system. Maintaining fertility programs is also key. "Pythium diseases are thought to be high-nitrogen diseases, but there are many Pythium diseases," Kerns says. "Furthermore, high nitrogen typically refers to rates that are not reasonable for golf courses. Many times I find a little boost in nitrogen helps with most Pythium diseases. I am not advocating a half or one pound of nitrogen, rather an increase from 1/10 to 1/8 of a pound."

Root rot and root dysfunction develop when turfgrass is under stress. The single biggest stress is mowing, therefore adopting an alternating mowing and rolling program will help manage Pythium.

Pythium blight can kill turf in 24 to 48 hours, says Golembiewski, so preventive measures are key for controlling this disease. While fungicides are commonly used preventatively as environmental conditions turn favorable for Pythium development, proper cultural practices should be implemented to deter disease. He advises avoiding excessive nitrogen fertility; aerating/needle-tining to improve soil drainage and enhance air exchange; selective pruning of trees and shrubs; using fans to enhance air movement; and limiting dew duration.

"In turf areas most prone to Pythium outbreaks, delay mowing and/or rolling until surfaces are dry so as to not spread inoculums," Golembiewski says.

Superintendents may want renovate low lying areas associated with sitting water or contours that create a flow of water across the surface, both of which contribute to Pythium outbreaks and movement across the playing surfaces.

"As for cost effectiveness, cultural practices should already be implemented as part of a good agronomic program," Golembiewski says. "The key is to adjust when or how you implement to maximize their effectiveness in preventing Pythium outbreaks."

Goodrich stresses proper fertilization and plant health. "In these days, fast green speeds, lower fertilization inputs (especially nitrogen), and decreased

THE RIGHT DIAGNOSIS

Superintendents often mistake Pythium blight for leaf spot on ultradwarf Bermudagrass putting greens, says North Carolina State University assistant professor and extension specialist of turfgrass pathology Dr. Jim Kerns. "In our experience, Pythium blight is a much bigger problem than leaf spot," he says. "I also see much confusion surrounding root rot and root dysfunction. These diseases are very, very different from one another.

Root dysfunction has only been documented on creeping bentgrass, Kerns says. If superintendents suspect root dysfunction on annual bluegrass or Bermudagrass, they should contact a turfgrass professor immediately, as it would be a newly reported host. "Root rot, however, has been documented on almost every turfgrass species, and in our experience is more common than root dysfunction," he adds. "Pick diagnostic labs that have experience and have done research with root diseases, especially with Pythium diseases."

mowing heights can be problematic as they lead to weakened turf," he says. "If you can bump up the nitrogen a bit and raise the mowing height a bit, you can help stave off the possibility of an outbreak. The practices I've mentioned are all things supers are doing or thinking about and therefore there is minimal cost above what they already have budgeted, so they can be very easy to implement."

In addition, Syngenta technical manager Dr. Lane Tredway urges superintendents to "get ahead" of Pythium with a sound preventative fungicide program. "Curative control is not very effective, as most of these diseases attack at a time of year when the turf is not growing most actively," he says."

In growing environments conducive to Pythium development, more fungicide applications will be required to provide adequate control, Tredway says. A superintendent may need to apply higher rates at shorter intervals, or sometimes even mix multiple chemistries together.

Start preventative Pythium applications before conditions become optimum for an outbreak, Copley says. "There is a lot of truth to the old saying 'an ounce of prevention is worth a pound of cure.' The turf won't have to deal with trying to heal itself and it will also be easier on the budgets of superintendents," he says. "The preventative rate on products is sometimes one-half the cost of the curative rate." **GCI**

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

TIME CAPSULE

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.

I wrote this column 10 years ago about future technology in irrigation, but it was never published. It is amazing how much of it is now common practice. So imagine what will happen in the next decade... — BV

It's early morning in the fall of 2015 and you're standing on the ninth green of your golf course watching your irrigation system complete its nightly watering cycle. Feeling a little melancholy, you pause in your thoughts to reflect on the differences between your irrigation system of today and a short 10 years ago, back in 2005.

First, you think about how much less water you are using by irrigating more efficiently. Between new technologies, better control and government regulation you are watering slightly less turf — due to adding some naturalized areas — than a decade ago with about 25 percent less water. Not only is the water available to you less, but also its quality has degraded so that you have to be more precise with your applications, filter the water and provide a number of different treatment scenarios, including pH adjustment and the increased use of wetting agents.

As you watch the last group of sprinklers operating, you know that the sprinklers are each covering a smaller area to provide you with precise control. The 60-foot sprinkler spacing is much less than your old course of 1980s vintage, which had sprinkler spacing over 80 feet. The smaller spacing has given you the ability to be very specific with the amount of water you are putting down in its area, with the added benefit of operating at 20-psi lower pressure. A side benefit is the lighter precipitation rate, again allowing you more finite control of the sprinklers application. All of these features have helped you to reduce the amount of water the golf course uses, providing environmental and public relation advantages.

It is obvious by watching them that the sprinklers have an improved ability to water uniformly and a consistent rotation speed. No need to overwater to get the dry spots or pull out the hoses every afternoon to syringe the fairways anymore. The versatility of this new generation of sprinklers is interesting. They are all individually controlled, no more groups of two to four operating at the same time. You chose to wire the sprinklers back to a field controller individually, but surprisingly you were given the option of communicating with the sprinklers and even the few electric valves you have directly from your laptop computer wirelessly to each sprinkler. Maybe on your next system you'll do that, but at this point in your life, you wanted a little redundancy.

The sprinkler's ability to have the same sprinkler as a full circle or part circle was a great help in your recent renovation project. You also particularly like the feature of being able to add a small back nozzle to the part circles so that it waters 20 to 40 feet behind it, to cover small turf areas without throwing an additional 20 to 40 feet into the woods, wasting water. In windy areas, you have been able to adjust the sprinklers' arc to a lower trajectory so they do not have to fight the wind as much and provide better coverage, especially on the ninth and 18th greens. You have a couple of other areas that you need to change the trajectory on and need to remember to talk to your irrigation technician about them.

He was just telling you the other day his favorite thing about these sprinklers is the ability to service everything from the top, so rarely does he have to do any digging. Not that you are having a lot of problems with the sprinklers, but the screen, wire connection, pressure regulator and solenoid can all be accessed with the removal of a couple of screws. Your technician was also commenting a feature of the sprinkler that most people are unaware of is the ability to set either the right or left stop, as neither is fixed. He said it sure makes setting the part circle easier as he does not have to worry about lining up the fixed side.

During the design of the new system, you decided to water some of the golf course with sub-surface drip irrigation instead of sprinklers. Many of the renovated bunkers have almost vertical grass faces, so you installed sub-surface drip under the turf to keep them watered. It works well, but you need to filter and pressure regulate the sub-surface drip zones. You are also trying the drip on a couple of relatively small tees that do not get a lot of air movement. So far they seem to be holding up well.

Not only have the sprinklers improved your ability to manage the water and turf, but the new technologies

(**VINCHESI** *continues on page 53)*

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Eliminating worries on the **Eastern Shore**

Mike Moyer started his role as the superintendent at Bear Trap Dunes, a 27-hole semi-private facility along Delaware's Eastern Shore, in 2014. The course can attract as many as 1,000 rounds on busy summer weekends.

© MIKE MOYER

Developing a reliable spray program allows **Bear Trap Dunes** superintendent **Mike Moyer** to handle a frantic mix of member and vacation play.

By **Guy Cipriano**

Changing cups, hand watering greens, clearing debris golfers will notice during rounds. A title suggesting the role of a delegator, doesn't prevent Bear Trap Dunes superintendent Mike Moyer from remaining a doer.

A mix of member and tourist play – Bear Trap Dunes rests along the Eastern Shore, a popular Mid-Atlantic and East Coast vacation spot – means busy weekends can bring as many 1,000 golfers to the facility. Customers have numerous options, because the frantic late 1990s and early 2000s turned the Eastern Shore into a northern version of Myrtle Beach, albeit on a smaller scale. More than 25 courses open to public play are within 30 miles of Bear Trap Dunes.

Moyer's days are also frantic. He arrives at the Ocean View, Del., course at 5 a.m. Peak season weekday tee times begin at 7 a.m. Peak season weekend tee times begin at 6:30 a.m. Moyer and assistant William Welsh start mornings from May to September on the course, performing various jobs alongside a peak season crew of 15 workers responsible for maintaining 27 holes.

"Not having enough guys is never a good excuse," Moyer says. "It's the reality of the marketplace. It doesn't reduce the standards of the golf course you are supposed to be presenting. That's where we incorporate ourselves as supervisors, being regular parts of those first jobs in the morning, making sure things done ahead of play and then turning back around and focusing on other aspects of the job."

Designed by Rick Jacobson and opened in 1999, Bear Trap Dunes is a property offering a superintendent few lulls. The course rests three miles from the Atlantic Ocean and less than three hours from Washington, Baltimore and Philadelphia. A coastal climate provides opportunities for year-round play, although Moyer describes the winter as "project time."

Bear Trap Dunes' primary agronomic challenge is straightforward sounding yet daunting to execute: managing bentgrass in the Transition Zone. The three nines consist of 124 irrigated acres and 36 acres of native areas that add a links-style appeal to the course. L-93 bentgrass covers greens. Bentgrass is also the dominant variety on fairways and tees.

Heavy fog and dew are common occurrences because of the course's proximity to the coast. Wetness created without precipitation can "exacerbate" dollar spot activity, says Syngenta technical manager Dr. Mike Agnew, who closely follows disease patterns on the Eastern Shore. "You get growing conditions that are perfect for dollar spot," Agnew says.

Ocean breezes limit humidity, and growing conditions aren't as harsh at Bear Trap Dunes as more inland parts

ABOVE: A reliable spray program allows superintendent Mike Moyer to devote more attention to the bunkers and natural areas that give parts of Bear Trap Dunes a links-style feel. ***OPPOSITE:*** Moyer calls dollar spot "the historic pest" at Bear Trap Dunes. Using Secure as a rotational partner with Daconil Action helps prevent the disease and preserve the course's tidy look.

of the Transition Zone such as Washington, D.C., and its surrounding areas, Moyer says. But that doesn't mean Moyer deploys a lax approach to preventing dollar spot, which he calls "the historic pest" at Bear Trap Dunes.

Moyer became superintendent in October 2014 and familiarity with the property helped when developing a spray program. Bear Trap Dunes is one of three Eastern Shore facilities owned by Carl M. Freeman Golf and managed by Troon Golf. Four years in the Troon system working at Seaview Golf Resort and The Bay Club, an Eastern Shore property owned by Carl M. Freeman Golf in Berlin, Md., allowed Moyer to develop a close relationship with Dan Weitzel, who oversaw agronomy at Bear Trap Dunes, The Bay Club and Bayside Resort Golf Club in Selbyville, Del., before becoming the director of agronomy at Manchester (N.H.) Country Club.

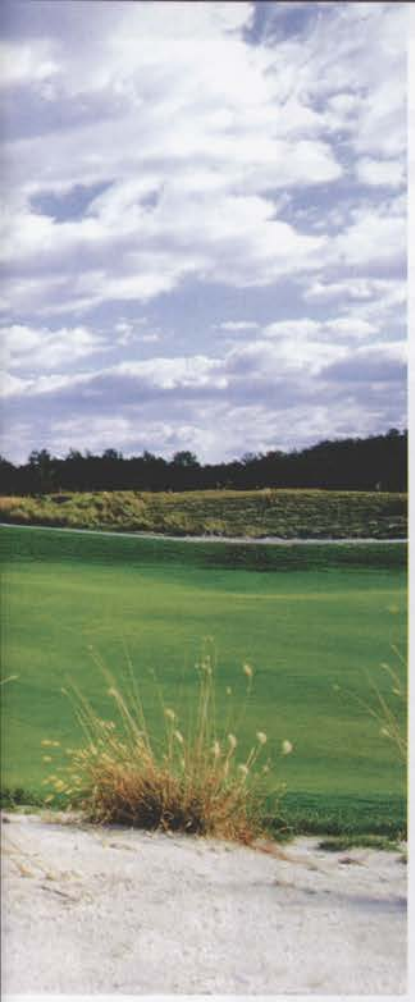
During his tenure at The Bay Club, Moyer followed the agronomics at Bear Trap Dunes, where dollar spot control trials were conducted using Syngenta's Secure, a multi-site fungicide introduced in 2012. The success of the trials gave Moyer confidence to make Secure a staple of his dollar spot control program. Using Secure as a rotational partner with Daconil Action, Moyer experienced no incidence of dollar spot on treated areas in his first season at Bear Trap Dunes.

The program implemented by Moyer is preventative, because he says reacting to the disease has damaging consequences. A lengthy to-do list makes trying to recover from dollar spot damage during the peak season a harrowing thought. "If you wait until you see it down here, you are going to be seeing it for the rest of the golf season," he says. Extended growing seasons such as the one experienced because of a warm December 2015 can further confound superintendents, says Syngenta territory manager Doug Rider, a former Philadelphia-area superintendent who covers the Eastern Shore for the company.

A penchant for boosting efficiency and maximizing resources, traits instilled in him by his agronomic mentors Weitzel and Pennsylvania superintendent John Erickson, pushed Moyer toward tweaking the program for 2016. Instead of spraying in 21-day intervals, Moyer is spraying in 14-day intervals at lower rates. The revamped program started in April. "It was actually cheaper for me to go on the 14-day rather than the 21-day program," he says. Bear Trap Dunes' past issues with dollar spot stem from incidences on fairways, but Moyer also sprays Secure on greens and tees. "We treat greens, tees and fairways the same way," he says. "I'm not going to take chances seeing it on greens." Anthracnose on greens joins dollar spot on fairways as the biggest disease concerns on the Eastern Shore, Agnew says. Moyer controls preventatively for anthracnose by using Daconil Action and Velista in his rotation.

The annual bluegrass weevil also presents major challenges on the Eastern Shore, but a dearth of tree-lined holes and abundance of bentgrass places Moyer in the monitoring stages. "I come from a *Poa annua* course where we did have a lot of ABW activity in New Jersey," he says. "I still keep in touch with what guys are seeing and what they are doing spray-wise, but I don't have a program here currently to control it. If we started seeing damage beyond the threshold we can tolerate, we would quickly change our tune."

Working at a rapid pace on a third golf course in six years can be unsettling, so relationships help Moyer en-



hance every aspect of Bear Trap Dunes. Longtime Bayside Resort superintendent Eric Hindes and The Bay Club's Shaun Flaherty work for the same company as Moyer, and the trio openly shares ideas and equipment. Superintendents at the Troon-managed courses on the Eastern Shore also receive opportunities to attend workshops conducted by industry partners such as Syngenta. Moyer tweaked his 2016 spray program after studying Syngenta's recommendations for his region and multiple discussions with Rider, who offered guidance on using the company's online rebate-calculating tools. Agnew also provides regular technical assistance for courses on the Eastern Shore. "They have both been great resources to me being newer to the area than some of the other superintendents around here," Moyer says.

Still, even with a spray program solidified, uncontrollable application challenges exist, primarily in the form of wind. Like any superintendent on the East Coast, Moyer must demonstrate flexibility, because spraying at the wrong time could result in product drifting from its intended target. The start of 2016 proved confounding because high winds emerged on days it didn't rain. "You always have one eye on the forecast and what the winds are supposed to be, just trying to pick and choose the best times," Moyer says. "We have sprayed later in days because the winds have died down. It's being flexible and being adaptable and not just saying, 'Oh, it's greens day and we are going out regardless.'"

It's no surprise Moyer has evolved into a flexible superintendent. Moyer graduated from Millersville (Pa.) University with a history degree and settled into a job as a social worker. Looking to make a career change, he received an opportunity in 2007 to work for Erickson at Honey Run Golf Club in York, Pa. He then landed a job in 2010 working for Weitzel at Seaview Resort. Online studying and continuing education programs helped Moyer develop an agronomic base, but he attributes his management style to lessons gleaned from Erickson and Weitzel.

"They instilled the importance of just keeping your eyes on your grass and being hands on," Moyer says. "I haven't had the luxury of having very large crews anywhere I have been. It's that work ethic, even if you don't have enough guys on your crew to get something done, it still needs to get done, and not being afraid of hopping on a mower, changing cups or those sort of things."

Or rebuilding bunkers. On the rare occasions when there's no need to mow, irrigate and spray turf, Moyer and his crew are renovating bunkers and adding drainage. Both projects are being completed in-house. Thirty-four of Bear Trap Dunes' 97 primary bunkers still need renovated, and expect Moyer to spend time in each one alongside his winter crew.

"These guys have so many challenges and you only visit them so many times throughout the year," Rider says. "You see them working on one thing one visit, and you see them a month later and they have moved onto the next challenge. I was a superintendent once, and these guys are a resilient bunch and out of anybody on the property, they know how to work very well with that they are given. They are very creative." **GCI**

FIRST IMPRESSIONS, SECOND THOUGHTS AND THE THIRD DEGREE

Monroe Miller retired after 36 years as superintendent at Blackhawk CC in Madison, Wis. He is a recipient of the 2004 USGA Green Section Award, the 2009 GCSAA Col. John Morley DSA Award, and is the only superintendent in the Wisconsin Golf Hall of Fame. Reach him at groots@charter.net.

First impressions. When I visited the UMass turf team in Amherst last fall, I'd hoped to visit a person I had communicated with via email a couple of times. He lives a few miles west of Amherst, but he was out of town when I was there. Jim Ricci's name came to me through several sources – Mel Lucas, Peter Cookingham (TIC) and several USGA staff. All told me he was a premier collector of mowers, and this was around the time I was lamenting the lack of a real museum where I could donate my meager collection before my wife and daughters tossed them. The conversations were all nearly the same: "You won't believe how much Jim knows about grass cutting machinery and how magnificent his collection is!"

Well, now I do. James B. Ricci has written a book: "Hand, Horses and Motor: The Development of the Lawn Mower Industry in the United States." I was stunned when the book arrived. It is a magnum opus, thorough and complete and a tremendous addition to the history of turf management.

The book is loaded with facts, everything from patents to product literature from companies that have built mowers in our country. The author puts it this way: "This is a book in which I attempt to document my discoveries of all the companies that made lawn mowers in the USA, with some anecdotes and points of interest included as well."

It is a reference book, to be sure, but I really enjoyed the side notes and pictures and artwork, as well. You can learn more about the book and order it through reellawnmower.com.

SECOND THOUGHTS. Years ago, when management companies were first showing up on the scene, many were angered by their methods. Too often we saw a management outfit move in to a course and either replace the superintendent or reduce his pay. Assistant superintendents were sometimes thrown overboard as an unnecessary expense, and good equipment mechanics were given their walking papers. The workload left for remaining staff significantly increased and sometimes the benefit and pay packages were lowered. It was ugly.

> "The Masters seems a safe harbor, for a few days, from what can be an ugly world. I live close enough to Chicago to get reports on the obscene and increasing gang violence there."

I have not entirely changed my view, but since the big turndown in golf, some of these companies have helped numerous courses survive. Some golf course superintendent positions have been improved by adding responsibilities and some commensurate pay.

I've seen staff that never had the chance to attend educational meetings now going to the GIS. Equipment consolidation, the use of individual qualified staff across several golf course facilities (to their benefit), some sharing of expensive but little used machinery, and numerous other money saving practices work to the benefit of those courses under a management company umbrella. I have also seen the career of top-notch superintendents rehabilitated, giving them more time in the profession well suited to them.

At my age I can attest to the truth in the old saw, "the only constant in life and work is change." This development may qualify.

THIRD DEGREE. I attended the Masters Tournament again this year. It was a fantastic experience as it always has been. The course was beautiful, the players truly honored to play Augusta National, and the weather cooperated.

The Masters seems a safe harbor, for a few days, from what can be an ugly world. I live close enough to Chicago to get reports on the obscene and increasing gang violence there. We are all subjected to – in my view – a thoroughly disgusting presidential campaign. There has been extensive flooding down South in places this spring, and there is worry about another season of forest fires out West. And I have even read that NASA has measured a change in the earth's wobble due to melting ice sheets.

What is this world coming to?

This is why, for a brief time, it is so refreshing to attend the Masters. Everyone is polite, the meals and refreshments are very affordable, the club welcomes superintendents and golf pros, and every effort is made to

(MILLER *continues on page 56)*

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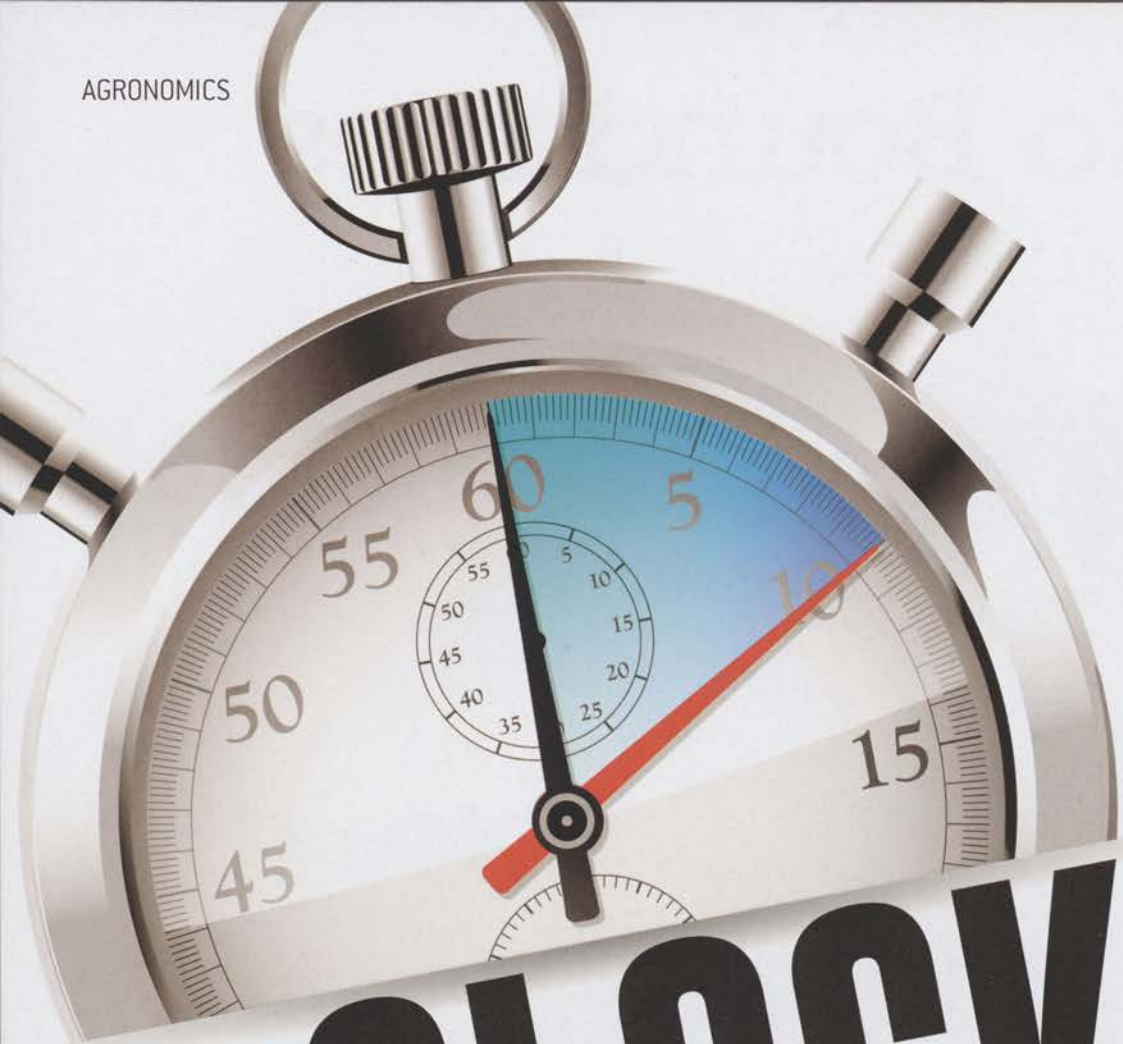

ON THE CLOCK

Tracking growing degree days could simplify your approach to PGR application with better results and more efficient use of resources.

By **Rick Woelfel**

Golf course superintendents sing the praises of plant growth regulators (PGRs). They increase the density and stress tolerance of the turf and enhance color. They are also effective when dealing with issues like annual bluegrass control. But PGR usage must be monitored carefully for maximum effectiveness.

Dr. Bill Kreuser, an assistant professor at the University of Nebraska, is considered one of the turf industry's foremost authorities on PGR issues, which he has been studying since his days as an undergraduate at the University of Wisconsin. He estimates 70 percent of superintendents, perhaps more, use PGRs. He touts their benefits but says golf course superin-


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tendents must be ever vigilant.

"You have to stay on top of the application," he says. "If you put down a product, you're going to get a certain period of time where the amount of growth is going to be slower than if you didn't apply any PGR so you get growth suppression."

When the PGR wears off, the grass actually rebounds and grows at a faster rate than it would have if it was never treated with a PGR and you lose all the benefits you just gained, Kreuser says.

"The sugar storage, the color increases, the stress tolerance, everything you gained during the suppression period when that rebound phase happens it gets cancelled out so the net over the course of the year is no change," he says.

Because PGRs break down more rapidly in warm weather, they must be reapplied more frequently during the summer months. With that knowledge at hand, Kresuer developed what he calls a growing degree day model to help superintendents anticipate environmental conditions and determine when reapplication is necessary.

"We developed these growing degree day models to roughly approximate how much PGR is in the plant," Kresuer says, "then we estimate how much growth suppression or growth rebound we're getting depending on when we apply the product."

The model is fairly simple. Tabulations begin the first day a PGR is applied at the start of the season. The turf manager simply takes the high and low temperatures for the day, adds them and divides that total by two to get the average temperature for the day. The average temperatures for each day are added up until the total reaches the threshold for a particular product, which means it's time to reapply the PGR.

Two important factors should be noted:

- All temperatures should be recorded on the Celsius, not the Fahrenheit scale
- Because PGRs break down at different rates, each product has a different threshold.

For example, Primo Maxx, perhaps the most common PGR (active ingredient Trinexapac-ethyl), has a threshold of approximately 200 growing degree days. In this hypothetical example, on the day of application on a cool-season putting green somewhere in the Northeast the morning low was 2 degrees (36 degrees Fahrenheit) and the high temperature for the day was 14 degrees Celsius (58 degrees Fahrenheit). Thus the average temperature for the day was 8 degrees Celsius. The next day the average temperature might be 7 degrees, 10 degrees on the third day and so on. The numbers are added up day by day. When the total reaches 200, it's time for another application of Primo Maxx. The formula is followed all season long until the grass stops growing at some point in the fall or winter and picks up in the late winter or early spring, whenever the grass starts to grow again.

In the case of Primo Maxx, the rate of application does not impact the rate of growth or the application interval, but that's not true in every circumstance. In the case of Cutless 50W for instance (active ingredient: Flurprimidol), varied application rates will produce a maximum reapplication rate of between 210 and 270 GDDs; Kreuser would recommend 180-240 GDDs for maximum effectiveness.

The examples listed above are for cool-season putting greens. Research is ongoing as to how the model works for fairways, tees, etc. although Kreuser says some trends are emerging. With some products, specifically Class B PGRs, the rate of application impacts the reapplication interval as noted with Cutless 50W.

Mowing height is a factor, as well, although Kreuser says the research in this area is still in its early stages. "We don't have really good data yet for the high-mown turf," he says. "We have really good data for cool-season greens, so we're expanding to cool-season season

PGR PERFORMANCE ON COOL-SEASON PUTTING GREENS

Common Name	Active Ingredient	Relative Growth Suppression		Duration of Suppression and Rebound (GDD)**		Ideal Reapplication Interval (GDD)	
		Low Rate*	High Rate	Low Rate	High Rate	Low Rate	High Rate
Primo Maxx	Trinexapac-ethyl	20%	20%	800	800	230	230
Trimmit 2SC	Paclobutrazol	30%	50%	850	950	280	310
Cutless 50W	Flurprimidol	20%	30%	600	800	210	270
Anuew	Prohexadione-Ca	25%	25%	840	840	280	280
Legacy	Flurprimidol + Trinexapac-ethyl	20%	35%	810	910	270	300
Musketeer	Flurprimidol + Paclobutrazol + Trinexapac-ethyl	25%	40%	880	880	290	290

*Low and high rates correspond with the lowest and highest application rate for cool-season putting greens on each product's label. **Degrees °C, base 0° C; **Source:** Dr. Bill Kreuser, University of Nebraska

While the table shows a reapplication interval for Pro Maxx of 230 days, Kreuser describes that number as an "Extreme stretch" and strongly recommends putting down a fresh application of product when the sum of growing degree days reaches a total within 30 of the maximum.

Dr. Bill Kreuser, an assistant professor at the University of Nebraska, estimates that at least 70 percent of superintendents use PGRs. A large part of that usage occurs on greens.

roughs and tees."

Relatively little work has been done on growing degree day models vis-à-vis warm-season grasses, although Dr. Christian Baldwin at Mississippi State University has been doing some work in this area.

"People in the South are just designing experiments this year to figure out what these numbers are for our warm-season grasses," Kreuser says, "because they're going to have different base temperatures and they're going to have different intervals."

Kreuser believes reapplication intervals will be longer with warm-season grasses such as Bermuda, in part due to base temperature issues.

"PGRs really knock down the growth rate on long-season grasses like Bermudagrass," he says, "so that's kind of an issue. On a cool-season green with Primo, you might get 20 percent growth suppression. In the summer that might last a week to 10 days.

"Get that same application rate on a Bermudagrass green and you're going to get a 60 percent growth-suppression rate and it may last three to four weeks," he says.

The idea of basing a PGR application schedule on actual weather and soil conditions as opposed to merely following the calendar is one that is drawing more attention, in part because mild early spring temperatures are occurring more regularly in certain parts of the country.

It is an approach Dr. Jeff Atkinson embraces. Atkinson is the landscape and ornamental research manager for SePRO. He has a masters and a Ph.D. from Clemson in plant and environmental sciences and has done extensive research on PGR issues. He believes superintendents should consider more than just the calendar when setting up their PGR application schedule.

"We've been trained by our industry, by the chemical industry, by the manufacturing industry, with our labels," Atkinson says. "They're so specific, suggesting you apply products at a given rate on a specific application schedule. That makes the assumption that we're dealing with a static system and we're really not. With the biological systems, we're managing a very dynamic system in the cases of plant growth and response to environmental conditions. Especially with air temperatures because they fluctuate, water availability, as that fluctuates throughout a season, and nutrient availability because that fluctuates throughout a system."

All of those factors have an effect on how long any plant protection product, plant product or PGR product put on turf will last, and how often superintendents need to or at what rate to reapply, Atkinson says.

"Modeling is a great way to take into account these dynamic systems in the environment and their effect upon biological systems and how long an application of a product will last," he says.

> **"CALENDAR APPLICATION (SCHEDULES) DON'T GIVE US A GOOD FEEL FOR WHAT AN APPROPRIATE START DATE MIGHT BE OR WHEN A REAPPLICATION IS NECESSARY."**
>
> — *Dr. Jeff Atkinson, SePRO*

Charting growing degree days over time can be useful in determining when to start the PGR cycle at the beginning of the year or after a period of cold weather, Atkinson says. "Calendar application (schedules) don't give us a good feel for what an appropriate start date might be or when a reapplication is necessary," he says, "But if I look at the growing degree day model, I'll look at growing-degree day accumulation after a frost period or after coming out of winter.

"That gives me a good idea based on an accumulation of temperature units over a given period of time when I should make that application and when I should make that subsequent reapplication," he adds.

Adhering to a growing degree day model is a more environmentally friendly approach to the PGR issue, Atkinson says. "If you're making calendar-based applications, you're occasionally making applications at too high of an application rate or too frequent an application," he says, "or making too infrequent an application. That's not being the best steward of the product.

"If we can get the same results, if we can get the same effect by applying less frequently at a correct application rate, that makes us use the product with a greater degree of responsibility, puts less of a product on the environment and decreases our overall environmental footprint." **GCI**

Rick Woelfel is a Philadelphia-based turf writer and frequent GCI contributor.

CONTOURING GREENS FOR PUTTING CHALLENGE

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.

After getting the basics right - drainage (2-3 main swales), front to back slope for visibility, and maximizing cupping areas with 1.5-3 percent slopes, golf course architects looking to create great greens devote endless hours to adding challenging contours within and on top of those basic parameters. There are many tools we can use. The most often used are briefly described below.

BASE GRADE VARIATIONS. Over 18 greens, randomly varying basic slopes on different greens from 1.5 to 2.5 percent makes green reading more interesting because none break exactly like the last one.

PLANED GREENS. Because most greens are a mix of swales and ridges, the occasional "tilted plywood sheet" approach provides a unique twist. A constant slope magnifies certain breaks (like downhill trailing putts). These work well on slightly uphill holes, where the constant slope often help attain complete vision of the putting surface that rolls might block. Specific features are listed below.

LONG EXTERIOR RIDGES. Greens are often shaped within perimeter exterior mounds, which typically extend into the putting surface. Sometimes the mounds "die into" the green edge, but most extend into the putting surface a few feet. Some extend close to halfway across. These create visible, but gentle rolls, partially divides the green into different pin positions, and ties the green and outside contours together with natural flow.

EDGE ROLLS. Because pins are set back 10-12 feet from the green edge, rolling contours on the green perimeter can give the appearance of rolling contours without greatly reducing cup space or affecting putts. The rolling edge probably makes nearby recovery shots more interesting than they affect actual putts. Depending on their orientation to damaging winter or summer winds, turf type, and green exit traffic, these are subject to drying, and designers consider those factors.

INTERNAL CONTOURS/ BUMPS. "Internal contours" are becoming more common. Loosely defined as features contained mostly/entirely inside the green, these are typically small knobs and mounds, because hollows don't drain. Even on pure sand greens architects are reluctant to design a drainage pocket. These are usually small (from 3-15 inches high).

SUBTLE CHANGE OF GRADE. Small, subtle and barely noticeable areas of 3-5 percent slope within areas of primarily 1.5-2 percent slopes increases green reading problems over gently rolling but fairly constant slopes. Breaks encountered midway through a putt's roll are more unpredictable as to speed, and thus break. Like other features, it's hard to put pins close to these areas.

SWALES. While hollows don't drain well, sharp feature swales are common. Among the best examples are Charles Blair MacDonald's famous "Biarritz" holes, featuring deep swales through the green. Modern versions are usually shallower, with gentler side slopes and more free form for a more natural look.

TIERS. Some greens have two to four distinct areas, separated by ridges, swales or 1- to 2-foot-high "stair steps" or tiers. Some are bigger. A few two-tier greens have elevation changes of over 10 feet. The steep slopes of tiers reduce pinnable area. "Wavy" tiers typically create more unusable pockets top and bottom of the tier, and tiers following the long green axis use even more space.

MICRO CONTOURS. Older greens are often devilish to read. Their subtlety is probably less a factor of design, and more a result of years of settling and topdressing. With modern bulldozer construction, newer greens may have less future settling.

PRACTICAL CONSIDERATIONS. Edge rolls, swales, tiers, ridges and mounds all usually require bigger greens to ensure you get the pin locations you need given your traffic. They are less practical on high play and low budget courses, and are subject to the whims of Mother Nature even on high budget, private courses, as they tend to dry out, especially if there are also environmental, irrigation and/or traffic problems. And, they can scalp, unless there are nice transition slopes at top or bottom. **GCI**

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CRYSTAL CLEAR

Superintendents are often required to develop an aquatic maintenance plan to care for their courses' water features. Our experts provide valuable insight to turn you into a pond specialist.

by **Rob Thomas**

To maintain an environmentally sound pond, Jim Skorulski, an agronomist with the USGA Green Section, suggests the prevention of nutrients (nitrogen and phosphorus) from entering the pond system. This is done by managing clippings, using buffers, preventing fertilizer applications and redirecting drain tiles if possible.

"Secondly, oxygenate the water column to improve water quality and support microbial activity and help reduce nutrient availability," Skorulski says. "Third, remove nutrient sources or make nutrients unavailable to algae and plants in the pond, i.e. dredging sediments, using alum and other products that bind with nutrients. Fourth (not in importance), deepen the water column. Shallow ponds will always be problematic in regards to aquatic plants and algae."

When coming up with a maintenance plan, many superintendents turn to pond specialists, such as David Ellison, aquatic biologist and regional director with SOLitude Lake Management, based in Virginia Beach, Va., who provides lake, pond and fisheries management services, consulting, and aquatic products nationwide.

Ellison agrees nutrient management should be the main focus when searching for best practices.

"Preventative measures such as aerating the waterbody and establishing beneficial vegetation and pond buffers to reduce nutrient loading are highly beneficial to overall pond health," Ellison says. "These measures will often help in the uptake of nutrients and can help limit the amount of pesticides required for algae and aquatic weed control. Professional assessment will often allow for the staff at SOLitude to provide a prescription for the lake or pond to target the specific plant species in need of control."

Treat the source of a pond's problems and not the symptoms of the problem, says Doug Hicks, President and CEO of Koenders Water Solutions.

"With proper prevention, treatment and maintenance, your pond will be clean and clear without the use of chemicals," he says. "Natural pond maintenance means your pond will become easier and less costly to treat every year. It also means that you will be reducing your nutrient pollution contribution to today's fresh water environmental challenges."

The biggest mistake Vincent Dodge says his colleagues make is reacting to problems instead of proactively preventing them from happening.

"Instead of controlling the golf course, the golf course controls them," says Dodge, CGCS at The Wilderness at Fortune Bay in Lake Vermilion, Minn. "A successful superintendent takes measures to control or limit an issue before the issue becomes a problem."

Take an algae-infested pond as an example, Dodge says. The quick and reactive solution is to contact a chemical sales rep to ask what's available to eliminate algae and then apply it.

"The proactive solution is to ask yourself why is there an algae problem in the first place," he says. "Too much phosphorus fertilizer? Poor aeration in the lake? Is the lake too shallow or is the water circulation poor? Figure out what the actual cause of the problem is and take the appropriate measures. Adjust your fertilizer program, add an aerator to the lake, and dredge the lake to make it deeper or add a bubbler to circulate and/or aerate the water. The go-to answer is not always the chemical control ... a mistake commonly made."

Many superintendents fail to leave a proper buffer between their ponds and their grass, choosing to manicure and cut grass right to the edge of the pond, which will cause grass clippings, fertilizer and other run off to seep into the pond, Hicks says.

"Use tall grass, or cattails to create a natural barrier," he says. "Even a longer cut grass can filter some of the run-off. The denser and longer the turf you have around the pond the better the filter."

This can be especially prevalent around areas with snow, because as the snow and ice melts and runs into the pond it picks up everything along the way and carries it into the pond, Hicks says. The barrier catches some of the run off and stops it from being

AIR **INFUSION**

According to Doug Hicks, president and CEO of Koenders Water Solutions, aerating the water can produce an environmentally sound pond. Add oxygen through aeration:

- Provides oxygen for aerobic bacteria;
- Aids in the breakdown of nutrients;
- Helps to keep algae and weeds at bay;
- Vents foul odors and carbon dioxide;
- Lowers risk of fish kill; and
- Decreases insect larvae growth.

There are two main types of aeration systems: bottom-up aeration and surface aeration.

"Bottom-up aeration systems are designed to aerate water from the bottom of the pond," Hicks says. "This is by far the most effective aerating method. Air is compressed into the airline and driven down to the bottom areas of the pond where airstone diffusers take the compressed oxygen and turn it into thousands of tiny oxygen bubbles that dissolve directly into the pond body.

"Dissolving oxygen into the water at the bottom of the pond allows the oxygen to more efficiently mix with the water and it provides a filtration system effect," he says. "As the oxygen bubbles (column) rises up through the pond, they pick up organic debris that is suspended in the pond body – thus burning off excess organic debris that causes pond stagnation, algae and weeds. The more time the oxygen has in the water, the more efficient the dissolving process is, helping avoid fish kills and supporting an overall healthier ecosystem in the pond. The deeper the aeration, the larger the bubbles will grow and the larger the column expands in the pond, thus acting as a means of water circulation."

Bottom-up aeration systems use less energy than surface aeration systems. Fountains or surface aeration suck up and pump water in the air several feet. This requires a lot of energy – thus higher costs of operation and lower life expectancies because the motor on the fountains are working much harder.

"Surface aeration is less efficient than bottom-up aeration for the oxygen that is added to the pond water is derived only from the splashing of the water on the surface of the pond," Hicks says. "Essentially, the splashing traps oxygen in the top 6 inches to 1 foot at the surface of the pond water. Decorative nozzles can be used to increase the oxygen capture and depth that the surface aeration will go down. The deeper the water splashes on the surface of the water, then the better the oxygen penetration is, which also helps with the circulation flow in the pond."

KEY QUESTIONS

For Vincent Dodge, CGCS at The Wilderness at Fortune Bay in Lake Vermilion, Minn., assessing a pond includes questions such as: What kind of plants are growing in the pond? Is it algae or broadleaf weeds? Are the weeds rooted or are they floating? Are they submerged or emergent? All of this will affect the plan of action?

"How deep is the pond?" Dodge asks. "If less than 6-8 feet deep, maybe a dredging –though costly – would be a good idea. Many times golf course construction projects will use the spoils generated from a lake dredging to build new course features, making the project less cost prohibitive."

Dodge also considers the fertilization program in adjacent turf areas. If excessive, backing off on the fertilization program might help improve the pond condition in the future.

Other questions he asks include:

- Is there a long-grass buffer zone around the pond to help filter our unwanted plant nutrients?
- Is there a possibility of adding an aerator to the pond?
- Is there a power source nearby that can be utilized to install the aerator/fountain?

"I think that all of the [above] questions need to be answered and if practical corrective actions should be taken before choosing a chemical control to a problem," Dodge says. "In the end, the chemical solution may be the only practical one ... but only after exhausting other possibilities.

"Solving the problem before it becomes a problem applies with aquatic issues just as it does with most problems encountered in golf course maintenance," he adds. "While this is not always possible, it is something that all of us as superintendents should strive for. Reactive management is for losers."

Treating the source of a pond's problems and not the symptoms is the approach used by The Wilderness at Fortune Bay (Minn.) superintendent Vincent Dodge. "The proactive solution is to ask yourself why is there an algae problem in the first place," he says.

washed into the water. He also advises to only use the amount of fertilizer needed, as excess fertilizer will run off into the nearby bodies of water.

Another common mistake is using herbicides and algaecides to kill off weeds, which only deals with the symptoms of the problem, and not with the root problem in the pond water, Hicks says.

"This practice only serves to further pollute these bodies of water and make them more prone to further algae blooms and weed regrowth," Hicks says.

If it's too late and the pond is a mess – aesthetically and biologically – there are solutions, Ellison says.

"Proper assessment would be the first step to remedy an aesthetically poor pond," he says. "The typical cause of the excessive growth is a nutrient issue and a professional evaluation by a lake manager can establish a plan to remedy the situation.

"Water testing is often a good idea and can provide valuable information in solving the problems," Ellison adds. "The plan may include the establishment of aeration, aquatic weed and algae treatments and an annual maintenance program."

Superintendents fortunate to start with a clean slate during new pond construction should build ponds to a minimum depth of 8 feet, if possible, to minimize light reaching the bottom, Skorulski says. "The deeper water column should remain cooler, as well," he says. "The ponds should be built with a more shallow shelve around the perimeter where some plant growth is encouraged. The plants are beneficial and useful on many fronts."

Build a pond that adheres to the local storm water regulations, Ellison says. "An improperly built pond can have a significant effect on the sedimentation rate and length of time before dredging the water body may become a necessity," he says. "Proper construction will also benefit the establishment of a healthy fish population, if that is a desired goal."

When building, prepare with the future in mind, Dodge says. "During the construction process, it is always a good idea to route power lines to golf course ponds and lakes to accommodate future placement of fountains/aerators," he says. "Most places I have worked at that did not do this, sooner or later regretted not doing so."

Dodge suggests the creation of no-mow, longer grass buffer zones around all lake edges to help protect water quality.

With proper care and maintenance, even the most neglected pond can become an environmentally friendly and attractive water feature. **GCI**

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KEEPING SCORE

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.

As an equipment manager/maintenance shop manager I needed to find a way to show the superintendent what the value of the maintenance shop is to the Crown Golf Club. Traditionally the shop was considered nothing more than an expense the course could not get away from and needed to be reduced or eliminated. The alternative to having a maintenance shop is to farm out all critical maintenance and repair tasks to other shops such as the equipment dealer. Sending the work out is not only inconvenient, it is much more expensive. Suddenly, I got the idea to change our focus and start reporting how much the shop saved each day.

REAL NUMBERS. To get real numbers to work with I started by getting competitive quotes from outside shops on how much they would charge to do specific tasks and what their shop time charge is. That is when I discovered how much a bargain having our own shop really is. Here is a typical day last week:

SWEEPSTER REPAIRS. The generic gear box I ordered was half the price of the last remaining custom made gear box at the dealer. Oh, by the way, the generic gear box was made by the same company that made the original gear box for the sweeper company — ***$550 saved.***

TAP & DIE SET LAYOUT. Someone helping in the shop broke a tap. It happens. To see what taps and dies I have, I arranged them by size, coarse thread along the bottom row, fine thread along the top row. I discovered the set is complete and the broken tap was an extra. Not having to buy a new tap — ***$6.50 saved.***

BALL PICKER. Oddly, as it turns out, buying the whole roller as an assembly is about $30 less each than buying the parts separately. I bought three replacement assemblies — ***$90 saved.***

DOOR CLOSER PROBLEMS. The weather, radio interference from LED bulbs, sheet metal on the building and cold weather acting on the batteries in the outdoor key pads made them unreliable and frustrating to use. Past door company service calls only solved the problems for a short while. Purchasing two old fashioned wired keypads and installing them ourselves made all the problems go away. The wired keypads have their backup battery inside the building, and have a "program/operate" switch at ground level so no tall ladder is needed to change the codes. The wired key pads have a slimmer profile, nice positive feel to the buttons, have a light that tells you they are working, and the door opens or closes promptly. They are a joy to use. No door company service call needed to solve the problem — ***$294 saved.***

RADIO FAILURE. The rear door closer's radio quit working. The replacement was an easy to install plug in the power outlet unit with a wire running to the wall push button connection on the door closer. The maintenance shop crew installed it saving the cost of a door company service call — ***$98 saved.***

OUT OF WARRANTY MOWER MODIFICATION. The original battery pack had failed and needed replaced. The original style batteries because of where they were located could not be accessed for testing or troubleshooting. I chose to replace them with the same kind of battery the mower uses for starting. While they are the same weight and located close to where the original batteries were, they are easily accessible for testing, troubleshooting, visual inspection, etc. The new batteries were on sale for a third of the price of the original style — ***$260 saved.***

OTHER ADVANTAGES. Beyond the dollars saved, there is real value in being able to repair a mower in a few minutes and get it back out mowing again rather than shipping it off and waiting days before you get it back — ***Priceless.***

THIS DAY'S TOTAL. All this totals a savings of about $1,298.50, and while the repairs are different every day, my goal is to save more than what I am paid each day. While savings is not income, only sales can create income, money saved does show up in the bottom line figure.

In this example, the shop saved over a thousand dollars in one day. OK, I know the beverage cart girl can bring in a similar amount each day in sales, but you really do need both to keep the course running smoothly. Right? **GCI**

(**VINCHESI** *continued from page 34)*

incorporated into your system have given you the ultimate in control, communication and feedback.

Not matter where you are, you can check up with the system through a simple Internet connection. Once logged on, you can monitor the pump station operation, irrigation system operation and check on the various soil moisture, rain fall and temperature sensors installed throughout the golf course. The communication is all wireless and seamless. You recently ordered a Blackberry PDA device which allows even greater access to the system on an immediate basis, as well as increased interaction with your GPS based map and GIS system.

Through your Internet access as well as your future wireless PDA, you can look at the on-site weather station for current conditions or log on to any of several neighboring weather stations. You can also check the status of the pump system: what pumps are running, flow, pressure, alarms, and any injection and treatments you provide to the water. You can even turn your transfer pump from the river to the irrigation pond on or off and look at the amount transferring over the last 24 hours.

The new system does not just use water more efficiently and provide you with a great deal of feedback, but it also has reduced the irrigation maintenance significantly. The new sprinklers are much less maintenance intensive, but other parts of the system are also better. The pipe and fittings never seem to break anymore, unless of course when the crew hits something with the backhoe while adding drainage.

The slower velocities in the pipe, VFD drives at the pump station and better fittings are the reason for this. You have no glue in your system. The fittings are all gasketed, a combination of ductile iron and PVC. The threaded parts of the system are Schedule 80. Your designer required ACME threads wherever possible and the quick couplers are installed on brass swing joints so they do not twist off.

New technology has improved the ability to manage the water dispersed on turf while giving turfgrass managers increased control, communication and feedback.

The wire connections are waterproof and everything buried is accessible through a valve box, which is color coded to let the crew know what is in the box. The wire is also color coded so the crew knows what the controller station is watering.

The GPS base map in the central computer tied together with the GIS inventory system allows you to catalogue and inventory all maintenance on the golf course. The map is useful in irrigation system operation, taking care of dry spots or adjusting my program in the field. You also use the map to identify maintenance locations for the crew and use it to develop work orders. With the GIS, you keep track of preventive care of trees, and log all irrigation and drainage repairs. You have just started logging spot pesticide and herbicide application areas too so you have a record of what needs to get treated first when the signs of an outbreak are apparent. You see using the GIS aspects of the new system more and more in the next decade.

You also use the Internet connection and wireless connections to receive feedback from the irrigation system and the many sensors spread around the course. The sensors are "smart" in that they do not to ask what's going on; they automatically download information into the system and depending on what parameters you may have set they contact you through your cell phone. For example, if the soil temperature on your No. 8 green reaches a certain temperature, it lets you know so you can decide if it needs to be cooled down. It also works automatically, shutting down the irrigation system when the wind speed is too high or when the soil moisture level reaches a certain level. Sometimes, the system is so automatic you wonder why you need to be around so much.

However, that thought only lasts a minute or two, as you know that all of this technology is just a tool to help you make the right decision when it comes to using water. The new system has helped you save significant amounts of water and to improve the quality of water that is being applied. Bottom line, saving water these days is what it is all about. **GCI**

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.

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.

PRECISION FAN WITH HONDA ENGINE

This Precision oscillating greens fan is totally portable, as the original electric motor was replaced with a Honda 23 HP Model GX690 Engine using the original pulleys and adjustable fan belt. The RPMs are the same, with only less than one-half throttle required. The throttle, choke, hour meter and on/off switch came with the engine and the wiring was extended to the control panel on the outside of the fan. A Honda car muffler was installed with a 1-inch pipe for a very quiet operation, as it has one-half the decimals of a generator and is covered with a mesh screen for safety. The oscillation is now powered with a Model 220-1500W PowerBright ERP converter that is operated by the 12-volt battery. An 18-gallon fuel tank was acquired from Northern Tool & Equipment. The total conversion cost about $3,200 and it took less than a day to complete. This original design concept was performed by JR Wilson, equipment manager, and Brian Goleski, superintendent, at the Noyac Golf Club in Sag Harbor, Long Island, N.Y.

FAIRWAY YARDAGE MARKERS

The 27-hole Heron Creek Golf & Country Club, in North Port, Fla., previously used green and white striped "barber poles" placed in sleeves to mark 150 yards from the greens. Tommy Rainey, superintendent, replaced them using one pallet of Nature Walk Oak Patio Stones (approximately 19 inches by 13 inches by 1 ¾ inches) from Home Depot and made in-house yardage markers designating 100, 150 and 200 yards, with 250 yards on the par 5s. Two packets of 4-inch high stencils along with a ¾-inch air chisel attachment for an air gun was used to engrave the numbers into the stones. Each number was then painted flat black using about 1 gallon of paint. The staff placed them into the Tifway 419 Bermudagrass fairways and they are edged as needed. Total cost was less than $750 and it took less than 30 minutes to complete each stone.

(MILLER *continued from page 40)*

maintain its status as the world-class affair it is.

Many of us rush in, set up our Masters folding chairs at a place we want to watch from later in the day, and head out to explore the golf course. I set up at the tee blocks on the 10th tee and watched some of my favorite players come through.

At a break I walked down the 10th fairway and over to the spot near the confluence of the 11th, 14th and 15th holes, hoping to see Tenia Workman. She is the executive director of the Georgia GCSA and a longtime volunteer at the Masters. After a brief chat, I trekked back to the 10th tee, my folding chair and more golf.

When I arrived there, my chair was gone. Stolen! Swiped! I couldn't believe it. I had it clearly identified, so I scouted the area with another disbelieving Masters patron. It wasn't to be seen anywhere.

The incident hasn't changed, in even a slight way, the way I feel about the tournament, the golf course and the wonderfully generous club. But it does make me ask the old Vince Lombardi question, "What the hell is going on here?"

> "My suggestion is that when the HWW Book Award is given and it's clear that it will be a difficult purchase to make, the USGA should have a few hundred copies available for online purchase. You can order a U.S. Open shirt or a ball marker, but not the most recent USGA book award winner."

THIRD DEGRE NO. 2. When the USGA announced its 2015 Herbert Warren Wind Book Award Winner, Roger McStravick really wasn't a surprise. Roger spent several years researching and writing the book "St. Andrews: In the Footsteps of Old Tom Morris," and I anticipated its publication. The writing, the photos and the design promised it would be a great one, and I was anxious to add it to my library.

And I would, if I could figure out how to buy a copy. No help from bookstores, no real straightforward way on the Internet, and — despite several calls and messages — no help from the USGA.

My suggestion is that when the HWW Book Award is given and it's clear that it will be a difficult purchase to make, the USGA should have a few hundred copies available for online purchase.

You can order a U.S. Open shirt or a ball marker, but not the most recent USGA book award winner. Just a suggestion. **GCI**

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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

Patrick Williams
Editorial Intern

GRAPHICS / PRODUCTION

Jim Blayney
Art Director

Helen Duerr
Production Director

Carolyn Capka
Graphic Design Intern

Samra Kajtezovic
Graphic Design Intern

ADVERTISING/PRODUCTION INQUIRIES

Jodi Shipley
jshipley@gie.net, 216-393-0273

SALES

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

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

Bonnie Velikonya
Classified Sales
bvelikonya@gie.net • 216-393-0291

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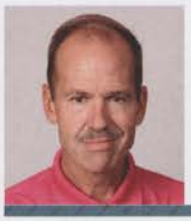
IF A CICADA COULD TALK



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

And he was just 17…

The good people of Cleveland have been abuzz about the re-emergence of the famed 17-Year Cicadas over the past few weeks. I was out in yard the other day observing them when I noticed something astonishing. One cicada was holding what appeared to be a tiny golf club and was wearing a teensy little Nike visor. I had discovered an entomological miracle: a golfing 17-Year Cicada who could talk! Here's the conversation I had with the little bugger:

ME: Hey little fella … what's your name?
CICADA: I'm Arnold … but everyone calls me Arnie.
ME: What's up with the golf club?
ARNOLD: Working on my short game … I haven't played since 1999 and I'm rusty as hell. What's been going on in the wide wide world of golf since the last time I was around?
ME: Well, remember how golf was a big hot hairy thing back 17 years ago and rich guys were building courses as fast as they could?
ARNOLD: Yeah, there must be like 30,000 courses I could play now, right?
ME: Not so much. Turns out we were a wee bit optimistic about how many people would be playing golf here in 2016. We've actually closed about a thousand courses since then and we're down to 15,000ish.
ARNOLD: Dang! Can I still get a tee-time someplace? Who should I call?
ME: That will not be a problem. Plenty of openings at the remaining 11,000+ public facilities in the USA. And there's this thing called GolfNow that lets you book a tee time right from your computer about anywhere for peanuts. It's convenient but it's actually devalued the price of a round of golf at lots of places and maybe caused more problems than it's solved.
ARNOLD: Why would courses discount their prices so much?
ME: Because they get desperate to fill tee sheets since there are too many courses and the number of golfers stopped growing.
ARNOLD: Jeez! I'm a bug and even I know that discounting is a death-spiral in the long run.
ME: Amen, my itsy-bitsy brother.
ARNOLD: I'll bet golf course maintenance is pretty simple now what with all the genetically modified grasses the Scotts Company was about to launch back in 1999. Just spray that Roundup and everything's perfect, huh?
ME: Nope. Never happened. Too much uproar about GMOs and not enough money to be made. Scotts actually bailed out of the golf business completely.
ARNOLD: I'm surprised one of the other 21 basic chemical manufacturers hasn't picked up on the idea.
ME: Ah, there's been a little bit of consolidation and now we're down to four or five big chemical companies, depending on how you count.
ARNOLD: Holy smokes! Has anything good happened in the past 17 years?
ME: Well, we were forced by the downturn in golf and the big recession back in '08 to get smarter. Courses had to start acting more like regular businesses and that's been positive. We've also gotten more careful about water and chemical use. Most regulators now view golf as a pretty responsible industry, thanks to hard work by a bunch of terrific superintendents. It's helped to grow some recognition and respect for supers.
ARNOLD: That's good to hear. Those dudes deserve some attention. I always thought it was a shame the way they were stuck down in the maintenance barn with no way to tell golfers about what they do and how important it is.
ME: Well, some computer geeks created "social media," which allows anyone to post stories and pictures about what they do. A lot of superintendents use one called Twitter to communicate with their members now.
ARNOLD: So what else is going on in Cleveland this summer?
ME: We're hosting the Republican National Convention in July.
ARNOLD: Who's the nominee?
ME: Donald Trump.
ARNOLD: Hah! Right. How are the Browns doing? The team had just come back last time I was around.
ME: They've had 25 starting quarterbacks since 1999.
ARNOLD: That's about as likely as Donald Trump being the Republican nominee for president of the United States.
ME: You said it.
ARNOLD: So Tiger must have won about 30 majors by now right?
ME: Yeah, about Tiger…**GCI**

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