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07.22

Cool like Kelly

Whether diving in a pond to chain a pump or mowing in near-freezing rain, these women pursue their careers in turf with gusto

Kelly Kuchelmeister, superintendent, Sinnissippi GC, Rockford, Ill.

PLUS

TDRs in the spotlight

Dr. D discusses LIV Golf

Dave Johnson honored at U.S. Open

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Jump right in

Whether diving in a pond to chain a pump or mowing in near-freezing rain, these women pursue their careers in turf with gusto

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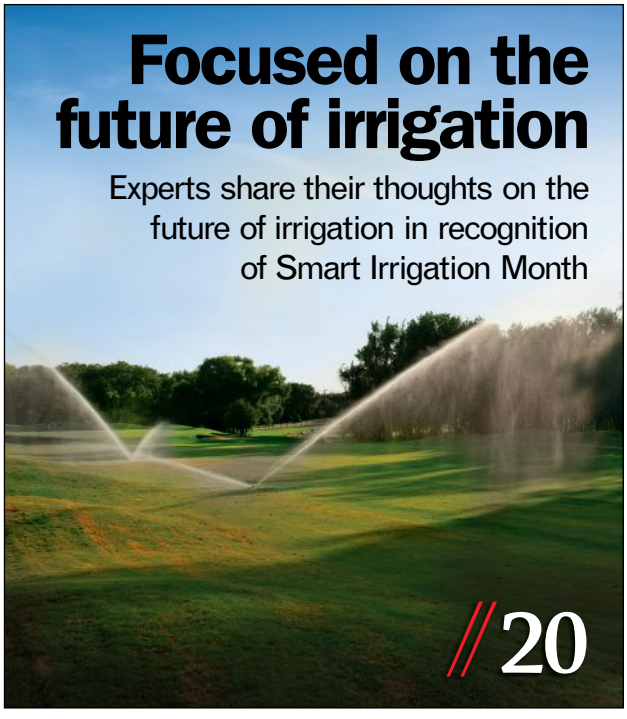

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SUPER SCIENCE

COVER PHOTO BY: TIM KLEIN PHOTOGRAPHY

Golfdom

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"I contacted Carroll to learn more about her presentation and how her paper — available online — can help our readers. I also asked her how that talk, given to a room full of superintendents in Raleigh, N.C., went."

SETH JONES, *Editor-in-Chief & Associate Publisher*

Three tips to grow the 3-percent

In my free time (ha!) I read chapter publications to see what is being written about at the local level of the industry. I get quite a few of the various chapter publications, both in print and via email. If you have a chapter publication and I'm not getting it, I'd be honored to be added to your circulation list.

It was in the new *Carolinas Green* (the official publication of the Carolinas GCSA and a fantastic read) that a story caught my eye: "Labor a hot topic at Return of the Southeast Conference." At the conference, Devon Carroll, Ph.D., solutions development manager, Bayer Environmental Science, gave a presentation to attendees on her research paper titled, "Women in Turf: A Qualitative Study Examining How Women Have Sustained Their Leadership Role in the Turfgrass Industry." Based on the article, the presentation was a success and created some insightful discussion.

Knowing that this issue of *Golfdom* has a cover story focused on women in turf, I contacted Carroll to learn more about her presentation and how her paper — available online at **jae-online.org** — can help our readers. I also asked her how that talk given to a room full of superintendents in Raleigh, N.C. went.

"I'll admit I was a little nervous to give that talk," Carroll told me about the presentation at the Southeast Conference. "I'd given it a few times to women at different women in turf events. That was the first time I gave it to guys. The response was super-positive. They were asking me specific things like, 'What can I do to make sure the women at my course feel like a part of the team?' and 'What can I do to attract more women?'"

Those questions were also my questions, so I asked Carroll to elaborate. "This is largely related to my own experience working on courses, and not necessarily from my research — in my opinion, there are three things you can do to make women feel more comfortable," she said. They are:

- **Be considerate about staff clothing.** "I worked at one club that gave me a men's XL polo. The sleeves are down to my elbows, I feel ridiculous, I look ridiculous. It was a signal that I did not belong on that team."
- **Think through and consider the locker room and bathroom situation.** "I understand that not every facility is going to be set up to have men's and women's rooms, but just think about it. It could be as simple as putting a lock on the main door."
- **Consider the overall culture of the crew.** "Like it or not, any time you put a group of guys together, sometimes there will be language or topics of conversation that aren't professional. Keep in mind that a golf course crew room is a professional setting. Whether the ladies are present or not, keep the culture approachable if and when women do join the crew."

On page 14 of this issue, our cover story, "Jump right in," profiles four women in the industry and their experience maintaining golf courses around the country. Digital Editor Sydney Fischer and Managing Editor Jon Delozier collaborated on the story and did a great job spotlighting these turf professionals. We're happy to share their stories.

Where will this women in turf trend go? Carroll remains optimistic.

"It's hard to predict, but I feel good about where we're headed," Carroll said. "I remember going to a conference and being the only woman in the room. Now, eight years later, it's still heavily male-dominated, but women are gaining traction. I don't think it'll ever be 50/50, and I don't think that is the goal. Women are three percent of the golf course working population right now, and I'd love to see it hit 5, 10, 15 percent in the next few years. I definitely see it tracking that way."

Email Jones at:
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NEWS, NOTES AND QUOTES

//SILVER PLATTER

Dave Johnson, director of grounds at The Country Club, took home some hardware, becoming the first recipient of the E.J. Marshall Platter.

USGA HONORS U.S. OPEN SUPERINTENDENT

DAVE JOHNSON PRESENTED WITH E.J. MARSHALL PLATTER

By Seth Jones // *Editor-in-Chief*

It was just minutes after Matt Fitzpatrick walked off No. 18 at the Country Club in Brookline, Mass., as the 2022 U.S. Open champion. Mike Whan, CEO of the USGA, took to the podium to present the trophy to the Englishman. But before the U.S. Open trophy presentation, there was one more piece of hardware to hand out.

Introducing the E.J. Marshall Platter, an award for the superintendent of the host course.

"Most traditions at the USGA date back over 100 years. But today, right now, we're going to start a new one," Whan said during the broadcast. "We've never done this before in 127 years, but today we're going to give the E.J. Marshall Platter … And that's going to go to an incredible partner in agronomy and course set-up. We're giving it to The Country Club's Director of Grounds, Dave Johnson."

A visibly emotional Johnson held up the platter as the surrounding crowd roared in appreciation.

"I was totally taken back, not expecting it. I was completely honored," Johnson told *Golfdom* on Monday following the tournament. "(I found out about the award) when Mike Whan announced it. I was totally taken by surprise. I am just really proud that I get to help elevate our industry and be a part of letting people know what we do, and the value we bring as golf course superintendents."

The award honors E.J. Marshall, chair of the greens committee at Inverness Club, Toledo, Ohio. In 1920, Marshall, preparing Inverness for the U.S. Open, reached out to the USGA and the U.S. Department of Agriculture to seek agronomic advice when patches of turf started dying on greens. Later that year, theUSGA formed the USGA Green Section to provide course care expertise, which it still does today.

Visit **Golfdom.com** to see a Zoom interview with Johnson in regards to the tournament, the ensuing work that will take place to recover from the U.S. Open and, of course, his reaction to being presented with this new honor.

//ASSISTING ASSISTANTS

GREEN START ACADEMY BACK AT PINEHURST

Applications for the Green Start Academy, a leadership and development program for assistant superintendents, are now open. The application window closes Aug. 1.

The event, co-hosted by Bayer, John Deere and Rain Bird, returns for a second year to Pinehurst Resort in North Carolina. The event takes place Dec. 12 to 14. Topics presented by top leaders in the industry include balancing a budget, how to manage diversity, equity and inclusion in the workplace, resume building, networking tips and more.

The Green Start Academy annually welcomes 50 assistant superintendents from across North America to participate.

//JACK OF ALL TRADES

MORGAN NAMED VP, PROJECT DEVELOPMENT

Landscapes Unlimited named Jack Morgan vice president, project development, after 23 years with the company. Morgan's role formalizes Landscapes Unlimited's capability to lead capital strategies, master planning, pre-construction, total project design-build and fully integrated program management solutions.

Jack Morgan

Morgan and his team deal with total development and major redevelopment management of turf care complexes, practice facilities, clubhouses and other amenities in addition to golf courses.

PHOTO BY: WELLGLAD / ISTOCK-GETTY IMAGES PLUS / GETTY IMAGES (GOLFBALL); COURTESY OF THE USGA (DAVID JOHNSON)

//WINNING TIME

A TORRENT GOES TO THE WINDY CITY

Steve Kuretsky (left) was awarded a new Turfco Torrent 2 Debris Blower from Scott Kinkead, executive vice president of Turfco Manufacturing, as the grand prize winner of Turfco's 2022 Golf Giveaway. Kuretsky accepted the blower on behalf of Cantigny Golf Club, Wheaton, Ill., where he is employed as director of agronomy. "Cantigny Golf Club is known as one of the top public golf courses In the Midwest, and we are happy to give this award to Steve, knowing that it will be put to good use, helping to keep the Cantigny golf courses looking and playing their best for years to come," Kinkead said.

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@BorRazu13
Superintendent,
Eastpointe CC,
Palm Beach Gardens, Fla.

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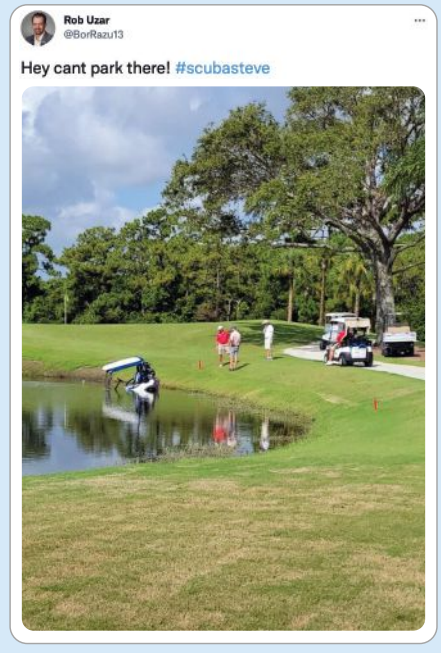

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//QUALITY PROMOTION

QUALI-PRO PROMOTES BLODORN

After six years as an area manager, former superintendent Paul Blodorn has been promoted to key accounts manager at Quali-Pro.

Blodorn, a Certified Golf Course Superintendent, received his bachelor's in plant and soil science from the University of Massachusetts. He has spent his entire career in the turfgrass industry as a superintendent and distributor sales representative. Blodorn is a member of both the Long Island GCSA and Vermont GCSA.


Paul Blodorn

"I have enjoyed constantly learning new ways to do things from interactions with people in the industry," Blodorn said.

//IN MEMORIAM

PAST GCSAA PREZ BAIDY PASSES

Joseph G. Baidy, a long-time superintendent and agronomist, died on May 6. He was 82.

Baidy was a superintendent for 56 years. During that time, he served in many roles including president of the Allegheny Mountain GCSA, president of the Greater Pittsburgh GCSA and president of the GCSAA. During the latter part of his career Baidy worked with notable golf course architects including Jack Nicklaus, Arnold Palmer, Robert Trent Jones Jr., Tom Fazio and more.

Baidy was a former Marine deployed with the Third Force Recon Battalion Fleet Marine Force (Special Forces). Baidy, a father and grandfather, recently celebrated his 57th wedding anniversary with his wife Judith.

//GOLFDOM WISDOM

We are in a bold new era when a superintendent might be presented an award at the conclusion of an event. So be sure to keep your hands free until the conclusion of the trophy presentation. That includes your radio as well as your Rolling Rock. #GolfdomWisdom

Legends Initiative

Bob Farren

Director of golf course and grounds management

Pinehurst Resort & CC, Village of Pinehurst, N.C.

By Seth Jones

Started by Anuvia, the Legends Initiative celebrates superintendents who have gone above and beyond in their careers — not just in maintaining tremendous golf courses but also in their contributions to the industry, creative problem solving and mentorship. *Golfdom* sat down with Anuvia Legend Bob Farren to discuss this month's Adaptive Championship, surviving summer and the latest on USGA's partnership with Pinehurst Resort.

This month Pinehurst Course No. 6 is hosting the USGA's inaugural U.S. Adaptive Championship. How are preparations going for the tournament, and how is it different from other tournament prep? It's a great opportunity. We've looked forward to it since they announced it. There's a learning curve. You have to look at things from a different perspective. The USGA is excited for it.

It will give us an opportunity to engage the community with another great golf course, Pinehurst No. 6. Jerry Everett is the superintendent of that course. No. 6 sets itself up for the event beautifully. All of the fairways, tees and bunkers are easily accessible. We made some small tweaks to the bunkers, but that's all.

Now that we've entered summer and the busy season for golf, how do you keep the crew motivated to keep charging forward? We're on our third week of aerifying right now — No. 5 is getting aerified, No. 6 is preparing for the Adaptive Championship, No. 8 is in a full agronomic renovation program — so we've got tentacles going in all directions. We stress that everyone has to be on the same page, cooperating and maintaining a reasonable sense of sanity as we try and do all of this. It increases our need to focus on the marathon versus sprint aspect.

There is a lot going on with the USGA and Pinehurst Resort. What is the most current update on progress in the Village of Pinehurst? We broke ground on Golf House Pinehurst; there was a ceremony following the U.S. Women's Open at Pine Needles. That construction is getting more underway every day on our main campus. They expect construction to be finished by early 2024, before our next U.S. Open Championship here (on Course No. 2 in June 2024).

I've been very impressed with (USGA CEO) Mike Whan, his energy and enthusiasm, his outlook and his perspective. One of the neat things he said in his opening remarks is, when you decide on a site, you expect people to ask, 'Why that community?' He said no one has questioned, 'Why Pinehurst?' Because Pinehurst is just a logical fit. No one has questioned the decision, which is remarkable. We're proud to have them here, along with the USGA Green Section and the equipment-testing and research facility.

Ask Thad

By Thad Thompson
Superintendent
Terry Hills GC, Batavia, N.Y.

Why do you love being a superintendent?

— Allen Knight, co-host, Pullin Weeds Podcast.

Easily the easiest and hardest question of this series. It's easy to say I love riding around the evening before a big tournament with tremendous satisfaction in all that my team has accomplished but I'd be lying. If I'm riding around the evening before a tournament, it's because I'm still working on something that I don't think is quite right.

Do I do it because golfers tell me I'm doing a great job? I don't know about your job, but most golfers point out things that they don't like, not the miracle work we do when they're still in bed. Because of the money, right? This is my 34th season, I started out during the 80-plus hour weeks of getting taken advantage of. If I ever did this for the money, I would have been out of the business by 1998.

Being a golf course superintendent gets in your blood. It's a lifestyle that you must embrace. It isn't for everybody and those outside of the business don't always understand. It isn't all about growing turf. After a few years nobody will ask about your grades in turf school, you will prove yourself to a crew or you won't.

To be successful you will become a leader. I love managing the people on my team and having my dog at work. I love seeing my employees take pride in their work. I love teaching and talking turf. I love grinding reels and puttering around the shop. I love figuring out irrigation and getting young people interested in golf course maintenance. When it comes to that big tournament though, I must admit, I love the pressure. I love being the go-to guy.

This is the best profession in the world.

*Got a question for Thad? Tweet to **@TerryHillsMaint** and **@Golfdom** or email Thad at **thadthompson@terryhills.com***

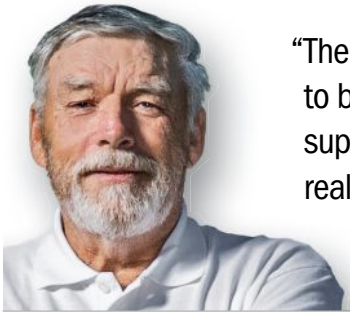
//GCSAA IN THE NEWS

EQUIPMENT MANAGERS CAN GET CERTIFIED

Turf equipment management professionals can now add some letters to their business cards thanks to a program created by the Golf Course Superintendents Association of America (GCSAA).

The Certified Turf Equipment Manager (CTEM) program is the first certification program for professionals who specialize in maintaining turf equipment, the association says. GCSAA added the equipment manager classification to its ranks in 2015. In 2017 the Equipment Manager Certification Program (EMCP) began, which demonstrates key competencies in eight different areas on two levels. To become a CTEM, equipment technicians must complete level 1 and level 2 of the EMCP program, be employed as turf equipment managers and have three or more years of experience.

"Ever since equipment managers became a part of the GCSAA family, we have continually expanded our resources and opportunities for them to grow their careers and CTEM is that commitment realized," said Rhett Evans, CEO of the GCSAA.



"The many forms of digital connections have proven to be tremendously useful to today's golf course superintendent. However, I believe there is a very real danger of becoming digitally isolated."

JIM MOORE, *retired director of education and outreach, USGA Green Section*

The things that you miss in today's digital world

Superintendents have it made today. Now that I have made you mad let me explain myself. What I mean by this is that never before have superintendents had the ability to get help from so many others with such ease.

Before cell phones, social media, text messages and emails, most superintendents were on their own — effectively isolated from their peers. This was particularly true in towns with only one or two golf courses. Your connections consisted of a magazine or two once a month, a state conference (if your course could afford it) and visits from salespeople.

Again, if your course had the funds, you might have had a visit from the state turf Extension agent or the regional USGA agronomist. For most, getting help on solving problems was a matter of digging through textbooks and a lot of trial and error.

Power at your fingertips

I cannot overstate the power of digital connections. For example, the ability to post, "Are you seeing armyworms?" and receive answers in seconds is remarkable.

Equally extraordinary is the digital help in identifying weeds, insect pests and disease outbreaks. You can take a picture with a cell phone, post it to an app and wait a few seconds for others to chime in. This is so easy and commonplace it is easy to forget how hard it used to be.

To accomplish the picture identification scenario I just described when I was a superintendent: you had to break out your 35mm camera and make sure it had film; take the picture; wait days for the development of the film; hope that at least one of your pictures had proper exposure and focus; put the photograph in the mail and wait more days for it to get to the person you hoped could help you.

Another advantage of digital connections is the ability to easily talk to your peers and technical support. Consider how we used to do it. You would pick up the phone in your office, make an expensive long-distance call and hope the person you were trying to reach happened to be next to the phone in their office (good luck!)

Phone tag was inefficient and extremely aggravating.

Danger to digital

So yes, the many forms of digital connections have proven tremendously useful to today's golf course superintendent. However, I believe there is a very real danger of becoming digitally isolated. There is real power and worth in many of the ways we did things in the old days.

Face-to-face interactions at conferences allowed for much more detailed and diversified conversations. They were also therapeutic in that you realized others faced the same challenges as you did. Magazine articles still provide help with the identification of problems and in-depth scientific analysis of why and how they occur.

As for those old dusty textbooks on your shelf? 99 percent of the information in them is still accurate. Nothing can help you understand complex problems better than a couple of hours of quiet reading and study of agronomic principles.

Finally, in my opinion, the most valuable communication tool at your disposal is not digital — it's personal. Make the time to visit with salespersons and tap into what they see as they travel the region.

Periodically invite one or more of your trusted peers to visit your course and ask them for an honest evaluation of what you can do better. If you can't afford to implement a suggestion, it should go into a long-range plan for the future.

Return the favor by being willing to visit other courses and superintendents in your area. An hour or two riding the course and having lunch together will do more than 100 text messages. And in addition to gathering valuable information regarding how to manage a golf course, you might very well make a friend for life.

That's something you can't do with an emoji.

Jim Moore is the retired director of education and outreach for the USGA Green Section. While with USGA, Moore made more than 1,000 consulting visits to golf courses in the U.S., Mexico and Germany. Now retired, he lives on the family farm in McGregor, Texas. He can be reached at jfcmoore@gmail.com.

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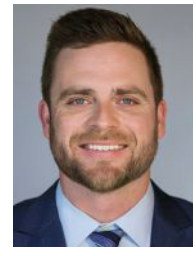
Assurance through Ascernity

Neil Packard relies on Ascernity fungicide from Syngenta to treat his largest problem

Eventually, all golf courses will experience different turf diseases, whether it be root rot, *Pythium* or large patch. For many superintendents managing warm-season turf, large patch is not only an eyesore but can also devastate Zoysia turf. This is true, even at the prestigious Dallas National Golf Club.

Since the beginning of his career in the golf industry, Neil Packard, superintendent at Dallas National, has been battling large patch. Every spring, Packard was sure to see large patch all over the course. After trying product after product with little to no improvement, he reached out to one of his distributor reps to ask what products they had that could tackle this problem. He introduced him to Ascernity® fungicide, and **Packard felt his eyes had been opened.**



Neil Packard

"The main reason we wanted to test Ascernity fungicide was for Zoysia fairways. Previously we had been using other fungicides and didn't see much improvement. **Nothing was really working,"** Packard says. "We started seeing more and more brown patch every spring. It was getting out of control. **My distributor showed me what Ascernity could do. I needed something to work, and it worked very well."**

In the fall of 2020, **Packard began using Ascernity and felt it was the first time they really gained control of the disease.** In 2018, he switched products and found some relief but noticed that large patch kept coming back.

"We are constantly looking for better, and that's how we found Ascernity," says Packard. "This year we honestly didn't see any large patch. **We did two applications last year, and that completely controlled it."**

Packard's plan

Packard has a simple plan for controlling large patch: two applications of Ascernity on all 110 acres.

"We will make a fall application, usually when the temperatures start dropping, so late September or early October, then a second application thirty days after," Packard explains. "In the spring, it's mid to late March or early April. This year, we didn't see any disease and kept waiting and waiting and waiting until we were out of the patch weather. **We didn't see one single large patch after the Ascernity application."**

Even on the tougher areas of turf along the course, Packard relies on the power of Ascernity.

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more wet," says Packard. "We used to have a really hard time controlling large patch on this area of Zoysia, and **now we don't have to work nearly as hard to get even better control."**

For the technicians at Dallas National, using Ascernity for large patch treatment is one of the simpler additions in their arsenal. Packard has even been able to spray it along with his regular preemergent treatment with success.

"My favorite aspect about partnering with Syngenta would be just knowing that the products are good and they aren't just filler," Packard says. "Syngenta has products that work. Usually, when you use a product, you want to see results. When you use Ascernity, and you see nothing, that is the result. It's sort of backwards, but the best outcome is no outcome. That means the product is actively killing the disease."

Keeping the customer happy

As the seasons have progressed without large patch, **Packard has found that the players and guests are happier than ever.** Before using Ascernity, it was likely Packard would receive complaints of large patch causing orange soft spots throughout the course. Since employing Ascernity, these complaints have been few and far between.

"When there's no patch, the turf quality is night and day different," Packard explains. "When the patch is there, it's soft, orange, weak and looks bad. **When using Ascerntiy it's consistent and sets us up for a better spring and fall. And when you have better quality turf, then the more compliments you get from the players and guests, even the board of directors. People tend to be happier when the grass is green."**

In the last five to seven years, Packard and the crew at Dallas National have been battling a particularly rough infestation of large patch in their Zoysia, but this year was different.

"This past year, we just didn't have it," says Packard. **"Ascernity has over performed.** Whenever we tried different products in the past, I'd always have to go in the spring and spot-treat, hoping something helps. The fact that we didn't have to make a spring application still blows my mind."

For Packard, the peace of mind he receives from using Ascernity and partnering with Syngenta has completely changed the way he approaches handling turf problems. In the past, he would have to employ multiple products to pretreat and then spot-treat. Now, with the reassurance that Ascernity offers, he no longer has to prep for the works. He can instead focus on giving the players a better playing experience, which has made all the difference.

"When you can eliminate or control things in your control — like large patch on Zoysia — you can then focus your time on other things, which in turn makes the course even better," Packard says.

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Jump right in

By **JON DELOZIER** and **SYDNEY FISCHER**

Whether diving in a pond to chain a pump or mowing in near-freezing rain, these women pursue their careers in turf with gusto

History may have been made at the 2021 U.S. Women's Open at the Olympic Club in San Francisco when the crew, full-time and volunteer, proudly boasted a large contingent of women maintaining the course. Last month, history repeated itself when another large contingent of women in the golf maintenance industry ascended on Pine Needles Lodge and Golf Club, Southern Pines, S.C., to maintain that course for the best women golfers in the world.

"Everyone needs to get used to seeing us out there at the (U.S.) Women's Open ... We all love this industry and love this game," says Jill Seymour, superintendent for Monmouth County, N.J.'s six public courses. "I drive on the golf course daily, and heads still turn seeing a girl on the golf course, let alone if I walk up to them and tell them I'm the boss. We're here to stay."

We spotlight these four women — working on America's fairways and greens — who see golf maintenance as a rewarding role.

Kelly Kuchelmeister

SUPERINTENDENT, Sinnissippi Golf Course, Rockford, Ill.

When Kelly Kuchelmeister graduated high school, she had a difficult decision to make. The University of Kentucky recruited Kuchelmeister to play softball but she didn't want the sport to become her life. She decided to postpone college and instead take a job at Countryside Golf Course in Wisconsin.

"A friend of mine worked at Countryside and said they were hiring for help inside the clubhouse. I started off cleaning the clubhouse and scrubbing toilets," Kuchelmeister says. "Come fall, they were shorthanded outside and asked if I wanted to help. I immediately hopped on a mower on the fairway. It was pouring rain and 40 degrees. It was awful, but when I came back inside, they offered me a full-time job on the grounds crew."

After four years at Countryside, Kuchelmeister moved to Rockford, Ill., where she attended college. Sinnissippi Golf Course hired her when the superintendent retired in 2017. There are five courses in Rockford's Park District, and Kuchelmeister says the crews all work closely together. "If you need help, you call each other," she says. "Getting to learn from guys who have been in the industry longer than I have and being respected by them has been awesome."

Save Sinnissippi

In 2018 Sinnissippi needed help. With budget shortfalls across the parks district, the course faced permanent closure. Kuchelmeister found herself off the golf course and in meeting rooms.

"There wasn't much I could do — I kept my budget lean while trying to produce a quality product," she recalls. "(Director of Golf) Ann Broomfield and I did a lot of speaking, advocating for the course. We told them, here's the business end, but the biggest thing is, just come out and golf."

The community responded with a "Save Sinnissippi" campaign, as well as a spike in rounds played and talk of closing the course has gone

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PHOTO BY: TIM KLEIN PHOTOGRAPHY

"THAT'S WHAT I DID. TRACTORS, MOWERS, BACKHOES, DUMP TRUCKS – ALL KINDS OF STUFF. DON'T BE AFRAID TO LEARN AND KNOW THAT YOU'RE NOT GOING TO BE GOOD AT IT RIGHT OFF THE BAT. IT TAKES TIME."

— Kelly Kuchelmeister

SINNISSIPPI GC, ROCKFORD, ILL.

Continued from page 14

away. "The community decided that Sinnissippi was valuable," she says.

Have no fear

Kuchelmeister encourages women getting into the industry to reach out and follow others on social platforms. She also urges women to get on as much equipment as they can.

"That's what I did. Tractors, mowers, backhoes, dump trucks all kinds of stuff," Kuchelmeister says. "Don't be afraid to learn and know that you're not going to be good at it right off the bat. It takes time."

— S.F.

Jill Seymour

SUPERINTENDENT, Monmouth County Parks System, New Jersey

A couple of years studying psychology in college was enough for Jill Seymour as the golf industry and associated outdoor work proved irresistible. That desire and more than two ensuing decades in the industry earned her the role of superintendent in New Jersey's Monmouth County Parks System.

Jill Seymour, superintendent, Monmouth County Parks System, with the 2022 U.S. Women's Open trophy.

PHOTO BY: JILL SEYMOUR

Seymour says she's never looked back after her drastic change in career plans.

"I was doing an internship, two and a half years into the (psychology) program," she says. "I remember coming out of a building and seeing four inches of snow on the ground. It made me mad because I missed it, and no one told me it was snowing. It hit me that I didn't want to be in an office. I wanted to find something else. I kind of floundered around for a few years, then a friend told me about a degree they were going toward."

That talk led Seymour to Penn State University's turfgrass science program, where she earned a bachelor's degree that paved way for multiple stints as an assistant superintendent in Pennsylvania and New Jersey. Seymour also served as an adjunct professor of turfgrass science at New Jersey's Mercer County Community College.

Now a seasoned industry veteran, she is entering her seventh year as Monmouth County Parks System golf course superintendent.

"I fell in love with this life, this line of work," Seymour says. "I lived with my parents for a summer in Maryland and got a job at a golf course, thinking I should give it a try before I go to school for it. As soon as I got there, I was helping with bunkers, cutting the pins, doing morning set-up. I absolutely fell in love. I knew this is where I wanted to be.

"After that, it took about 15 years of hard work to get to this point," she continues. "But here I am."

A boom for public golf

The Monmouth County Parks system includes six golf courses in Colts Neck, Wall, Millstone Township, Farmingdale, Manalapan and Neptune, N.J. The courses were steady before, but then the pandemic created a full-on golf boom of new and former golfers for the public courses.

"We don't have memberships here, as a public course, so anyone who wants to pick up golf is always welcome to come out," she says. "The increase for us has been huge. It's hard to get anything done in the afternoon once everything gets rolling. It's hard to get the labor in here and get enough people to help us out."

Even on the most hectic days, Seymour says she's happy to be part of the first and second generation of women who've normalized being part of the golf industry and sitting in leadership positions.

"For me, it's always been about being eager and being passionate," she says. "Everyone needs to get used to seeing us out there at the (U.S.) Women's Open. The grass doesn't know male or female. We all love this industry and love this game. I drive on the golf course daily, and heads still turn seeing a girl on the golf course, let alone if I walk up to them and tell them I'm the boss. We're here to stay."

— J.D.

Tami Jones

SUPERINTENDENT, DeSoto Golf Club, Hot Springs Village, Ark.

Growing up in southwest Florida, a passion for golf and a desire to enter the industry took hold of Tami Jones as a teenager.

Now a 40-year industry veteran and superintendent at DeSoto Golf Club, Hot Springs Village, Ark., Jones is happy she chose to "be there" while working her way up from irrigation and mowing duties.

"I really didn't know what I was doing at first," Jones says about her first industry job. "I was just looking for a high school summer job. I wanted to get in early, get off early and get to the beach with my friends. I had a car, and I needed gas, so that's how it all started."

Jones says proving herself reliable and simply showing up went a long way.

"It was a matter of choosing to be there and put my full effort into it," she says. "It was a matter of getting out there, being seen and talking to people, showing them I'm here to do the work. I just wanted to get involved, and people could see that."

A daring act also played into landing her first golf industry job.

"There were submergible pumps at the course I was working at," Jones says. "There were two of us standing on a floating dock. The superintendent said, 'Whoever dives in and puts a chain around the pump gets the job, the irrigation position.' I dove right in, put the chain on and told them to haul it out. The other guy didn't even go in."

Jones' efforts eventually earned her Integrated Pest Management (IPM) credentials — an area of the industry she worked in for roughly 10 years. That was followed by stints as assistant superintendent at Highland Wood G&CC, Bonita Springs, Fla., and her first superintendent position at Osprey Ridge Golf Course adjacent to Walt Disney World.

She took over as superintendent at DeSoto Golf Club in 2018, making her the first woman in Arkansas history to hold that title at any course.

"I just love leading a team," Jones says. "I don't really look at myself as superintendent. I look at myself as the lead team member. I handle the purse strings. The assistant handles the crew. He and I make up the plans, he executes, and I make sure it's paid for. That about sums it up."

Jones is also the current vice president of Arkansas' GCSAA chapter, the first woman to take that mantle. She says a run for Arkansas GCSAA president could be on the horizon. Moving up to that position would mark another first for women in the state.

"I don't really look at these things like that," Jones says. "I just try to focus on it as a progression and something that I really want

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to do, something I know I'd be good at."

Jones offers advice to young women who have golf industry aspirations as she did.

"Above all else, believe in yourself," she says. "Get to know your local GCSAA chapter. Show people you want to put in the work. Find outreach programs. Go to meetings. Just stay involved and never stop."

— J.D.

Sally Jones, superintendent, Benson Golf Club, added the title of general manager of the club in 2015.

Sally Jones

GENERAL MANAGER/SUPERINTENDENT, Benson Golf Club, Benson, Minn.

At the age of 15, Sally Jones spent much of her time playing and exploring golf courses in her area. When she started picking the range at one of those courses for fun, she knew her career path.

Jones attended Penn State University in the Turfgrass Science program. After graduation, she returned to Minnesota and became the second assistant at Dellwood Hills CC for one season before becoming the superintendent at Benson GC.

Her advice to other young women who want to pursue a career in turf is to do the opposite of what she did when she first started.

"I did get intimidated by going to events and being the only female," she says. "There's a lot of small talk and conversation outside of work that was difficult. There are a lot of topics that I just didn't connect with. I was never mistreated, but the struggles I have gone through have also made me who I am."

Jones is the only woman on her grounds crew, but she emphasizes her crew respects her all the same.

"I just feel like the personalities that we have gathered here will work well together," she says. "All of them have an invested interest in the game of golf." *— S.F.*

PHOTO BY: SALLY JONES

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TSP GOLFDOM JUL22 R2_05-31-22

Focused on the future of irrigation

BY JON DELOZIER

Every July, the Irrigation Association celebrates Smart Irrigation Month. The initiative gives irrigation professionals an opportunity to boast about the benefits of smart irrigation and share how their company promotes that practice. This year's theme is "Proud of our past. Focused on our future."

Using that theme as a queue, we looked west to ask three friends of *Golfdom* — a longtime superintendent and two young turf brothers — about the future of irrigation.

Thinking water 365

Water and irrigation hurdles stemming from the drought seem to pop up in more areas of the Pacific Northwest, says Josh Lewis, a partner at Los Angeles-based Gradoville and Hertzing Management Group. Lewis has worked in golf maintenance for more than 25 years, with time spent at seven top-100 courses.

"The thing with irrigation and water, in general, is that (the drought) region is getting very big," Lewis says. "We're starting to see these issues creep into Oregon quite a bit. Colorado is just getting hammered right now. Texas, the whole southwest. In a place like Oregon, the water is just so shallow in a lot of the wells right now. It's still a regional problem, but it is definitely spreading."

Josh Lewis

As that water shortage region gets bigger, Lewis says his firm's clients put extra effort into staying up-to-date on management technology.

"We're thinking about water out here 365 days a year," Lewis says. "That can mean in-ground moisture sensors, handheld meters, TDRs. If you don't have handheld moisture meters at this point, you've been living under a rock or something. That's some of the greatest tech, in my opinion, to come along in decades. Irrigation systems, obviously, are also making several updates to controls and hardware. People are really coming to that realization, the need to upgrade."

Diving into drones

Jason Fuertes, superintendent, Industry Hills Golf Club at Pacific Palms Resort, City of Industry, Calif., foresees irrigation stalwarts like TDRs complimented by drone technology.

Jason Fuertes

"The TDR testers have worked well for us," he says. "We've talked about bringing out the drones to start paying attention to areas that are really being affected. It'll show us an area where we can

In honor of the Irrigation Association's Smart Irrigation Month, we talk to boots-on-the-ground pros about the future of irrigation tech in golf

say, 'Do we really need water?' or, in the future, is this an area where we're going to have to remove some turf?"

Brian Fuertes, Jason's younger brother, assistant superintendent at Spyglass Hill Golf Course in Pebble Beach, Calif., agrees that drone technology will be a big part of the future of irrigation.

"A lot of my master's degree was dealing with drone technology, hyperspectral imaging, hand-held spectral radiometers, things like that," he says. "It was interesting to dive into. Drone technology hasn't been implemented here yet, but it could definitely help out. The hyperspectral camera can detect things and see colors in a way we can't necessarily see."

A drone with a hyperspectral camera can detect plant diseases, weeds and soil erosion problems, Brian Fuertes says. He adds that when used in agriculture, it can estimate crop yield.

"When I used that camera, it could detect all of these areas on the verge of wilting and if something else was out of the ordinary," Brian Fuertes says. "It was able to give us that data back very quickly. In a golf course setting, it can give a great general idea of what to expect over the course of a few days."

The younger Fuertes adds that while a hyperspectral camera can be helpful in proactively detecting drought-related problems, it can be put to even better use in finding more subtle hurdles that occur under normal conditions.

"A lot of the problems we're facing are quite obvious and just right there in front of you," Brian says. "(But) you have to also think about training someone in being proficient in observing the imagery and compiling the data. The drone is another eye, which is good."

Hyperspectral cameras have also been used to estimate chlorophyll concentrations in pond water as well as the scope of pest infestations.

Come together

Lewis hopes to see an expansion of artificial intelligence (A.I.) into irrigation technology, and, like the Fuertes brothers, he believes drones will play a key role in mitigating any new or expanded struggles with irrigation.

"All of those things will be integrated into your entire system and start to talk to your entire system," he says. "You're going to see this technology that, right now, is existing on its own as a stand-alone start to be able to talk back and forth. You'll have the drone system talking directly to irrigation central control. All of that equipment speaking and playing well together will take a lot of work off the superintendent's or the assistant's shoulders."

PHOTO BY: JAMESREILLYWILSON / E+ / GETTY IMAGES

15 years later, another Tiger effect

Tony Whelan, National Sales Manager, Rain Bird Golf, discusses what he sees with irrigation renovations. To read his full article, visit **Golfdom.com**

The surge in golf demand is driving an increase in irrigation system renovations and course remodels. There has been minimal disturbance of access to players. Therefore the cash influx to most golf facilities has been relatively uninterrupted.

The rise in new players has increased the demand for golf, which creates competition among courses for players. The increased demand creates a need to upgrade conditions, resulting in courses re-doing their irrigation systems (to improve playing conditions). Consider also the "Tiger effect" — The average lifespan for a golf irrigation system is 15 to 25 years, depending on the location of the property. Most courses designed during the boom in golf, driven by the dominance and growth experienced during Tiger Woods' dominance, are in this range and are in need of an irrigation renovation.

This increase in renovation and remodel work has put a strain not only on the supply of materials but also on the availability of qualified contractors to complete the work. The availability of qualified contractors is the single biggest pacing item in renovation and remodel activity. Many courses are tendering projects today for work being performed well into the future (2 to 4 years in some cases).

Super Science

// SEASONED STUDY

THE IMPORTANCE OF SOIL MOISTURE METER ACCURACY IN SALINE SOILS

By Mike Kenna, Ph.D.

Measuring soil moisture with time domain reflectometry (TDR) sensors can aid turfgrass water conservation efforts. Improved irrigation efficiency improves playing conditions and assists in rootzone salinity management.

In 2015, there was concern about the accuracy and reliability of hand-held TDR sensors in saline soils. New Mexico State University conducted a laboratory study to investigate the accuracy and reliability of TDR soil moisture sensors at different salinity levels.

RESEARCH METHODS

The team filled columns measuring 5.5 inches high and 8 inches in diameter with sand meeting USGA specifications for particle size distribution. The research team saturated the columns for 24 hours with distilled, tap or saline water. The results were columns at an ECe of 0.46 (distilled water), 1.08 (tap water), and 3.68, 5.40, 5.78, 7.68, 9.38 and 19.84 dS m^{-1}, respectively.

The researchers evaluated two FieldScout TDR 100 (Spectrum Technologies) with a rod length of 3 inches and two Decagon 5TE (Decagon Devices) with a rod length of 2 inches. The research team inserted the soil moisture sensors into the columns and placed them onto a pressure plate inside a pressure chamber to record sensor readings at different soil moisture levels.

Increasing air pressure removed water from the soil in the columns and sensors and initiated soil drying. At the end of the dry-down period, researchers dried columns at 221 degrees F. The team determined volumetric soil moisture for each moisture level and based data comparisons on either fitting linear regressions or quadratic polynomials to all salinities.

RESULTS

Overall, sensor values increased with more soil moisture as slopes differ significantly from 0 for every soil salinity. Slopes for ECe ≥ 5 dS m^{-1} were greater than for salinities of ECe < 4 dS m^{-1}. The slope at ECe = 19.8 dS m^{-1} was 4 times higher than the slope at ECe = 0.5 dS m^{-1}.

The results show that different salinity levels need separate calibration for ECe > 5 dS m^{-1} if the absolute soil moisture value is of interest rather than the relative difference. Soil sensors accurately estimated moisture in a USGA sand at salinity levels of ECe < 5 dS m^{-1}.

This research led to the improvement of TDR soil moisture sensors to also measure salinity to improve accuracy.

USGA
This project was funded in part by the USGA Green Section.

NEWS UPDATES

MISSISSIPPI STATE UNIVERSITY RELEASES NEW BERMUDAGRASSES

Mississippi State University (MSU) scientists in the Agricultural and Forestry Experiment Station (MAFES) have developed two new turfgrass cultivars as the first hybrid bermudagrass cultivars unrelated to the commonly used bermudagrass 328 (Tifgreen).

"The superior performance of these two grasses provides stakeholders with new options in the putting green market," Hongxu Dong, assistant professor at MSU who specializes in turfgrass breeding and genetics, said. "These two grasses are adding novel genetic diversity to the bermudagrass cultivars, especially to the ones used on putting greens."

Dong noted that the two types of grass, "MSB-264" and "MSB-285," have a more upright leaf orientation than traditional bermudagrass putting green cultivars. While these are visually similar, they have different genetic compositions. Both are propagated vegetatively and are sterile triploid genotypes, meaning that they do not produce seeds.

"Both 'MSB-264' and 'MSB-285' exhibited superior turf quality, leaf texture, density, genetic color, fall and winter color retention, spring green-up speed and high percentages of living ground cover," Dong said.

> "A FEW TDR PRODUCTS WERE ON THE MARKET, BUT MOST WERE TOO EXPENSIVE OR UNABLE TO HOLD UP TO DAILY USAGE ON THE COURSE."
>
> **Mike Kenna, Ph.D.**
> *(see story on page 32)*

//MAKING CENTS

A close look at the economic benefits of water research

By Cole Thompson, Ph.D.; Donald Kridel, Ph.D.; and Mike Kenna, Ph.D.

Widespread droughts and other environmental concerns in the 1970s drove the decision to invigorate United States Golf Association (USGA) turfgrass research in 1982 (6). Since then, the USGA has invested more than $45 million in turfgrass and environmental research, which, among other things, has improved irrigation efficiency on U.S. golf courses.

The effort to estimate rates of evapotranspiration (ET) for the turfgrasses used on golf courses was an essential first step in water conservation (5). Fixed and mobile soil moisture sensors are another important innovation in irrigation management, which now are commonly used by golf course superintendents to estimate irrigation thresholds as soils dry. Scientists used nascent versions of these devices in early turfgrass water-use research supported by the USGA, and Green Section staff have helped normalize commercial TDRs in irrigation scheduling (1,7).

However, the economic benefits of these water conservation strategies are unknown. Therefore, our objective was to estimate the golf industry's resource use and financial benefits from the USGA's investment in ET-based irrigation (ET) and soil moisture sensing (moisture meter, MM) strategies.

Our objective was to estimate the golf industry's resource use and financial benefits from the USGA's investment in ET-based irrigation and soil moisture sensing strategies.

SURVEY

We partnered with Fleishman-Hillard's TRUE Global Intelligence research division to survey superintendents with an online instrument focused on the benefits associated with golf-facility adoption of research-based management practices in six primary areas of interest. These include 1) ET-based irrigation scheduling (i.e., ET or water budgeting), 2) soil moisture sensing (i.e., MM), 3) BMPs that reduce nonpoint source pollution of fertilizers and pesticides, 4) putting green construction techniques, 5) naturalized rough and 6) improved turfgrass cultivars. For this article, we will focus on ET and MM.

We sampled the Golf Course Superintendents Association of America's (GCSAA) superintendent research panel and supplemented outreach with the GCSAA's superintendent database. We closed the survey in August 2020 with 610 complete responses from the U.S. and Canada (2 percent of responses).

The survey had sections to profile facilities and collect relevant adoption and economic benefits data for ET and MM. We asked about familiarity with ET and MM, if the course adopted either ET or MM, the extent of perceived benefit(s) associated with adoption and the timing of adoption. We asked respondents that had not adopted a strategy whether and when they plan to adopt one.

MODELING

We developed three econometric models for ET and MM from survey data:

Ⓐ a logit (i.e., yes/no) model to predict the probability of familiarity,

Ⓑ a logit (i.e., yes/no) model to predict the probability of previous adoption, and

Ⓒ a multiple regression model to estimate the average annual monetary cost-savings for an adopting facility.

We only asked facilities that were highly familiar (i.e., at least a score of

Continued on page 24

Research Takeaways

- The United States Golf Association (USGA) invested more than $45 million (USD) in turfgrass and environmental research from 1983 to 2020.
- The USGA's investment in research related to irrigation and water conservation returns approximately $730 million annually (USD) to the golf industry.
- Research investment by government and industry leaders is critical to the sustainability of the golf industry.

USGA

Research provided and funded by USGA.

Continued from page 23

3 on a 1-4 scale) with a management practice about their experience with adoption. We used each to score the entire sample of 610 respondents. The base prediction — labeled model (mean) in Figures 1 and 2 — was the average prediction across all scored respondents.

In addition, we provided alternative predictions with the upper and lower quartiles to estimate statistical uncertainty. We projected aggregate savings estimates from these predictions and industry-population data for each management practice. We provide a model projection for each strategy for annual savings (in percent and USD) per facility basis and projections for the total number of adopting facilities and total (industry-wide) savings (million [M] USD).

PARTICIPANT PROFILE AND AWARENESS

Golf course superintendents comprised 95 percent of the respondents. Member-owned facilities were most prominent among survey respondents (slightly more than one-third). Approximately 70 percent of respondents had maintenance budgets less than $1 million annually, and 22 percent had budgets between $1 million and $2 million. There was a good geographic spread across the U.S. Nearly 75 percent of the facilities had 18 holes, and 20 percent were larger. Approximately 40 percent of the facilities ranged between 99 and 150 acres, and the remaining 60 percent were split nearly equally between smaller and larger facilities.

Modeling indicated that U.S. golf courses save between 4 and 6.7 percent in annual maintenance expenditures for ET and MM respectively.

Approximately 55 percent of the facilities used less than an acre-foot of water per acre (325,851 gallons per acre) annually; only 10 percent used four acre-feet per acre (1.3 million gallons per acre) or more annually. In addition, approximately one-third of all facilities irrigated less area in 2019 than in the previous year.

Approximately 90 percent of respondents were familiar with ET and MM, but the rate of adoption was more variable — 0 percent for ET and 50 percent for MM (Table 1).

SAVINGS REPORTED

Adopters of MM reported higher annual cost savings per facility than adopters of ET (Table 2). ET-based irrigation had the highest proportion of the earliest adopters, with approximately 30 percent reporting adoption more than 10 years ago (Table 3). Conversely, only 8 percent of MM adopters did so more than 10 years ago. Planned adoption timing was very similar among the two strategies, likely reflecting the uncertainty of future behavior (Table 4).

For brevity, we did not include coefficients from logit and regression models in this summary. These are available in the original paper.

FACTORS DRIVING FAMILIARITY AND ADOPTION

To summarize, the models reflect the size of the maintenance budget was an important driver of familiarity, especially for MM. Social media users also were more likely to be familiar with ET and MM. The maintenance budget and (to a lesser extent) the size of the facility affected the adoption decision for ET and MM. Unsurprisingly, facilities in the West were much more likely

to have adopted ET than those in the Northeast.

PROJECTED AVERAGE FACILITY COST SAVINGS

For each adopting facility, we calculated annual monetary cost-savings generated for each intervention from responses to seven cost-savings questions from the survey — one each for water use, potable water use, labor, fuel, fertilizer, pesticide and general cost savings related to more efficient turf management. Total cost-savings (e.g., the sum over these seven individual categories) was the dependent variable explained in the cost-savings regressions.

Modeling indicated that U.S. golf courses save between 4 and 6.7 percent in annual maintenance expenditures for ET and MM, respectively (Figure 1A). Using self-reported maintenance budgets from the survey and national maintenance budget estimates, we can easily map the percent savings from percentages to USD (3). With this detail, we estimated that the average adopter of ET saves approximately $37,000 annually, whereas MM saves adopting facilities $62,800 annually (Figure 1B). It is important to note that adopters attributed roughly 57.5 and 71 percent of the savings from ET and MM, respectively, to labor efficiency. Water use attributed to the second-largest portion of savings for these strategies (25.7 percent for ET and 18.1 percent for MM).

These savings are relatable and have contributed to water conservation on golf courses reported by others (2). Surveyed superintendents showed a 21.8 percent decrease in annual water use from 2005 to 2013. A small part of this reduction was from golf course closures but conservation practices (e.g., keeping turf drier and using irrigation management techniques, etc.) and voluntary removal of acreage accounted for most of the reduction.

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TABLE 1

Familiarity and adoption of research-based management practices among 610 respondents

	ET-based irrigation (ET)	Soil moisture meters (MM)
	percent	
Familiar	88.2	92.3
Adopters among those familiar	29.2	49.6

TABLE 2

Familiarity and adoption of research-based management practices among 610 respondents

	ET-based irrigation (ET)	Soil moisture meters (MM)
	adoption percent	
Already adopted	25.7	45.7
Planning to adopt	36.8	28.5
	USD[a] percent	
Average annual savings per facility	39,196 (4.09)	58,009 (6.26)

[a] United States Dollar.
[b] Annual savings questions were asked only to those who reported adoption and savings associated with a research-based management practice (n = 163 and 279 ET-based irrigation and soil moisture meters, respectively).

TABLE 3

Historical adoption timing for adopters (percent of adopters)

	ET-based irrigation (ET)	Soil moisture meters (MM)
	percent of adopters[a]	
< 1 year	13.5	14.7
1-3 years	21.5	26.2
3-5 years	17.2	24.4
5-10 years	16.6	26.5
>10 years	30.1	7.9

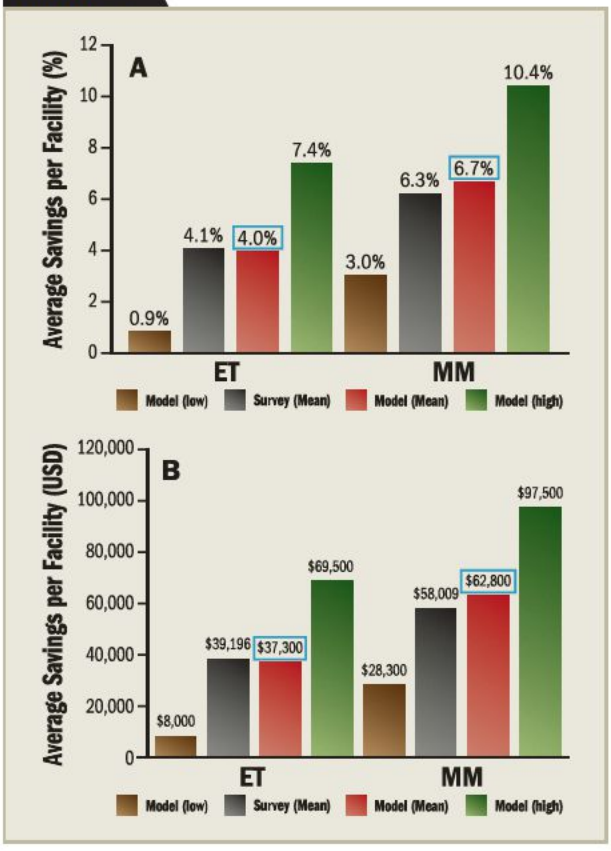
[a] Columns do not sum to 100 percent because "don't know" responses have been omitted.

TABLE 4

Future adoption timing for planners (percent of planners)

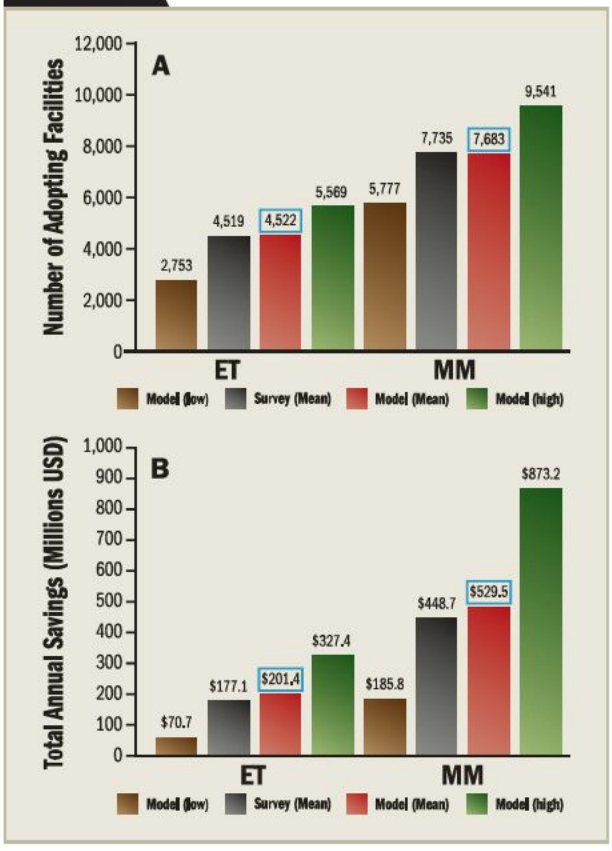
	ET-based irrigation (ET)	Soil moisture meters (MM)
	percent of adopters	
Within 3 years	29.4	37.9
3-5 years	45.2	43.7
5-10 years	25.3	18.4

FIGURE 1



Average percent (A) and USD (B) annual savings for ET-based irrigation scheduling (ET) or soil moisture meters (MM) per facility. Estimates (A) were generated with predicted savings from multiple regression divided by the reported budget. Estimates (B) were generated from the percent savings (from A) multiplied by annual budgets (3). Lower and upper quartiles from model predictions were used to estimate statistical uncertainty for the modeled mean. The survey (Mean) is the simple average of the survey respondents.

FIGURE 2



Industry-wide adoption (A) and USD savings (B) in the U.S. based on the adoption of ET-based irrigation scheduling (ET) or soil moisture meters (MM). Estimates (A) were generated with the familiarity logit prediction multiplied by the adoption logit prediction multiplied by the total number of facilities. Estimates (B) were generated from the number of facilities (from A) multiplied by the average savings in USD (from Figure 1B). Lower and upper quartiles from model predictions were used to estimate statistical uncertainty for the modeled mean. Survey (Mean) is the simple average of the survey respondents.

Surveyed superintendents showed a 21.8 percent decrease in annual water used from 2005 to 2013 ... conservation practices and voluntary removal of acreage accounted for most of the reduction.

Continued from page 25

PROJECTED INDUSTRY-WIDE ADOPTION AND SAVINGS

We estimate approximately 7,683 facilities to adopt MM, whereas only 4,522 facilities adopted ET (Figure 2A). We estimated industry-wide savings for the U.S. golf industry with adoption and annual USD savings projections from the per-facility models. Soil moisture meters represent the greatest industry-wide savings ($529.5 million annually), driven by higher annual savings per facility and more adopting facilities (Figure 2B).

CONCLUSION

Widely-adopted ET scheduling and MM save the U.S. golf industry an estimated $730 million yearly. This compares to an estimated yearly Green Section budget of roughly $10 million, which invests about $2 million in turfgrass and environmental research.

Research investments are critical to the sustainability of the golf industry. Government and industry leaders should note the return on investment and other metrics documenting these benefits and increase turfgrass and environmental research investment.

Cole S. Thompson, Ph.D., research director, USGA Green Section; Donald J. Kridel, Ph.D., department of economics, University of Missouri-St. Louis; and Michael P. Kenna, Ph.D., retired, USGA Green Section. For more information, contact Thompson at cthompson@usga.org.

The article summarizes a portion of Thompson CS, Kridel DJ, Kenna MP. Economic and sustainability benefits of the United States Golf Association's investment in water, fertilizer, and pesticide management research. *Int Turfgrass Soc Res J*, 2022;1–11. https://doi.org/10.1002/its2.91

Acknowledgments

The United States Golf Association funded this research. The Turfgrass and Environmental Research Committee, the countless scientists that have measured the intersection of turfgrasses and the environment, the USGA Executive Committee and senior leaders and myriad staff of the Green Section, made the extolled benefits of the research herein possible. We appreciate the significant contributions of Kim Funcik and Eric Rydell with FleishmanHillard TRUE Global Intelligence for their excellent work with survey implementation. Thanks to the Golf Course Superintendents Association of America for assistance with survey distribution.

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Widely adopted ET scheduling and MM save the U.S. golf industry an estimated $730 yearly. This compares to an estimated yearly Green Section budget of roughly $10 million.

Give 'em the root Grady Miller, Ph.D., says superintendents should collect soil moisture at the same depth as the root systems.

How to maximize your soil moisture sensors

Soil moisture sensors can help superintendents determine turfgrass field capacities and stress

By Chris Lewis

To reap as many benefits from their soil moisture sensors as possible, Grady Miller, Ph.D., professor and Extension turf specialist in the crop and soil sciences department at North Carolina State University, advises superintendents to utilize them frequently.

In doing so, Miller says superintendents will become more comfortable using them, learning the various ins and outs and the measurements they should typically expect with each type of soil profile they evaluate at their courses. Not to mention, they'll also learn exactly how to utilize the sensor to collect the data needed to make key decisions.

Grady Miller

"For example, superintendents should consider taking readings several hours after a soaking rain in order to receive a field capacity reading," Miller says. "By acquiring a field capacity reading, they'll be able to fully understand their courses' upper soil moisture limits. On the other hand, to determine their lower soil moisture limits, they should obtain data regarding slightly stressed turfgrass."

THE MORE YOU KNOW

Miller encourages superintendents to measure as many areas on greens as possible to get a good range of readings for each area.

"As a result, they'll learn their data range in a variety of turf areas, from well-watered to stressed areas," he says.

Of equal importance, superintendents should always collect soil moisture at approximately the same depth as the majority of the turfgrass root systems, which is generally about 4 inches. Depths may be shallower on greens. Upon collecting this data, superintendents can then determine the field capacities and stress on the course. Once they verify these findings, they can then use such data singularly or in conjunction with evapotranspiration (ET) calculations.

"Singular usage can be helpful if superintendents have areas that may require hand watering," Miller says. "By utilizing soil moisture sensors singularly — as turf health and water conservation tools — their courses' surfaces will likely remain more uniform not only in appearance but from an overall health standpoint."

PHOTOS COURTESY OF: SOIL SCOUT / SPIO

Groundworx

TIM BARRIER, CGCS
Consultant

Groundworx delivers efficiencies by establishing real-time thresholds. Therefore, superintendents can apply the exact amount of water that's necessary to maximize conservation — without sacrificing turf health. As temperatures rise, it's critical to remove the guesswork about what is occurring at the root zone. Our device is intuitive. It provides a snapshot of how much water is available, as well as where it is essential, every 10 minutes. An "inventory" of available moisture is always visible on the dashboard or app. As a result, the water holding capacities of soils will emerge in the superintendent's data, and they see firsthand where any waste is occurring. Heavy clay soils hold moisture longer than sandier soils, and they stretch superintendents' windows on timely irrigation applications. Sandier soil profiles will spike with water applications, fall rapidly and predictably drain water. Consequently, water management, particularly at the root zone, becomes a part of the course's culture.

Soil Scout

ADAM SEDGWICK
VP, international sales

Superintendents can get the most out of their soil moisture sensors by utilizing all of the data they collect to influence their timings for fertilizer and pesticide inputs. By using Soil Scout's soil moisture data alone, superintendents can optimize their irrigation practices and achieve considerable savings — upwards of 25 percent — in water usage. This is significant since, as an industry, we're all guilty of overwatering. Oftentimes, superintendents overlook moisture in the profiles of their greens, leading to pollution problems. When the profiles of greens (effectively just giant drains) are too wet, as fertilizer releases and becomes available, it runs straight through the profiles, resulting in waste. By utilizing the data they collect from soil sensors while also managing moisture better in the profiles under their greens, superintendents will be able to use their fertilizers more efficiently, leading to savings of 12 to 17 percent in nutrient availability — without the risk of pollution issues.

Spiio, Inc.

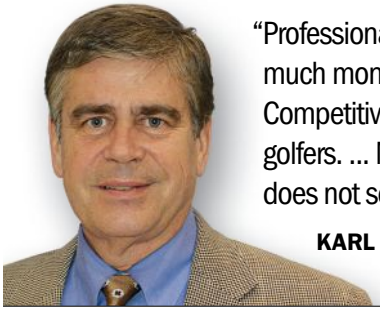
DAVE LATSHAW
National sales representative

Superintendents can utilize Spiio soil moisture sensors to their full advantage by implementing several of them per hole. In doing so, they'll have a complete picture of what's occurring beneath their soil, thereby enabling them to make more informed decisions on how to irrigate. As a result, they'll not only improve their courses' conditioning but also save water. In addition, superintendents can use the sensors as communication tools, as they offer their members evidence for their particular (often costly) irrigation decisions. Due to today's labor shortages, superintendents must become more reliant on labor-less methods to collect and gather data throughout their courses. Aside from typically overlooking this significant issue, they're also overlooking the ever-increasing pressure to use their courses' water more responsibly. In the future, regulatory agencies will target golf courses to determine if they're irrigating as efficiently as possible. Spiio soil moisture sensors will help them irrigate more effectively.

POGO Turf Pro

CARMEN MAGRO, CGCS
Vice president

Superintendents must fully understand their moisture sensor technology, as it's not supposed to only provide them figures. When they utilize moisture monitoring technology properly — by ensuring they don't compromise data collection — they'll acquire true insights into the most influential variable in the turfgrass system, which impacts so much more than just moisture usage. Additionally, they have to take representative sampling as anything less will leave them short on measuring what the turf is experiencing. By taking a representative number of samples, they'll acquire a true picture of their turf's life pulse. Research has shown superintendents should receive a minimum of two samples per 1,000 square feet for proper insights into putting green turf, along with 25 to 40 samples on the fairway. To perform representative samplings of their turfgrass zones, superintendents should consider utilizing POGO's HydraProbe sensor, as it doesn't require any calibration.



"Professional golfers have the right to make as much money as possible. Most of us would too. Competitive tours provide opportunities for more golfers. ... Money versus human rights abuses does not seem to be an issue that is good for golf."

KARL DANNEBERGER, PH.D., *Science Editor*

Morality intersects with the game of golf

Hurricanes originate as small storms off the coast of Africa, building in size and intensity as they move across the Atlantic Ocean and reach landfall in the United States. Like a growing hurricane, LIV Golf is set to be a disruptive force in professional golf.

LIV Golf — I did not even know what LIV stood for until I began writing this column — is offering mind-boggling guaranteed contracts to prominent professional golfers. For your information, LIV is the Roman numeral that stands for 54, which is the number of golfers in each of the new tournaments. There is speculation Phil Mickelson signed a contract for $200 million while some reports say Dustin Johnson will be making $125 million. This is more money than either player made in total earnings during their career on the PGA Tour.

Since the PGA Tour has initiated player suspensions and some sponsors are backing away, "taking the money and run" has become complicated. Of the issues that have risen from LIV Golf, I find the moral issue the most intriguing. Saudi Arabian government funds provide financial support for LIV Golf.

This wealth supplies staggering money for contracts, providing incentives, astronomical prize money and other guaranteed payouts. In response to this backing, the notorious human rights abuses and the brutal killing of Jamal Khashoggi, a journalist, have come into focus. Critics say because of the human rights abuses, Saudi Arabia is "sportswashing," or redoing its global image through sports, specifically golf.

DESIRE VS. DUTY

From books written and classes taught on morality, right versus wrong is straightforward, but the process is often complex. One simple aspect of a moral strategy is to look at duty and desires. In the case of LIV Golf, you could look at the desire vs. duty as "I want the money" versus "I ought to condemn human rights abuses."

As a personal example, and similar to what LIV Golf faces, but without the money, I had the opportunity in the 1980s to travel and speak in South Africa. The advantage of this speaking engagement was twofold, 1) to increase my own knowledge of turf and 2) to build an international reputation. The international reputation was what I wanted or desired.

At the time, the South African government had a repulsive policy of apartheid. Looking at morality from the two components previously mentioned, my duty was "I ought to not go." My first visit to South Africa did not occur until apartheid was struck down.

Morality and ethics can change over time. I use two examples that I think show change and perception over time. I was invited to Japan to speak and visit some of the country's golf courses. Japan is an amazing country with a rich history and vibrant golf industry and, it's an honor to go. When I mentioned the trip to my dad, he told me to enjoy the trip, but he did not have any interest in returning to that part of the world. My dad fought in the Philippines and Okinawa during World War II.

I graduated from high school in 1973, and several of my friends and classmates fought in the Vietnam War. Vietnam is a golf and tourist destination for many living throughout southeast Asia. I had the opportunity to go to Vietnam, and when I mentioned it to a few friends, the reply was, "the beaches are the most beautiful in the world, but I do not have any interest in going back."

Professional golfers have the right to make as much money as possible. Most of us would too. Competitive tours provide opportunities for more golfers. Given that, I wish the trade-off wasn't a moral one. Money versus human rights abuses does not seem to be an issue that is good for golf. Maybe this is not the time yet for LIV Golf as currently constructed.

Karl Danneberger, Ph.D., *Golfdom*'s science editor and a professor at The Ohio State University, can be reached at danneberger.1@osu.edu.

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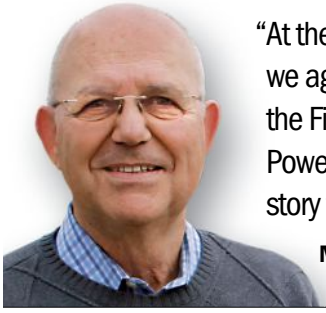

"At the Green Section staff meeting in fall 2008, we agreed to use research funds to purchase the Field Scout 300 for 15 agronomists. I use a PowerPoint from 2009 to this day to tell the TDR story from the 1980s to the 2008 U.S. Open."

MIKE KENNA, PH.D., *Research Editor*

TDR's evolution from the lab to the course

Using time domain reflectometry (TDR), soil moisture measurements have come a long way in the last 40 years. As the research article suggests this month, these measurements have made a significant economic impact and helped with water management on golf courses.

The TDR is a complex tool but operates on a simple concept. A superintendent inserts two metal probes (or waveguides) into the ground, and an electric pulse travels down the metal probes. When the pulse reaches the end of the probe, the electric pulse reflects. Higher moisture levels will increase the intensity of the pulse in the probe. The user calculates the average moisture by comparing the measured reflection to the initial pulse.

A LOOK AT THE PAST

In 1986, Robert Carrow, Ph.D., at the University of Georgia, conducted a United States Golf Association (USGA)-sponsored study, "Influence of Soil Moisture Level on Turfgrass Water Use and Growth." His research used moisture sensing probes installed at three soil depths. His TDR unit did not work correctly in the first year of the study, but it performed great in 1987 and 1988.

Carrow later penned an article titled "Irrigation Scheduling Technology: The Old and New" in the May 1987 issue of *Golf Course Management*. A photo of a TDR with the caption, "One device that may be of increasing value to future management is a time domain reflectometer," leads the article.

For the next 20 years, TDR soil moisture meters served primarily as a helpful research tool. A few TDR products were on the market, but most were too expensive or unable to hold up to daily usage on the course.

TDRS IN THE 21ST CENTURY

In late summer 2007, Greg Bell, Ph.D., Oklahoma State University, called me and said a fellow from Spectrum would demonstrate the company's new TDR. Mike Thurow, president of Spectrum, did the demonstration. He used the first version of the Spectrum TDR that looked like a small pogo stick.

Thurow started to take measurements on a bentgrass research putting green about every three paces. He could also download the readings and, using the cloud, provide a map of soil moisture on the putting green.

It was about this time that the USGA developed the TruFirm to measure putting green firmness. We wanted to find better water management practices to firm up greens for championships and daily play. Thurow came to the 2008 Golf Industry Show in Orlando, Fla., and we demonstrated the Field Scout and the USGA TruFirm.

Pat Gross, an agronomist with the USGA, used the Field Scout at the 2008 U.S. Open at Torrey Pines in San Diego. There was not a very good correlation between TDR moisture and TruFirm measurements.

The 3-inch probes on the TDR could not accurately account for moisture in the upper half-inch of the putting green. However, Gross used the tool to help the maintenance staff water more accurately. While staff made passes hand-watering the greens, he recorded the change in moisture, which helped manage the firmness better.

At the Green Section staff meeting in fall 2008, we agreed to use research funds to purchase the Field Scout 300 for 15 agronomists. I use a PowerPoint from 2009 to this day to tell the TDR story from the 1980s to the 2008 U.S. Open.

SOIL MOISTURE METERS TODAY

There are several soil moisture sensors on the market, such as the POGO, Toro Turfguard and Spiio, to name a few. An improvement in these devices is that they also measure soil salinity which affects the soil moisture readings (for more on this, see the Super Science Introduction on page 22).

Soil moisture meters were one of the categories measured for the economic impact of USGA-supported research. The adoption and economic impact of soil moisture sensing have been impressive and an excellent testament to technology moving from the laboratory to the field that helps improve resource management!

Mike Kenna, Ph.D., retired director of research, USGA Green Section. Contact him at mpkenna@gmail.com.

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4

5

6

4 | 6080A E-Cut Hybrid Fairway Mower

The **JOHN DEERE** 6080A E-Cut Hybrid Fairway Mower provides superintendents with three-wheel tire configuration, smooth tire maneuverability and precise after-cut appearance. The electric reel drive system is designed to ensure efficiency by eliminating all potential hydraulic leak points and reducing fuel consumption. This hybrid mower is equipped with a passcode-protected TechControl display, allowing users to input commands such as mow speed, turn speed, transport speed and service timers while recording onboard diagnostics.

Deere.com

5 | SLF530 fairway mower

JACOBSEN's SLF530 fairway mower combines Jake's signature cut with a light fairway footprint. The mower has a ground pressure measurement of less than 10 psi and a 6.5 AC cutting capacity. The SLF530 has a 24.8 horsepower Kubota engine and includes a high resolution, full-color screen, that delivers advanced onboard diagnostics to the user.

Jacobsen.com

6 | Anuew

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Nufarm.com

The 19th Hole

Kelly Kuchelmeister

SUPERINTENDENT // Sinnissippi GC, Rockford, Ill.

//BEST ADVICE

"MY FIRST BOSS HERE, GLEN, TOLD ME, 'IN THE END, IT'S JUST GRASS. IT WAS HERE BEFORE YOU, AND IT'LL BE HERE AFTER YOU. WORK HARD WHILE YOU'RE HERE BUT GO OUT AND LIVE YOUR LIFE AFTERWARD.'"

Kelly, what are you drinking? A brandy old fashioned, sweet. I'm from Wisconsin. When you go out on Friday night, it's always a brandy old fashioned, sweet.

Tell me about your course. It was built in 1912. It was the first public golf course in Rockford. In the 1980s, it was known as the longest 9-hole course in the nation. And we have, for airplanes, a directional in our rough area that is grown over now. That was put in in the 1930s. It just says "Rockford" with an arrow pointing towards the airport. When we get drought conditions, you can still see it.

What do you and the family like to do for fun? My fiancé, J.J., my stepdaughter, Brinley — usually you can find us on the boat or tied up on a sandbar somewhere. In the winter, we snowboard and ski. We're big outdoors people.

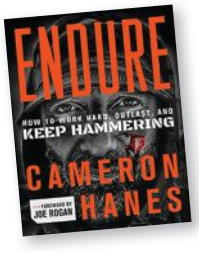
What is your favorite tool in the shop? That would be my ARB recovery strap. It's an off-road recovery strap, so it has some stretch in it. When it rains, we get some pretty wet areas. I have one guy in particular who tries to do some more technical stuff than he should. So we bought that strap, and it's helped out quite a bit. It's fun; I like trying to figure out, 'How am I going to get him out of this one?'

What sports teams do you root for? All Wisconsin teams — Packers, Badgers, Brewers. We go to a game or two every year.

Besides the daily grind, what are you looking forward to this summer? Getting on the lake with our friends. I also horseback ride. I'm working with a younger horse to get her up to speed and possibly do some horse shows this summer.

If you had a magic bullet for one problem on your course, what would you use it on? My irrigation system. We've got an old system. No parts are available, and we have to piece it together. It still works, but every day you're doing the (*makes the sign of the cross*) and hoping it comes on.

Give me a recommendation; book, movie or TV. I just finished reading *Endure: How to Work Hard, Outlast and Keep Hammering* by Cameron Hanes. I like people who are very motivating, but they don't just talk it, but they walk the walk. Cameron Hanes is a bowhunter, the world's best bowhunter. It talks about his life, the things he's gone through, and the people he's met. A couple of his mottos are, 'Keep hammering,' and 'Nobody cares, work harder.' There's always another level to reach.



As interviewed by Seth Jones, April 13, 2022.

PHOTO OF KELLY BY: TIM KLEIN PHOTOGRAPHY; GETTY IMAGES / ISTOCK-GETTY IMAGES PLUS / ABRAMOVA_KSENIYA (HORSE), ~USERG1196731 (DRINK)

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