

An Official Publication of the Wisconsin Golf Course Superintendents Association

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rstachlewitz@advancedturf.com
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@RustyStack



Jeff Leuzinger

jleuzinger@advancedturf.com
815-213-2858
@TallturfJeff



Mike Werth

mwerth@advancedturf.com
608-214-7011
@werthashot



Andy Weadge

aweadge@advancedturf.com
630-418-2678



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2026 WGCSA BOARD OF DIRECTORS

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Garrett Luck - Hidden Glen at Bentdale Farms
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E-mail: gluck@hiddenglengolfclub.com

VICE PRESIDENT

Ben LaBarre - Westmoor Country Club
400 S. Moorland Road, Brookfield, WI 53005
Work: 920-483-0386
E-mail: ben@westmoor.org

TREASURER

Brian Bonlender - West Bend CC
5846 Hwy Z, West Bend, WI 53095
Work: 262-338-0540
E-mail: brian@westbendcountryclub.org

SECRETARY

Timothy Schmidt - Butte des Morts CC
3600 Prospect Ave, Appleton, WI 54914
Work: 920-738-5541
E-mail: tischmidt31@gmail.com

DIRECTORS

Chad Grimm - Blackhawk CC
3606 Blackhawk Drive, Madison, WI 53705
Work: 608-577-9712
E-mail: chad@blackhawkcc.com

Brandon Nebl - Whispering Spring GC
827 Red Fox Run
Fond du Lac, WI 54937
Work: 920-517-4288
E-mail: bnebl@whisperingspringsgolf.com

Matt Shafer - North Hills CC
N73W13430 Appleton Ave
Menomonee Falls, WI 53051
Work: 317-442-1801
E-mail: mshafer@nhccwi.com

Tim Wegner - Brown Deer Park GC
7835 N Green Bay Road, Milwaukee, WI 53189
Work: 414-352-7502
E-mail: wegnertim49@gmail.com

PAST PRESIDENT

Scott Anthes - Brown County Golf Course
897 Riverdale Drive, Oneida, WI 54155
Work: 920-497-7819
E-mail: scott.antes@browncountywi.gov

VENDOR REPRESENTATIVE

Rob Johnson - Waupaca Sand and Solutions
E3481 Royalton St, Waupaca, WI 54981
Work: 715-258-8566
Email: rjohnson@waupacasand.com

CLASS C REPRESENTATIVE

Riley Thomson - Blackwolf Run
1115 W. Riverside Drive
Kohler, WI 53044
Work: 906-367-1525
Email: Riley.thomson@kohler.com

CLASS EM REPRESENTATIVE

Matt Radatz - Hawks Landing Golf Club
1602 Waterbend Drive, Verona, WI 53593
Work: 608-217-3558
Email: mhawkslanding@gmail.com

ABOUT THE COVER

The infamous par 3 Volcano Hole at Eagle Springs Golf Resort is a highlight of Wisconsin's oldest golf course.

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THE GRASS ROOTS is the quarterly publication of the Wisconsin Golf Course Superintendents Association. No part of the THE GRASS ROOTS may be used without the expressed written permission of the editor.

GRASS ROOTS EDITOR

Jake Schneider

grassroots@wgcsa.com - 608-530-4480
4174 Cherokee Drive, Madison, WI 53711

WGCSA EXECUTIVE DIRECTOR

Jake Schneider

jschneider@wgcsa.com - 608-530-4480
4174 Cherokee Drive, Madison, WI 53711



You Get What You Give

By: Garrett Luck, Superintendent, Hidden Glen Golf Club

As I reflect on my time serving our association, one truth stands out clearly. You get what you give. Volunteering has been one of the most rewarding parts of my professional journey, and I want to share why I believe service whether on the board, a committee, or in other ways pays dividends far beyond the hours invested.

I recognize that not everyone's life circumstances allow the time or flexibility to serve on a board or committee. There is a real commitment involved. Family, work demands, and personal responsibilities come first, and that is completely understandable. Still, for those who can find a way to give back, the benefits of service greatly outweigh the challenges.

Through my years on the WGCSA board, and now as president, I have formed meaningful connections with peers who share a deep dedication to our profession. I have grown my network of selfless, highly committed professionals including superintendents, assistants, equipment managers, and vendors who continually inspire me. These relationships have become a lasting source of support, insight, and friendship.

Serving in a leadership role has also expanded my perspective. Leading a board is different from being accountable only to a club or municipal board. It requires navigating varying personalities and priorities while keeping the greater good of the association in focus. The experience has given me a richer appreciation for the complexities of collective decision making. In many ways it mirrors managing a golf course. The goal is the same: to leave the place better than you found it. Whether it is the association or the course itself, that mindset of stewardship has been both challenging and deeply satisfying.

There is a quiet fulfillment that comes from contributing to something larger than yourself. Knowing that the work benefits fellow members and strengthens our profession brings a sense of purpose that is hard to match. I encourage each of you to serve as you are able. Your involvement helps drive new ideas and initiatives that keep our association moving forward.

With only a few months remaining in my term as president, I feel genuinely thankful for the privilege of serving on the board and in this role. I am pleased with the trajectory we are on and deeply grateful for the dedicated work of our WGCSA committees, the board, and our Executive Director, Jake Schneider. Their efforts have been instrumental in moving us forward.

I look forward to watching the continued positive growth and the new opportunities that WGCSA will create and deliver for the benefit of its members in the years ahead.

Thank you for the opportunity to serve. 🌱

WGCSA MISSION STATEMENT

The Wisconsin Golf Course Superintendents Association is dedicated to serving its members, advocating on behalf of the golf course management industry, and supporting the future of golf.

WGCSA VISION STATEMENT

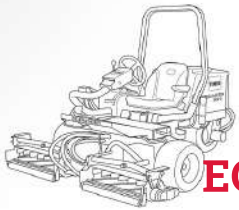
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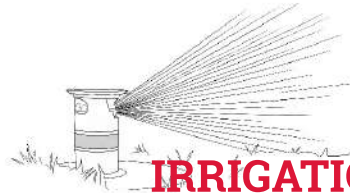
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Spreading the Word

By: Jake Schneider, Editor and Executive Director

This issue's cover feature on Mark Deutschmann and Eagle Springs Golf Resort by Paul Seifert of WiscoGolfAddict is my favorite story that we've had in many years. Not only does it feature a terrific superintendent and a fantastic golf course, but it highlights operations that are much more typical of the 550 golf courses that dot our fine state. While the Kohler Courses, Sand Valley, and Erin Hills garner much of the national attention (and rightfully so), what really makes golf tick in Wisconsin is the high quality of courses at every price point. While Eagle Springs is certainly no average property, Mark and his staff are making due with fewer resources than these "big money" facilities and that is something that most of you can relate to.

The article also had me reminiscing a bit about my own time as a seasonal greenkeeper at Trondheim Golfklubb in Norway where I worked for three summers while my wife and I lived overseas. Like Eagle Springs, Trondheim was a very scenic nine-hole property, and working there gave me a whole new appreciation for the extra work that it often takes the average superintendent to produce a high-quality product. When you don't have a dedicated equipment manager, assistant superintendent, spray technician, or irrigation technician, these superintendents often must take on all these responsibilities and those that do it well might be even more impressive than those with million-dollar budgets.

This isn't to say that any superintendent job in the state is "easy" because that clearly is not the case. Every job and each course have its own very different challenges that the everyday golfer is often unaware of. However, the WGCSA is doing what it can to raise the profile of superintendents all over the Badger State thanks to our collaboration with the aforementioned Mr. Seifert and WiscoGolfAddict.

Over the past three years, Paul has been an invaluable contributor to The Grass Roots by writing two feature stories per year. Last year, we expanded our collaboration when he produced two videos that highlighted Matt Shafer at North Hills CC and Garrett Luck at Hidden Glen GC. Thanks to realized profits from the WGCSA Reserve Fund, we continued the work with Paul this year by contracting with him to develop 20 Instagram posts that

would feature the work of WGCSA members and to say that this collaboration has been successful would be a gross understatement.

Since the inception of this social media relationship, the WGCSA-related posts from Paul have received an average of nearly 30,000 views and 500 interactions, both of which are phenomenal and nothing that we could have even come close to through our own account. At the same time, the followers of the WGCSA Instagram page have grown exponentially which allows us to reach more folks with our own, independent posts. While I believe this has changed as the years pass, superintendents are often not the best at telling their own stories, but through our partnership with the WiscoGolfAddict, the WGCSA is doing it for you, one Instagram post at a time! 

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2026 WGCSA Events Calendar

September 21, 2026	<i>Wee One Fundraiser Outing at Pine Hills Country Club, Sheboygan, WI</i>
September 22, 2026	Equipment Manager/Assistant Superintendent Golf Event at Eagle Springs Golf Resort, Eagle, WI
October 6, 2026	<i>WTA Fall Classic Golf Outing, Wausau Country Club, Wausau, WI</i>
October 20, 2026	Sporting Clays Event at Milford Hills, Lake Mills, WI
December 1, 2026	EM Seminar: "Cutline is King" by Mike Rollins, Maple Bluff Country Club, Madison, WI
January 6-7, 2027	Wisconsin Golf Turf Symposium, The American Club, Kohler, WI
January 20, 2027	Wisconsin Room at GCSAA CTS, Lucy's Retired Surfers Bar, New Orleans, LA

***Bold are WGCSA organized.**

Italicized are WTA/PGA/Wee One events.



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CELEBRATING OUR 2026 SCHOLARSHIP WINNERS

By: Matt Shafer, Superintendent, North Hills CC

One of the most rewarding ways that the WGCSA can support the future of our industry is by investing in students and young people pursuing their education. Through our scholarship programs, the association is proud to provide financial assistance and encourage the next generation of leaders in the turfgrass industry.

Each year, we have the opportunity to recognize outstanding scholarship recipients whose dedication to their education represents the future of our profession. We are pleased to announce and congratulate the 2026 WGCSA scholarship winners.

Legacy Scholarships

The WGCSA Legacy Scholarships provide financial assistance to children, grandchildren, or stepchildren of active WGCSA members. We are proud to recognize this year's recipients:

- **Siri Specht:** Daughter of Steven Specht
- **Mike Stahl:** Son of Nate Stahl
- **Rowan Bonlender:** Daughter of Brian Bonlender

Congratulations!

WGCSA Turf Scholarship

The WGCSA Turf Scholarship supports students pursuing education in turfgrass management or a related field. This year's recipient is:

- **Tyler Clapsaddle:** Penn State University

J.R. Love Scholarship

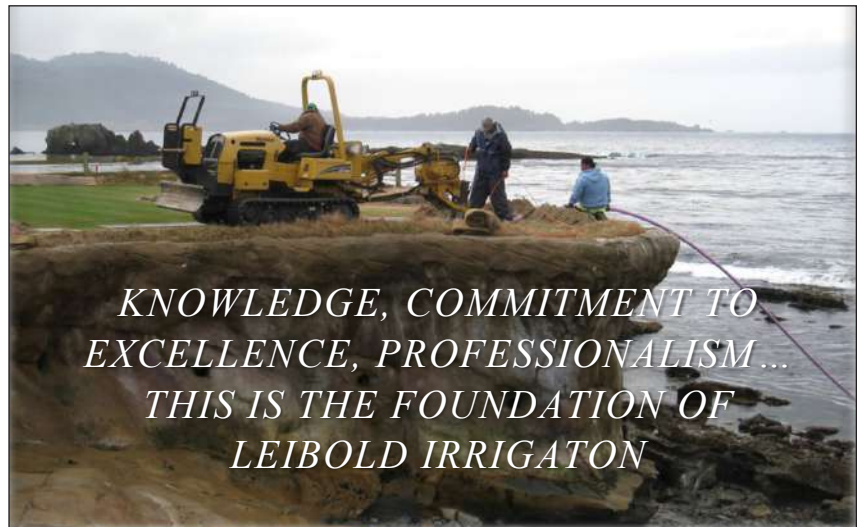
The J.R. Love Scholarship recognizes an outstanding student pursuing Turfgrass Management at the University of Wisconsin-Madison.

- **David Stralow:** UW-Madison

Congratulations to all our 2026 scholarship recipients!

The WGCSA is proud to support these students as they continue their education and work toward careers in the turfgrass industry. Investing in students today helps strengthen our profession and ensures a bright future for the industry we all care about.

We encourage WGCSA members and their families to take advantage of the scholarship opportunities available through the association and to continue supporting the next generation of turfgrass professionals. ✓



Contacts

JIM BOYER	563-213-0810	IRRIGATION
MIKE SKOPIK	563-564-6908	IRRIGATION SERVICE
KEVIN STEINEKE	563-564-9333	GOLF CONSTRUCTION
TROY TIETJENS	563-213-0011	PUMP STATION SERVICE



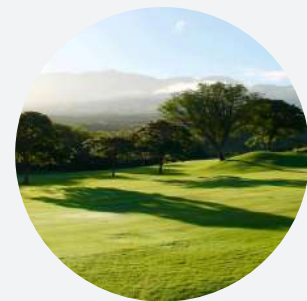
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Announcing the 2026 WGCSA Awards

The Wisconsin Golf Course Superintendents Association proudly presents the Superintendent, Assistant Superintendent, and Equipment Manager of the Year Awards, celebrating excellence in golf course management and dedication to our profession.



Nominate a colleague who exemplifies outstanding contributions in golf course care. WGCSA members may submit nominations from October 1 to January 15. Board members are not eligible for nomination.

A panel of three recent WGCSA past presidents will judge all nominations. Winners will be honored at the Spring Business Meeting with a plaque and media recognition, highlighting their commitment to excellence.

Join us in celebrating the achievements within our community. Nomination forms will be available starting October 1, 2026, at wgcsa.com. Submit your nomination by January 15, 2027, and recognize outstanding professionals.

Questions? Contact Jake Schneider, WGCSA Executive Director, at jschneider@wgcsa.com

Wisconsin Golf Course Superintendents Association — Elevating the Game.



The long 11th hole highlights some of the rolling terrain found in the southern Kettle Moraine area that Brandybrook lies in.

BRANDYBROOK HITS A HOLE-IN-ONE

By: Jake Schneider, Editor and Executive Director

When The Legend at Brandybrook was added to the WGCSA events calendar, hopes were high that it would be a great, well-attended event, and reality turned out to be even better than our expectations. The day in early June brought good weather (with a 5-minute sprinkle thrown in for good measure), some excellent golf (including a hole-in-one by Josh Malady), and an outstanding golf course courtesy of superintendent Charlie Edwards and his staff. Throw in ample food and drinks and spirits were high among the 94 golfers who teed off in Milwaukee's western suburbs.

The format for this year's event was once again a four-person shamle with winners in the gross and net divisions. Prizes were given to the first and second place teams along with a randomly selected place which ended up being lucky number 9. As usual, we also had several hole prizes to give out courtesy of our phenomenal industry partners. The results were as follows:

Net:

1. Brad Debels, Eric Leonard, Patrick Reutemann, Ryan Fitzgerald: -18
2. Brandon Nebl, Rob Giebel, Tony Berenz, Mike Lowther: -15
9. Alex Panzenhagen, Matt Garner, Andrew Hessa, Jordan Strate

Gross:

1. Brian Placzowski, Mark Lockhart, Jim Wallace, Travis Krauklis: -10
2. Rob Johnson, Kyle Rosenberg, Seth Brogen: -7
9. Mike Bremmer, Garrett Luck, Ethan Bublitz, Adam Wagner



WGCSA vice-president Ben LaBarre (center) presents superintendent Charlie Edwards (left) and superintendent emeritus Jake Renner with a framed flag in appreciation for hosting the event.

Hole Prizes:

- Long Drive on 2 sponsored by Clesens: Andrew Hessa
- Long Putt on 4 sponsored by Spartan Turf Products: Brian Digise
- Closest to the Pin on 6 sponsored by Revels Turf and Tractor: Josh Malady (Hole in One)
- Closest to the Pin in two on 8 sponsored by Syngenta: Travis Krauklis
- Long Putt on 10 sponsored by Advanced Turf Solutions: Mark Lockhart
- Closest to the Pin on 12 sponsored by Simplot: Patrick Reutemann
- Closest to the Pin in three on 15 sponsored by Milorganite: Andrew Powers
- Closest to the Pin on 16 sponsored by National Golf Graphics: Chad Grimm
- Long Drive on 18 sponsored by Thelen Materials: Andrew Hessa

Special thanks go out to Jack Gaudion with the Legends Clubs and the entire staff at Brandybrook for a fun, smoothly run day. And, of course, we can't play golf, have two meals, and give out prizes at one of the best private clubs in the state for less than \$100/player if it weren't for all the companies listed below who continue to support our events!

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Omar Zaldivar, equipment manager at Blackhawk CC, takes aim with his putter on the second hole.



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LEXI WEST



We hope to randomly highlight a few members each edition from all geographic areas, facility types and membership classifications. It may take us 20 years to get to everyone in the directory but please be ready for that phone to ring and be prepared to share stories, photos and information about YOU!

Name: Lexi West

Company Position: SOX Erosion Solutions – Midwest Regional Technical Expert

Years as WGCSA member: 1 year

Membership Classification: Class E Affiliate Company Member

Brief BIO : I am the Regional Technical Expert for SOX Erosion Solutions here in the Midwest. I live in Chicago now but am originally from Cleveland, Ohio. I graduated from Ohio University (Go Bobcats not Buckeyes) and spent a few years living in Austin, Texas working in construction project management and estimating. I've been happy to be back in the Midwest where I belong for the past several years now. I love the outdoors, I love lakes and I love animals. I have a cat of my own now but look forward to the day I can give a dog a nice backyard.

How did you get started in the turfgrass industry?

When I started working for SOX!

What is the most rewarding part of your career? Getting to help protect and restore the beauty of our natural world.

What would you consider to be your greatest career challenge? Learning the needs and challenges of the different industries I work with on a daily basis.

Which three adjectives describes you the best? Honest, Loyal, Hardworking (please see exhibit A.)

Tell us about your family. My parents and I are super close, and I have a large extended family back home in Cleveland that I look forward to seeing every year for the holidays!

What drives/motivates you every day? Happy clients who feel supported.

Who do you admire? My Grandpa

Who is the person in history you'd most like to meet? Chris Farley

What's a fun fact or two that people don't know about you? I never leave Wisconsin without a case of Spotted Cow.

What do you do in your spare time, favorite hobbies? Some of my favorite activities include walking along Lake

Michigan, beach volleyball, yoga, and drinking the spotted cow that I bring home from Wisconsin.

If you could go anywhere in the world on vacation, where would you go? I'd love to go anywhere in Portugal or Italy next but Sanibel Island, Florida is my favorite place.

What is one thing you would like to learn/accomplish someday? How to have a sub 20 handicap.

What is your favorite turf management related tool or technique? Cup cutting, it is very satisfying process to watch.

Favorites:

TV Show: Friends or Modern Family

Movie: Pretty Woman or The First Avengers

Food: Ice Cream

Sports Teams: Buffalo Bills, OU Bobcats, The Cubs

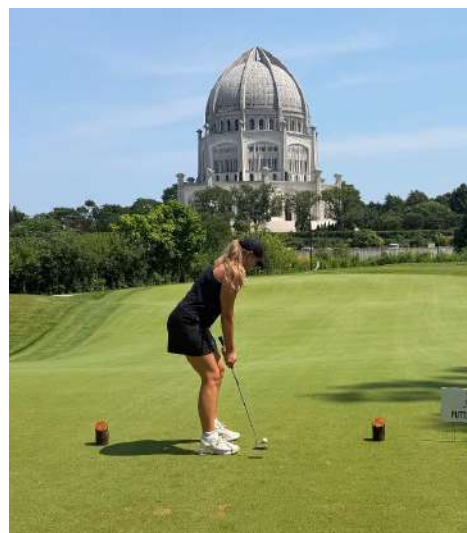
Do you golf? Handicap? Best shot or golf story? Yes. I don't want to talk about it. I hit my first shot out of a bunker perfectly and it went in. I'll never forget it.

Top Bucket List item? Own a boat.

If you could provide one piece of professional advice, what would it be? Do the hardest things first! 🍀



Me inside of our ShoreSOX solution. (Exhibit A.)



Working on my short game at Canal Shores Golf Course in Evanston, IL.



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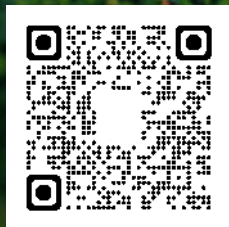
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With an upside-down smiley face aesthetic, sand is certainly in play around the 6th hole.

MARK DEUTSCHMANN: KEEPING EAGLE SPRINGS, EAGLE SPRINGS

By: Paul Seifert, WiscoGolfAddict

There are golf courses that impress you with grandeur, amenities or carefully manufactured drama.

Then there are places that stay with you for reasons that are much harder to explain.

Eagle Springs Golf Resort is one of those places.

Tucked away in Eagle, Wisconsin, just 45 minutes from Milwaukee, Eagle Springs is the oldest golf property in the state, dating to 1893. It is also one of the most fascinating nine-hole courses you will find anywhere, with bold, quirky architectural features that feel as though they belong to another era because, in many cases, they quite literally do.

It has been recognized among the best nine-hole golf courses in the world, yet somehow remains one of the ultimate hidden gems in Wisconsin golf. There are still plenty of serious golf enthusiasts throughout southeastern Wisconsin who have never played it - and plenty more who have probably driven within 10 minutes of the property without ever realizing what was hiding nearby.

Those who do make the trip quickly realize that Eagle Springs is about much more than nine holes of golf.

From the quiet drive onto the property to its wonderfully unconventional golf course, the old-school clubhouse with a tree trunk extending through the ceiling and generations of family history behind it, Eagle Springs has a soul that is almost impossible to manufacture. Time moves differently there.

And for Golf Course Superintendent Mark Deutschmann, that is precisely the point.

Deutschmann has spent the past several years helping Eagle Springs become better conditioned, more intentional and more professionally managed while being careful not to polish away any of the character that makes the property so special.

"Preserving our history and keeping the course original is more important than trying to improve any aspect," Deutschmann said.

That philosophy might seem unusual for an ambitious young superintendent who arrived with experience from a collection of highly regarded private clubs. At Eagle Springs, however, improvement does not necessarily mean change.

Sometimes it means knowing what not to change.



Mark Deutschmann and his team at Eagle Springs have continued to make the property a shining example of a well-conditioned golf course that has stood the test of time.

An Unlikely Path to Eagle Springs

Deutschmann did not grow up dreaming of becoming a golf course superintendent.

In fact, he did not know much about golf at all when his career began.

"My golf course career began on a whim doing an internship at Bellerive Country Club in St. Louis," he said. "I had no prior knowledge of golf. After one summer of being exposed to the game and what goes into setting up a course, I found it was a meaningful job and lifestyle."

That summer changed the trajectory of his career.

Deutschmann moved into an assistant role at Quincy Country Club following graduation before continuing to build his experience in the Chicago area at Oak Park Country Club and, most recently, Old Elm Club.

Each stop exposed him to the standards, practices and attention to detail associated with private club turf management.

None of it seemed particularly likely to lead to a small, family-owned public nine-hole course in southeastern Wisconsin.

"Spending my entire career at multiple private clubs, I never saw myself managing a public course," Deutschmann said. "But Eagle Springs is different. Between the members of the

Continues on page 16

THE MIDWEST'S PREMIER

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The seventh hole is a par 3 that you'd rather not be short on.

course and everyone involved in our history, it couldn't be a better fit."

Different is an appropriate word for Eagle Springs.

The property was founded by the Tuohy family and remains connected to that family six generations later. Through more than 130 years of golf, the course has managed to retain a personality and sense of place that would be nearly impossible to recreate today.

"The soul of Eagle Springs began with the Tuohy family that founded the course and it is still going with the sixth generation," Deutschmann said. "The course has been carefully preserved. I would imagine it has almost the same feel it would have over 100 years ago."

Today, that stewardship continues with sixth-generation owners Matt and Anne Krug, who have embraced both the responsibility of preserving what makes Eagle Springs special and the opportunity to support Deutschmann as he thoughtfully helps move the property forward.

That preservation has not meant absolute resistance to change.

Fifth-generation owner and superintendent Mike Bolan made several thoughtful alterations during his time caring for the property, particularly to a handful of greens. Those changes became part of Eagle Springs rather than departures from it.

"The only real changes to the course have been modifications to the greens on one, four, six and seven made by Mike Bolan," Deutschmann said. "They were thoughtful improvements that didn't drastically change the course or bring in another architect's name."

That approach has become a model for Deutschmann.

Improving Without Reinventing

There would be an easy way to misunderstand what Deutschmann has brought to Eagle Springs.

This is not a story about a superintendent arriving to rescue a property that had been neglected by the people who came before him.

Quite the opposite.

Generations of ownership have cared deeply for Eagle Springs, protecting it and resisting many of the impulses that have caused other historic courses to lose their identity over time. Bolan, in particular, invested tremendous personal effort into both maintaining and thoughtfully evolving the golf course.

What Deutschmann has added is another layer - the experience and knowledge of a professionally trained turf manager whose career was built at larger, more traditional golf operations.

That expertise is evident in the details.

Eagle Springs today retains the same wonderfully unconventional architecture, routing and atmosphere it always has, but the conditioning and day-to-day presentation of the property have continued to rise.

It is an important distinction.

Deutschmann is not trying to make Eagle Springs look or play like Old Elm, Bellerive or any of the other clubs that helped shape his career.

He is using what he learned at those places to help Eagle Springs become the best possible version of itself.

The result is a property that feels increasingly refined without becoming more conventional.

For a golf course whose greatest asset may be its individuality, that balance matters.

"The way the land was turned into a golf course rather than being created is truly remarkable," Deutschmann said. "The course has both bold and quirky features that could never be replicated."

Spend enough time at Eagle Springs and it becomes easy to understand what he means.

The course is filled with features that would likely never survive a modern design committee - severe slopes, blind and semi-blind shots, dramatic green contours and landforms that ask players to embrace creativity rather than simply execute prescribed shots.

The blind, uphill opening tee shot leads to a halfpipe fairway and Alps-style mound before reaching a massive greens complex with dueling punch bowls. The famous "Volcano" par-three second climbs to one of the smallest and most intimidating green sites in Wisconsin golf. The fourth tumbles left into a dramatic punchbowl that modern design convention might suggest belongs on the opposite side of the putting surface, yet a simple drain in the back-right makes it work beautifully. The sixth and seventh continue through terrain that seems almost purpose-built for memorable golf, even though much of Eagle Springs' charm comes from the sense that the course was discovered within the landscape rather than imposed upon it.

Deutschmann sees those quirks as part of what makes Eagle Springs special - features to understand, protect and preserve rather than smooth out or standardize.

The Ninth Green

Few projects better illustrate that philosophy than the recent expansion of the ninth green.

For years, players had asked for changes that would provide additional hole locations and make the putting surface more receptive.

A conventional answer would have been relatively straightforward: soften the contours and flatten portions of the green.

For Deutschmann, that was never really an option.

"Flattening the original green was not an option for us," he said.

Instead, Deutschmann and his staff looked for a way to solve the practical problem while allowing the original green to remain intact.

"A big task I spearheaded my first year of managing Eagle Springs was our expansion of the ninth green," he said. "For years our members have urged for the green to be flattened for more pin locations and to be more receptive. After plenty of discussion we came up with the idea of slightly expanding an area for the front-left pin location, adding a shelf to the back-right and a collection area in the back-left."

The project increased flexibility and created additional interest without erasing what was already there.

Just as importantly, Deutschmann wanted the finished product to look as though it belonged.

"The fifth generation has left his thumbprint on a few holes, but it feels like it was always there," Deutschmann said. "I wanted to do the same thing with the ninth green expansion my staff and I completed, and I think we pulled that off."

That sentence might summarize his broader approach to Eagle Springs better than anything else.

Make it better.

Continues on page 18

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Continued from page 17

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Doing More With Less

The superintendent role at Eagle Springs is also fundamentally different from what Deutschmann experienced earlier in his career.

At larger clubs, responsibilities can be divided among sizable teams with specialized roles, substantial equipment inventories and established infrastructure.

At Eagle Springs, the operation is considerably more personal.

Deutschmann is involved in nearly every aspect of maintaining and improving the property. The job can involve agronomy, equipment setup, troubleshooting, project planning, irrigation, staff development and whatever else happens to be required that day.

Much of the seasonal workforce is local - high school and college students, young people with connections to the course and others who arrive through word of mouth.

It creates an operation that reflects Eagle Springs itself: small, personal and deeply connected to the surrounding community.

It also means relationships beyond the property are invaluable.

Deutschmann joined the Wisconsin Golf Course Superintendents Association shortly after arriving at Eagle Springs, and the network he has developed throughout Wisconsin has become an important part of what he has been able to accomplish.

"Having the connections with other local superintendents



After the blind tee shot into the halfpipe fairway, you'll find a first green that has a double punch bowl effect protected by an imposing mound. How's that for a start to your round?

is a big reason why I've succeeded thus far," he said. "From borrowing equipment to getting a hand with projects or aeration has been quintessential."

That support can take many forms.

At a smaller operation, access to a specialized piece of equipment for a day can be the difference between postponing a project and completing it. An extra set of experienced hands during aeration can dramatically change what a small staff is able to accomplish. A phone call to another superintendent can provide an answer that might otherwise require hours of trial and error.

The relationships Deutschmann developed earlier in his career, along with those he has built since coming to Wisconsin, have allowed Eagle Springs to tap into expertise and resources extending well beyond its own maintenance facility.

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"The golf community of Wisconsin has been great to us," he said, "and I have been doing my best to show our appreciation."

For an organization such as the WGCSA, it is a meaningful example of what an industry community can look like in practice.

Networking is easy to discuss in abstract terms.

At Eagle Springs, it can mean a borrowed machine, additional help on an important morning or another superintendent willing to answer the phone.

The Ultimate Hidden Gem

For all the attention Eagle Springs has received from golf architecture enthusiasts in recent years, its relative anonymity remains remarkable.

It is difficult to think of another Wisconsin course that combines this much history, architectural interest and national recognition while remaining unfamiliar to so many players living nearby.

Part of that may simply be the number nine.

In an era when golf experiences are often judged by length, scale and amenities, some players instinctively dismiss a nine-hole course as incomplete. Eagle Springs challenges that assumption almost immediately.

There is more memorable golf packed into these nine holes than almost any other course can provide in 18, and the experience is inseparable from the environment surrounding them.

The property does not need to become bigger to become more meaningful.

It does not need a dramatic architectural overhaul to become more interesting.

And under Deutschmann's stewardship, it does not need to become something different in order to become better.

That may ultimately be the most important thing he understands about the place.

When asked what he hopes Eagle Springs will look and feel like five years from now, Deutschmann did not describe a long list of renovations or transformations.

"I don't see the course itself being much different," he said. "It is always going to feel the same, you cannot change culture."

For someone whose job is fundamentally about improvement, that might sound like an unusual goal.

At Eagle Springs, it feels exactly right.

The turf can continue to improve. The conditioning can become more consistent. Infrastructure can evolve, projects can be completed and another generation of employees can learn what it means to care for this remarkable piece of Wisconsin golf history.

But the ultimate measure of success may be much simpler.



The par 4 third hole is well protected by water and woods off the tee before opening up a bit by the green.

Decades from now, someone should still turn down the road into Eagle Springs Golf Resort, step onto the property and feel as though time has stopped.

The golf should still be quirky.

The architecture should still be bold.

The property should still ooze soul.

And Eagle Springs should still feel unmistakably like Eagle Springs. ✓

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A Tribute to Wayne Otto, CGCS

HOW EL NIÑO AND LA NIÑA IMPACTS SNOW MOLD IN THE MIDWEST

By: Paul Koch, PhD, University of Wisconsin – Madison

Author's Note: This article was originally published in the August 2026 issue of Golfdom magazine and is reprinted here with their permission.

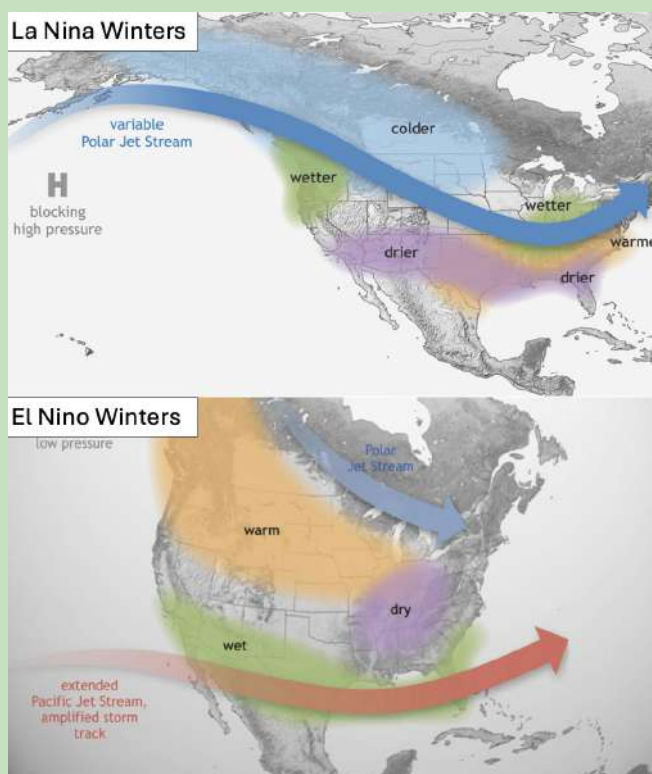
One of the biggest difficulties with snow mold control is that there is typically only one shot to get it right. Perhaps snow mold hasn't been observed in years so the decision was made to save a few bucks on the snow mold fungicide program and then, of course, the worst winter in a decade arrives with feet of snow piling up outside. At that point you can't really remove the snow and apply more fungicide, so you're basically left to wait and hope the damage isn't too bad. This leads to most superintendents planning for the worst and often applying much more fungicide protection than they'll probably need. But, as they say, better to plan for the worst than hope for the best.

But what if there was a way to accurately predict the conditions in certain winters? While this isn't possible every winter under current forecasting capabilities, what about certain winters impacted by the La Niña and El Niño phenomena with established histories of impacts on snowfall and temperature? Accurate snow mold predictions during these winters would allow superintendents to adjust their snow mold program based on the forecast for a severe or mild winter and put down just the right amount of protection needed to protect the turf.

What is El Niño and La Niña?

El Niño is the name given to warmer than average water temperatures in the Pacific Ocean near the equator, and La Niña is the name given when water temperatures are cooler than average. Despite being thousands of miles from the U.S. they can have large impacts on winter conditions across the entire country (Figure 1). In general, El Niño winters produce a more southern jet stream that causes cooler, wetter conditions in the south and warmer, drier conditions across the north. La Niña does the opposite, causing cooler and wetter conditions across the north and warmer and drier conditions across the south. Using these descriptions, we would expect snow mold in the Midwest, Northeast, and Pacific Northwest to be higher than average during La Niña winters and lower than average during El Niño winters. A 'super El Niño' is forecast this winter with water temperatures in

FIGURE 1:



Visual representations of the general effects that La Niña (top) and El Niño (bottom) can have on winter conditions across the U.S. Figures taken from the website <https://oceanservice.noaa.gov/facts/ninonina.html>.

the Pacific Ocean near the equator well above average. Does this mean superintendents across the northern U.S. can decrease their snow mold fungicides in anticipation of reduced snow mold pressure? Let's see what the data from past El Niño and La Niña winters suggests.

How has snow mold in the Midwest responded to El Niño and La Niña winters?

At the University of Wisconsin – Madison we have been studying snow mold across Wisconsin and surrounding

states for decades. We have posted snow mold research results at our fungicide evaluation results page (<https://tdl.wisc.edu/results/>) from every year dating back to 2008-2009. According to Golden Gate Weather Services (<https://ggweather.com/enso/roni.htm>) there were moderate or very strong El Niño winters in 2009-2010, 2015-2016, and 2023-2024, and moderate or strong La Niña winters in 2010-2011, 2011-2012, 2020-2021, and 2021-2022. During each of these winters we tested snow mold at sites in southern Wisconsin (Madison or Milwaukee), central Wisconsin (Wausau or Stevens Point), or further north in Michigan's Upper Peninsula (Marquette). The average snow mold on non-treated plots for each region in El Niño, La Niña, and 'Normal' winters are presented in Figure 2, and the individual data from each site is presented in Table 1.

FIGURE 2:



Average snow mold during El Niño, La Niña, and Normal winters across southern Wisconsin (South), central Wisconsin (Central), and Michigan's Upper Peninsula (North).

Table 1. Snow mold severity during winters identified as El Niño, La Niña, or Normal across golf courses in southern Wisconsin, central Wisconsin, and the Upper Peninsula of Michigan. Snow mold is from the non-treated control plots in each study and is averaged over 4 replications

El Niño		La Niña		Normal	
2009-2010	Snow mold %	2010-2011	Snow mold %	2012-2013	Snow mold %
South	0.0	South	17.5	South	11.3
Central	89.5	Central	74.8	Central	21.3
North	93.3	North	90.8	North	61.3
2015-2016		2011-2012		2013-2014	
South	0.0	South	0.0	South	3.8
Central	41.3	Central	0.0	Central	87.5
North	83.8	North	65.0	North	95.0
2023-2024		2020-2021		2018-2019	
South	40.0	South	87.5	South	0.0
Central	40.0	Central	12.5	Central	6.3
North	71.3	North	72.5	North	81.3
		2021-2022		2019-2020	
		South	2.5	South	56.3
		Central	50.0	Central	71.0
		North	94.5	North	87.5

In short, there was no ability of La Niña or El Niño winters to accurately or consistently predict snow mold pressure across our testing locations. Looking at the overall averages, the region where the winter appeared to be most impactful was the south, where the snow mold average of 27% in La Niña winters doubled the 13% in El Niño winters. However, closer inspection found immense variability from year to year. In both the 2009-2010 and 2015-2016 El Niño winters there was no snow mold observed in the southern locations, but in 2023-2024 (also an El Niño winter) snow mold damage averaged 40%. Snow mold in the La Niña winter of 2020-2021 averaged a very high 88%, but in 2010-2011, 2011-2012, and 2021-2022 the average was 18, 0, and 2.5%, respectively.

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Snow mold at the central Wisconsin sites also didn't follow any pattern related to El Niño or La Niña. What was more interesting was the gradual decrease over time in the level of snow mold seen at these locations. Snow mold at the central sites averaged nearly 55% snow mold prior to 2015 but only 38% after 2015. This data supports what we've noticed anecdotally on the plots, which is that climate change has transitioned central Wisconsin from an area that consistently experiences heavy snow mold damage every year to one that more sporadically experiences snow mold damage depending on the conditions that particular winter.

If central Wisconsin has transitioned from one side of the snow mold divide to the other, further north in the Upper Peninsula conditions remain firmly on the side of consistent snow mold pressure. Over the 11 years analyzed for this article the lowest snow mold present in the north was 61% disease in 2012-2013 (a 'normal' winter) and the highest was 95% in 2021-2022 (a La Niña winter). In the presumably lower snow mold pressures of El Niño winters in 2009-2010, 2015-2016, and 2023-2024 disease was 93, 84, and 71%, respectively. When you're this far north it doesn't really matter what the Pacific Ocean is doing... you're going to get snow mold (Figure 3).

FIGURE 3:



Winters in Michigan's Upper Peninsula have plenty of snow mold no matter the ocean temperatures in the Pacific.

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Conclusion

La Niña and El Niño can generally influence winter environments across the country that may have potentially devastating impacts like increased flooding, expansion of drought, etc. But their influence remains just that...general. Specific weather patterns at individual golf courses across the country will still vary in their winter environments whether it's a La Niña or El Niño year, which results in varying levels of snow mold pressure no matter what's happening in the Pacific Ocean. In addition, climate change is altering traditional winter patterns, so that what was needed to control snow mold at your location 20 years ago may no longer be needed.

The data presented in this article suggests that you shouldn't alter your snow mold fungicide program based purely on whether it's a La Niña or El Niño winter, but that doesn't mean you shouldn't alter your program at all. Leave one or more non-treated check plots around the course each year to assess the level of snow mold pressure you experience and ensure you're not applying more fungicide than needed. Keep up to date on new products and new restrictions on old products. And of course, keep up to

date on the latest snow mold research from my program and others so that you are fully equipped to deal with this challenging disease.

Acknowledgements

Conducting this kind of research for decades takes a lot of support. First and foremost, Kurt Hockemeyer is our Field Research Manager and expertly handles the logistics of a large and complex program. Second, private industry sponsors provide the essential funding to conduct the research. Lastly, this work can't be done without the support of our host superintendents. Since 2009 we've tested at the following locations with the following superintendents and are immensely thankful for their support:

- Grant Park GC – Jon Canavan
- Marquette CC – Craig Moore
- OJ Noer Turfgrass Research Facility – Tom Schwab/Bruce Schweiger/Dave Marach
- Sentryworld GC – Gary Tanko/Matt Smith
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THE HOCKEMEYER SUMMER DISEASE TRIALS WRAP UP: 2026 EDITION

By: Kurt Hockemeyer, Turfgrass Diagnostic Lab Manager

In early August, we hosted the WTA Summer Field Day at the OJ Noer Research Station. For me, this day is always a whirlwind. There is so much time and energy that goes into hosting this event and then it feels almost anti-climactic when it's 3pm and everyone is gone. Paul, Doug, and I have started somewhat of a tradition over the past few years where we have a celebratory beer together after Field Day; I have really started to look forward to that beer. And, now that I think about it, the reason I enjoy it so much is that it gives me a sense of finality that washes away that anti-climactic feeling. A sense of peace. I've always felt that Field Day is a culmination of all my/our work over the summer. Not just me, but Paul, Doug, Dave, grad students, undergrads, hourly employees, and research technicians, too. The definition of culmination is "to reach the highest point". And, instead of immediately being back at ground level, that beer gives me a chance to descend from the metaphorical peak. We chat about what went right during Field Day, what went wrong, who we saw, who we talked to, etc., etc. This gives me a chance to decompress, evaluate, and plan for next year. I don't always get that, and I've come to really appreciate it.

As we enter the final stretch of the growing season, I hope everyone gets a chance to descend from their own metaphorical peak. Maybe that is hosting a BBQ for your maintenance crew, grabbing a beer with some colleagues, or even just reflecting on the season with friends.

The summer of 2026 has been warm, dry, and humid. That is probably a major oversimplification. Diseases run rampant when it is warm and humid - a common thread among many fungal pathogens. To me, though, humidity is the most predictive of disease. I only pay attention to dew points when it comes to tracking humidity. Relative humidity changes throughout the day, but dew points are constant and will only change when humidity levels change. Dew points were at or above 60 for most of the summer. This is when the air starts to feel humid and when we start to see disease activity increase. Dollar spot takes off, as well as maybe leaf spot and red thread. Then, when dew points reach 70, the air starts to feel very muggy, and disease activity really starts to explode. We start to think about



Figure 1. Severe dollar spot on a putting green. We usually only see dollar spot this severe when dew points get above 70.

diseases like brown patch and Pythium blight, and dollar spot becomes severe on untreated turf (Figure 1). Even some of the best performing fungicides had some breakthrough in our trials. Unfortunately, fungicides are not perfect, especially under heavy disease pressure.

One of the more interesting studies we conducted this summer was our autonomous mower research on how overnight dew removal affects dollar spot development. We conducted two studies. The first study sent a mower out at different times of night/early morning. Initial results suggest that the critical time to remove dew is somewhere around midnight to 3 am. We need to study this more, but it is very interesting. The second study looked to see if stacking multiple dew removal events overnight could compound the effects of a single dew removal event. And the answer is an emphatic yes. Figure 2 shows how effective multiple dew removal events are as the plot is almost completely free of dollar spot.



Figure 2. Overnight dew removal by autonomous mowers appears to be very effective at controlling dollar spot. More research is needed but initial results appear very promising.

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The high dew points this summer also resulted in the most brown patch I have ever seen at the OJ Noer (Figure 3). This summer has been brutal from an environment standpoint. Lots of stressed grass coming into the diagnostic lab. But, also lots of diseases. As a plant pathologist, I couldn't ask for anymore!

Summer 2026 saw Plant Pathology test roughly 229 treatments across 22 different studies. That's nothing to sneeze at, but honestly, it's my favorite part of my job. Summer trials will be ending soon, so watch out for our summer reports on our website (tdl.wisc.edu) right around Labor Day. Dive in once they are posted and let me or Dr. Koch know if you have any questions about anything. Is it snow mold season yet? ✓✓



Figure 3. This is some of the most severe brown patch I have ever seen at the OJ Noer. No lasting damage occurred from this outbreak. Once humidity broke the brown patch just went away.

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MAPPING OUT THE FUTURE OF SOIL MOISTURE SENSING

By: Doug Soldat, Dept of Soil and Environmental Sciences, UW-Madison

Ask any superintendent what keeps them up at night, and irrigation will likely be at or near the top of the list. Too much water and you risk disease, compaction, and poor playing conditions. Too little and you risk losing grass. Many turfgrass managers have taken advantage of soil moisture probe technologies to help guide their decision making. While these probes were an advancement over the experience and visual inspection methods of the past, the process is still fairly labor intensive and not suitable for large areas. I am really excited to be part of a team at UW-Madison working to create a tool that may have the accuracy of a probe, but the speed of a scanning sensor. The code name for the

project is called SoilRadar, and the device is a relatively compact, vehicle-mounted radar system that maps soil moisture across any area in almost real time.

The SoilRadar system was developed by a multidisciplinary team at UW-Madison led by Assistant Professor Haihan Sun of the Department of Computer and Electrical Engineering and supported by Associate Professor Jingyi Huang and myself in the Department of Soil and Environmental Sciences. The prototype is a 12-inch cube weighing about five pounds. It consists of a microcomputer that records and processes data, a radar unit that transmits and receives electromagnetic waves,



Yuki Gao (driver, PhD student in Computer and Electrical Engineering) and Taorui Chen (passenger, PhD student in Computer and Electrical Engineering) showing off the current prototype of the SoilRadar system at University Ridge Golf Course.



A map of soil moisture of the 6th fairway at University Ridge generated by the SoilRadar system.

and a high-accuracy GPS receiver that georeferences every moisture reading. The system is mountable on a utility vehicle or mower and collects four measurements per second as it moves across the turf.

Because water affects how soil interacts with emitted electromagnetic signal, the system can infer soil volumetric water content (VWC) from the return signal. As the vehicle moves across a turf area, the system stitches together thousands of individual readings and uses interpolation to generate a moisture map with a resolution of about 3 feet, giving the turf manager a complete picture of where the wet areas are, and where irrigation might be needed.

The earliest testing started in 2024 – mostly developmental work, figuring out what worked and what didn't on some fairway turf at the O.J. Noer Turfgrass Research and Education Facility. In 2025, we were ready to test the SoilRadar system. We ran trials on a silt loam bentgrass fairway mowed at half an inch on a study that was looking at how dollar spot pressure varies under wet and dry fairway conditions. We took several TDR measurements within the sensing area to compare against the SoilRadar readings. The results were impressive. SoilRadar achieved an r^2 of 0.92, for context, an r^2 of 1.0 would mean that the TDR and SoilRadar readings were exactly the same, and an R^2 of 0.0 would mean that the two readings were completely unrelated. This suggests that the SoilRadar can perform at or near the level of accuracy that turf managers need to schedule irrigation with confidence. That said, the O.J. Noer trials were conducted on a single soil type on a stationary platform (not a moving vehicle).

The next logical step for us was to take SoilRadar out of the research station and into the field. Phil Davidson has been kind enough to let us do some real-world testing at University Ridge Golf Course in Madison this summer. As expected, the relationship wasn't as strong as it was for our stationary measurements, but was still quite impressive. The r^2 values from

our field testing have been around 0.6. However, the accuracy near the dry end (which is more important to know than the wet end) is much higher. University Ridge has a soil type very similar to the OJ Noer, so we are heading to some other Wisconsin golf courses soon. We are also hoping to visit Erin Hills, Sand Valley, and Lake Breeze to see how the sensor performs in sand, loamy, and clay soils.

Assuming things go well with those tests, we will move back down to a single site to do some cost-benefit analysis. The idea would be to use individual fairways to

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compare conventional irrigation scheduling (the visual inspection and experience-based approach) against a SoilRadar-guided precision irrigation approach, and a TDR-guided precision irrigation approach. Success will be measured through regular turfgrass quality ratings, NDVI/NDRE vegetation indices, and also economical and environmental metrics. We also hope to get some feedback from turf managers about the user-experience with SoilRadar.

The prospect of a validated SoilRadar system is exciting. At <\$2,000 in hardware costs, the system is likely within reach for most facilities. The University of Wisconsin is home to some of the most innovative turfgrass research in the country, and SoilRadar is another example of that tradition. We are grateful for the support of the WTA, WGCSEA, and network of superintendents willing to work with us to make this vision a reality. 





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ANOTHER SUCCESSFUL WTA FIELD DAY

By: Dave Marach, Superintendent, OJ Noer Turfgrass Research Facility

The dog days of summer are almost behind us and the 2026 Wisconsin Turfgrass Association Field Day has come and gone. This year's field had an increased attendance and even more vendors than in previous years, which is a great sign. For those who were unable to attend, Field Day was another great learning opportunity for anyone in the turf industry.

This year, the morning general turfgrass management session had two guest speakers. P.J. Liesh from UW-Madison Entomology gave everyone an introduction to some, review for others on common turf damaging insects. UW-Madison Horticulture Extension Agent, Bruce Spangenberg, gave some great information on weed management. From dandelions to the famous creeping charlie, all his insights on weed management will help us all keep our turf in tip top shape.

There were also stops with the OJ Noer team. Glen Obear, kind of new to the group, continued the talk and showed how the Kentucky bluegrass NTEP results will help you select the best variety and some nontraditional mixtures to seed your lawn with to help lower your inputs. Kurt Hockemeyer spoke about the old standby of Glyphosate vs the new formulation of Roundup. Paul Koch continued to keep everyone up on understanding and how to correctly diagnose home lawn diseases compared to mechanical or insect damage and how to select the proper treatment for a healthy lawn. Doug Soldat took the opportunity to jump in a soil pit left over from Grandparents' University to talk about soil formation, structure, different horizons and common problems that happen in city developments.

The afternoon golf session once again had a casual walk around the bentgrass plots with Doug, Paul and the research staff giving their latest findings on current research. Doug and his staff continue to conduct extensive research on wetting agents and a demonstration of mapping soil moisture. Paul and his research team continue their study on how leaf pH affects Dollar Spot, but now he brought in the robots. The Plant Pathology department is currently looking at how timing and frequency of mowing with autonomous mowers affect the formation of Dollar Spot with some interesting results.

Much like every year there is so much research going on, you really must see it for yourself, so pencil it in for next year. Same time (roughly), same place. ✓



Kurt Hockemeyer discussing the Roundup study during the morning session on general turf management.



Dr. Koch getting the afternoon golf tour started while Dr. Soldat waited in the wings.



Thanks to all the vendors who came out to support the event!



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WTA FALL CLASSIC HEADS NORTH

By: Jake Schneider, Executive Director and Editor

If you're anything like me, you don't need extra motivation to travel to the Northwoods of Wisconsin at any time of the year, especially in early fall when the leaves are changing and the landscape is transformed into a dazzling array of reds, oranges, and yellows. But, if you're a southerner who requires a boost to travel above Highway 29, the 2026 Wisconsin Turfgrass Association's annual Fall Classic golf outing should be just what you need. And, if you already live north of Highway 29, heading south will basically be a tropical vacation! This year's event will be held on October 6 at Wausau Country Club, and the accompanying picture says it all about the host venue and why you and all your friends should make the trip.

Nestled in a peninsula along the Wisconsin River, Wausau CC has a spectacular routing with tree-lined fairways and water in play on many holes. Superintendent Aaron

Hansen and his staff look forward to welcoming golfers from all over the state for the annual fundraiser benefiting turfgrass research at UW-Madison. Aside from some awesome golf, there will once again be a bucket raffle that will feature a bunch of great prizes courtesy of the WTA's industry partners along with a 50/50 raffle. Oh, and I almost forgot about the food; there will be plenty of it both before and after the round.

Make your plans now to attend this can't-miss outing and be sure to register at: <https://wisturf.org/event-6590511> The WTA looks forward to seeing you in Wausau in early October for a cause that supports the vital research that Drs. Koch and Soldat conduct for the benefit of turfgrass managers all across the Badger State.

I mean, look at that picture! 



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FIRST GREEN MEETS THE FIRST TEE

By: Jake Schneider, Editor and Executive Director

In what will hopefully be an annual tradition, the WGCSA hosted the First Tee of South-Central Wisconsin for a GCSAA First Green event at the OJ Noer Turfgrass Research Facility. Nearly 30 highly engaged kids (and a few parents) took part in a really fun morning learning a bit about what it takes to be a golf course superintendent. With any luck, we'll see one of them in our industry in the future! 🌱



Dr. Koch talked a bit about the different types of turf and also showed his captivated audience a few diseases that were present.



Kurt Hockemeyer was training several future turfgrass diagnosticians who got to look at disease samples under the microscope.



Although Mother Nature shortened our time outside and didn't allow PJ Liesch to demonstrate a soap drench test, the kids were plenty interested in the many bugs that were on display.



Dr. Soldat demonstrated how to properly cut a new hole and fill in the old one. He also had the kids practicing with a Stimpmeter and demonstrated how to use a soil moisture probe and soil probe.



Dave Marach gave a brief tutorial about the specialized equipment that is needed to properly maintain golf courses including sprayers, grinders, and reel mowers.

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GPS SPRAYING: IS IT WORTH THE COST?

By: Mike Anderson, Golf Course Supervisor, Washington County Golf Course

Living in the world of information, it has become simple to over analyze any purchase. I find myself all too often reading reviews to exhaustion contemplating which item to buy. For this reason, I've set out to help you with one of your golf course's most expensive and arguably the most important pieces of equipment, your sprayer. This will not be a battle of the brands, but an anecdotal comparison of GPS and non-GPS sprayers. Sales teams will claim that a GPS sprayer will provide a multitude of benefits such as long-term cost savings, environmental protection, improved turf health, increased efficiency, and extreme accuracy, but do they really?

What is GPS Spraying?

A GPS sprayer looks similar to a standard sprayer with the addition of a few more electronics. The sprayer I am familiar with is a Smithco 3180, however I will do my best to inform you generically rather than brand specific. GPS spraying utilizes Global Positioning System (GPS) technology to ensure the chosen product is applied where you desire. By mapping the precise boundaries on your course, a GPS-guided sprayer can apply treatments with pinpoint precision, eliminating overspray and ensuring that chemicals are applied only where needed.

How Much More does a GPS Sprayer cost?

After speaking to sales reps for John Deere, Smithco, Toro, and Frost the additional cost is roughly \$25,000 to \$75,000. This is only adding GPS capability to a new sprayer, not adding any other features, unless other features are required as a package to upgrade. In addition to that a subscription cost of \$1,400 to \$2,500

per year is also required to use these features. These are current market prices (July 2026) for our territory without any incentives, rewards programs, discounts, etc.

Savings in Chemical Cost

This is the area I was most skeptical. Will you really use less chemicals? Will it amount to a significant amount? Will it justify the added cost of going with GPS technology? After two and a half seasons of using our Smithco 3180 this is what we've found.

At our course we have approximately 3 acres of greens, 5 acres of tees, and 32 acres of fairways. We currently spray greens and tees every other week and fairways every three weeks. Since chemical prices change year after year it might not make sense to compare what we've spent each season. If we look at area however, we spray 32,000ft² less on greens, 67,000ft² less on tees, and 160,000ft² less on fairways per application. That's an area reduction of 19% on tees, 17% on greens, and 10% on fairways. If you were to use those percentages with your sprayable area, you could estimate potential chemical cost savings.

Do we now spend less on chemicals? Not really, but we haven't had to increase our chemical budget since switching to our GPS sprayer. We've also been able to stick to our spray schedule, whereas in the past we might extend the length of time in-between fairway and tee applications or skip an application all together towards the end of the season. The "savings" also allowed us to purchase additional chemicals which improve our turf health and/or playability without increasing our budget.



What Other Benefits?

All the benefits of the GPS sprayer are due to the exceptional accuracy. Spraying 10-19% less area has led to being more efficient. Less tanks and less time. Even if golfers were to catch you while spraying fairways, you can leave an area and come back later. It won't let you double spray without pressing extra buttons to override. One of the most undersold benefits is ease of mind. Spraying in a GPS sprayer with individual nozzle control greatly reduces the amount of stress that goes into an application. At the end of a pass, you aren't turning off whole booms at a time, each nozzle is turning off on its own. Our course still uses a foam marker most of the time, but it isn't necessary. Since the sprayer requires less input from the operator, you could train other employees to do the job. I have a hard time delegating the important tasks, so this is not something we've tried personally. We also shouldn't overlook the fact that reducing overlap and only spraying within your target area is being more environmentally friendly.

Final Verdict

With the added technology of a GPS sprayer, you will be more accurate

with your application. The potential to save money or at least offset the additional costs is there, however it may be difficult to track due to changes in chemical costs, using different products each season, etc. In the end, the main reason I would continue to have a GPS sprayer be a part of my fleet is the ease of mind. The product is going only where I want and at the proper rate. As a steward of the property, I urge all superintendents to consider upgrading if you haven't already. Schedule a demo if possible, visit a neighboring course that has one, and place a GPS sprayer right below a functioning greens mower on your list of important pieces of equipment. ✓





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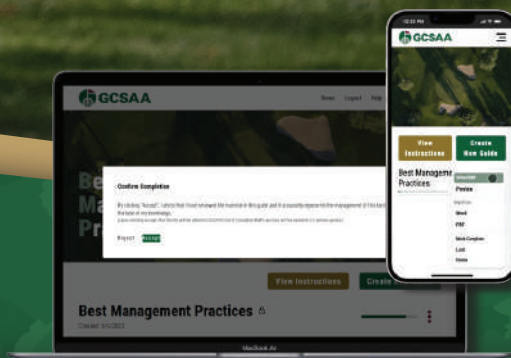


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PUTTING GREEN CONSTRUCTION SERIES

PART 3: THE GRAVEL LAYER

This is part 3 of a 4-part series that covers how to build a USGA variable depth green and select a rootzone and gravel with optimal performance characteristics.

By: Adam Moeller is President of Moeller Consulting and Director of Agronomy, North America with Turfgrass®, a global agronomy consultancy and golf course project management company. Contact Adam at: adammoellerconsulting@gmail.com or adam@turfgrass.golf

In the first two parts of this putting green construction series, we covered USGA variable-depth greens and the selection of sands, amendments, and soil physical performance parameters. In Part 3, we'll move into the often-debated topic – the gravel layer between the subgrade and rootzone mix.

Common Putting Green Construction Methods

Before discussing whether a gravel layer is necessary in putting green construction, it is helpful to review the most common construction methods being used by golf course architects and builders. These include USGA greens, USGA-style greens with variable-depth rootzones, California greens, sand-based greens with sand-channel drainage, and native-sand greens. The basic differences among these construction methods are outlined in Table 1.

Table 1. The most common construction methods used for modern putting greens.

Construction Method	Rootzone Depth	Gravel Layer	Pipe Spacing	Pipe Size
USGA	12-inches	Yes	≤15 feet	4-6-inch
USGA Style with Variable Depth	Determined by lab analysis. Often 8-10-inches on high spots, 12-inches on flat areas, and 14-16-inches in low-lying areas	Yes	≤15 feet	4-6-inch
California	12-inches	No	≤15 feet	4-6-inch
Sand-Based Rootzones with Sand Channel Drainage	Determined by lab analysis. Often 8-12-inches	No	6 feet	2-inch
Native Sand	NA	No	NA	NA

Continues on page 42



A gravel layer is required when building a USGA green. Sourcing a gravel that has a neutral pH is recommended to reduce the risk of an iron-cement layer.

What Are the Functions of a Gravel Layer?

The biggest difference between USGA greens and the other construction methods listed above is the presence of a gravel layer. The gravel layer serves several important functions:

- Creates a perched water table at the interface between the rootzone and gravel.
- Allows rapid movement of water into the drainage system once sufficient moisture accumulates in the rootzone.
- Helps prevent fine rootzone particles from migrating into the drainage pipes.
- Provides separation between the rootzone and subsoil, which can help limit upward movement of salts from underlying soils.

The most noteworthy impact of the gravel layer is the creation of a perched water table. This occurs because of the significant difference in particle size between the rootzone and gravel. The perched water table increases the rootzone's ability to retain moisture, allowing superintendents to irrigate more deeply and less frequently.

Research has shown that a gravel layer can provide more uniform soil moisture near the surface compared to a California green. When a gravel layer is absent, soil moisture in a California green can also be more strongly influenced by proximity to the underlying drainage pipe (Pettyman and McCoy, 2002).

Despite these documented benefits, the value of installing a gravel layer is often debated. The additional cost is easily scrutinized, and its benefits are not always readily visible. More recently, low-pH rootzone mixtures placed over

high-pH gravel have been linked to the formation of iron-cement layers at the rootzone-gravel interface (Obear and Soldat, 2014). These layers may impede drainage, particularly in low-lying areas and where high rates of iron-containing fertilizers are applied.

The USGA putting green construction recommendations were modified in 2018 to recommend selecting a neutral-pH gravel where practical to reduce the potential for iron-cement layer formation. However, it is still too early to determine whether this approach eliminates the risk entirely. However, I've not seen the formation of iron-cement layers in recent projects that have utilized gravel with a neutral pH – e.g., washed granite gravel. The USGA article *Genesis and Prevention of Layers in Putting Green Rootzone Profiles* (2018) is a good reference on the subject. A key message from the article states “not all observed iron layers reduce drainage and infiltration rate,” but this seems to be a lesser-known finding from the research.

Regardless of the concerns for iron layers, some industry professionals feel the gravel layer – and the perched water table it creates – may not be necessary in every situation. I would agree that there are certain instances where a gravel layer is not needed. For example, if the subgrade beneath the rootzone is sandy and naturally well-drained, a perched water table may provide less benefit than it would over poorly draining subsoil. In temperate climates with frequent rainfall, some also prefer having water move more freely toward the drainage system rather than retaining additional moisture in the rootzone. In situations where only 1-2 greens are being rebuilt and the remaining greens will remain soil push-up construction with a topdressing layer, building a USGA green with a

gravel layer may not be the best fit. Each situation depends upon soil conditions, environmental factors, cost, etc.

Ultimately, most industry professionals feel the benefits of a gravel layer outweigh the potential challenges and costs, which is why it continues to be included in most putting green construction projects.

Gravel Performance Indicators

When building a USGA green, a high-quality gravel source should be selected. For California greens, a good gravel source is also required to backfill the drainage trenches. Laboratory testing is necessary to confirm that the gravel meets established requirements for putting green construction, with bridging being a key factor. All the parameters that should be tested include particle-size distribution, CU, pH, lime content, and compatibility with the selected rootzone mix. If a soft limestones or similar sources are the only gravel source option, they should be tested for stability using the Micro-Deval test by an accredited laboratory.



Most putting greens are built with a gravel layer, but some feel that the perched water table isn't needed in select locations. This green was built on heavy clay soils and will have a gravel layer installed during the next phase of construction.

Continues on page 44

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Table 2 outlines the gravel performance criteria necessary when an intermediate layer – sometimes referred to as a choker layer – is not used. An intermediate layer of coarse sand, with at least 90% of the particles between 1 and 4 mm, is rarely needed. However, it may be required when a compatible rootzone mix and gravel source cannot be identified. In these situations, the intermediate layer 2-4-inches thick is placed between the rootzone and gravel.

Table 2. Performance factors of gravel when an intermediate layer isn't used (USGA, 2018)

Performance Factors	Recommendation
Bridging Factor	D15 gravel is $\leq 8 \times$ D85 rootzone
Permeability Factor	D15 gravel $\geq 5 \times$ D15 rootzone
Uniformity Factor	D90 / D15 gravel is ≤ 3
Particle Sizes	No particles greater than 12 mm
	Not more than 10% < 2 mm
	Not more than 5% < 1 mm

Quality Control Testing

Quality control testing is a critical aspect of building putting greens. Of the projects I've supported recently, there have been 3 separate instances where gravel that originally met USGA recommendations failed QC tests once delivered onsite. In these situations, washing the gravel either wasn't done or it wasn't done effectively.

In one severe case, the gravel was dirty and contaminated with silt and clay to the point where it locked up and setup very firm, almost like concrete. With that project, the Contractor had to remove the gravel from the green and replace it, resulting in added cost and construction



Quality control testing of gravel stockpiles onsite is important. Gravel should not be installed in a green cavity until it passes a QC test.

delays. This situation highlights the importance of QC testing prior to installing gravel and rootzone mix into a greens cavity.

Conclusion

While a gravel layer is not always needed in building greens, there are clear reasons proven by research as to why it is a requirement in USGA greens. Most agree that the benefits of the gravel layer and a perched water table outweigh the potential risks of an iron-oxide layer – which can be reduced by selecting a gravel layer with a neutral pH. The added cost of the gravel is substantial, but worth the investment in most cases. Finally, QC tests are always recommended for gravel and rootzone mixes to ensure they meet material specifications before they're installed in a green cavity. ✓

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THE IRON TRIANGLE: A PROJECT DECISION MAKING TOOL FOR GOLF COURSE SUPERINTENDENTS TO USE

By: Ben Larsen, Director of Grounds and Facilities, Green Bay CC

Good. Fast. Cheap. Every golf course project lives somewhere inside those three words.

Every golf course superintendent has heard a version of the request.

"Can we rebuild the bunkers before the member-guest?"

"Can we do it without increasing the budget?"

"Can we make them look and play like Augusta?"

The answer is found in one of the oldest principles of project management: The Iron Triangle. Sometimes called the Project Management Triangle or simply "Good, Fast, Cheap—Pick Two," it reminds us that every project is constrained by three competing priorities: quality, time, and cost.

Basically, how the triangle works is you can optimize two sides, but the third will inevitably be affected.

For golf course superintendents, this isn't a theoretical business concept. It's the reality behind nearly every improvement project, from executing a golf course master plan, to replacing an irrigation system to renovating bunkers or constructing a new short-game practice area.

I found using this tool very helpful when discussing and executing projects with members, committees and boards.

The Three Corners of Every Project

Imagine the Iron Triangle with three corners:

- **Quality:** How well the project is completed and the level of craftsmanship expected.
- **Time:** How quickly the project must be finished.
- **Cost:** The available budget, including labor, materials, equipment, and contractors.



Whenever one side changes, the other two must adjust.

Understanding this relationship is one of the most valuable skills a superintendent can develop—not only for managing projects but also for communicating expectations to owners, boards, committees, and members.

Good + Fast = Not Cheap

This is perhaps the easiest combination to understand and is what all superintendents secretly or loudly wish for, if there is an unlimited budget.

The quality expectations are exceptionally high. The completion date is fixed. The only remaining variable is cost.

Additional contractors may be hired. Crews may work overtime. Materials may be expedited. Equipment may be rented rather than scheduled. Every shortcut to save time comes with a financial premium.

The project can absolutely be completed on schedule with outstanding results—but it will almost certainly exceed the original budget.

Good + Cheap = Not Fast

Many superintendents live in this corner of the triangle.

The club wants exceptional work but has limited capital available.

Rather than outsourcing the project, the maintenance staff

performs much of the work themselves between routine maintenance responsibilities. Materials are purchased in phases. Construction is scheduled during slower seasons. Equipment is shared across multiple projects.

The end result can rival work performed by specialized contractors but it simply takes longer.

This approach delivers tremendous value because time becomes the resource that replaces money. However, due to the slower timeline, consistency and lifespan can be greatly varied.

Fast + Cheap = Not Good

This is the combination every superintendent hopes to avoid but boards, committees and owners unknowingly try to push. Some decision makers may assume they can achieve high quality results, keep the budget low, while complete a project in an ambitiously fast timeframe.

The project meets the deadline and stays within budget, but years later the consequences emerge through settling, drainage failures, or costly repairs.

In golf course management, inexpensive solutions frequently become expensive lessons.

Matching the Triangle to the Project

Not every project deserves the same priorities. A superintendent's role is to determine which combination best serves the club's objectives. The following section provides personal examples corresponding to each combination:

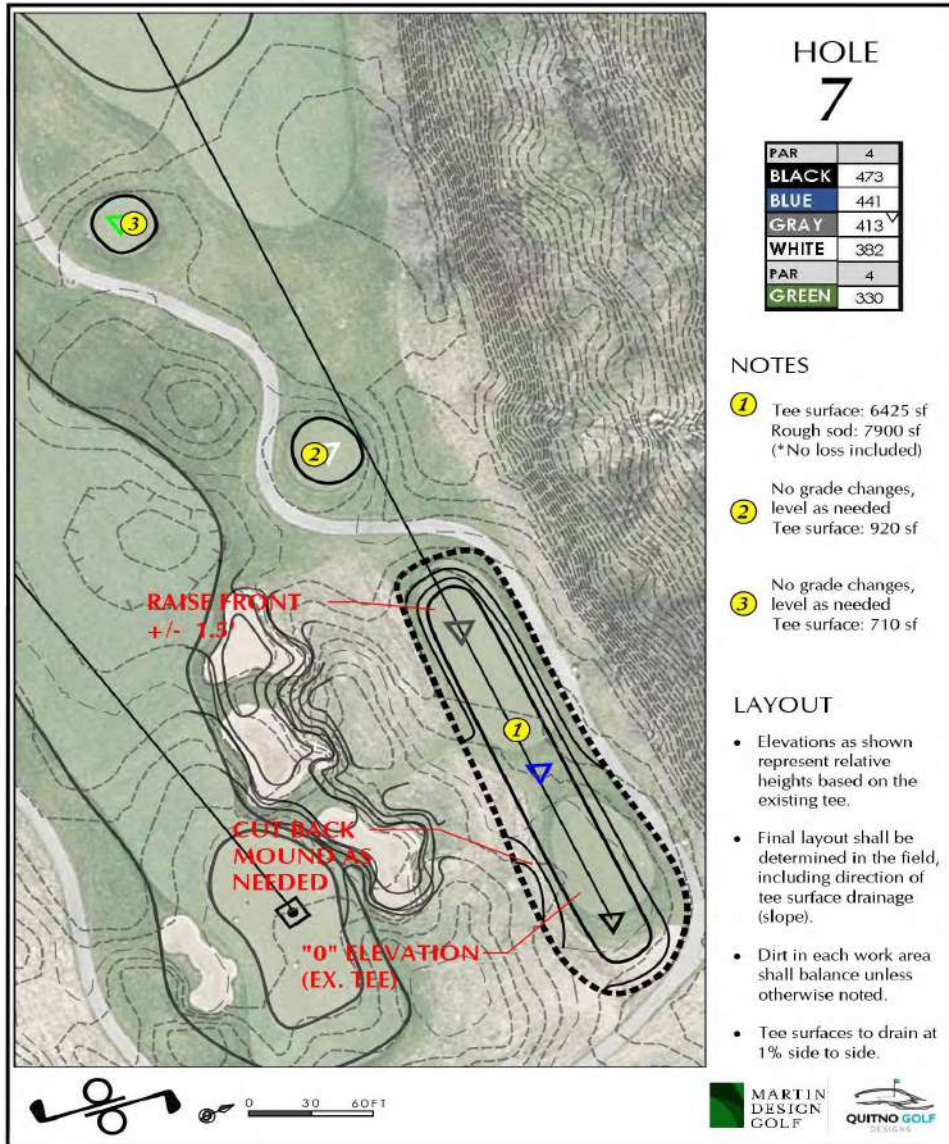
Green Bay Country Club is currently executing an architecturally designed Golf Course Master Plan by Greg Martin of Martin Design Golf and Todd Quitno of Quitno Golf Designs. As part of this plan, the club will renovate its driving range, putting greens, and short game practice area next year. For this project, Green Bay Country Club chose to prioritize **quality and speed**.



Because these practice facilities are essential amenities for members, the club wanted to minimize the length of time they would be unavailable. To avoid a prolonged closure, while still achieving a high-quality result, the club decided to hire an experienced golf course construction contractor to complete the renovations. This approach will reduce downtime, ensure the project is completed efficiently, and deliver a finished product that meets the club's quality standards.

Another part of Green Bay Country Club's comprehensive Golf Course Master Plan, the club is re-leveling, combining, extending, and constructing new teeing areas throughout the property. For the renovation of the championship course tees, Green Bay Country Club prioritized **quality and cost** by completing the work in-house.

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This decision was based on the Grounds Crew's proven skills, the trust they had earned from club leadership and membership, and the successful results of previous in-house projects. Because tee renovations were not considered time-sensitive, the membership supported completing the work over an extended period rather than hiring outside contractors. This approach allowed the club to maintain a high standard of quality while significantly reducing contractor expenses and making the best use of its internal resources.

Lastly, Green Bay Country Club avoids prioritizing **speed and cost** over quality unless circumstances make it necessary. However, certain projects and repairs require this approach. Last spring, Green Bay Country Club experienced extensive flooding that resulted in several landslides. These landslides caused significant damage to our hillside cart paths, leaving sections heaved, sunken, and unsafe for golf cart traffic.



While our long-term plan is to reroute and construct new cart paths, an immediate and less expensive repair to the existing paths was necessary to ensure golfers could continue to navigate the course safely until the permanent solution can be completed.



The Superintendent's Greatest Challenge

The Iron Triangle becomes particularly difficult because superintendents rarely control all three variables.

Boards establish budgets.

Tournament and event schedules determine deadlines.

Members expect championship-quality conditions regardless of circumstances.

The superintendent must somehow reconcile competing expectations that are mathematically impossible to satisfy simultaneously.

Success often depends less on turfgrass management than on expectation and project management.

Communicating the Triangle

Perhaps the greatest value of the Iron Triangle is not project planning—it's communication.

When club leaders ask whether a project can be completed faster, the superintendent can explain that accelerating the schedule generally requires additional funding.

When budgets are reduced, expectations for scope or completion dates should be adjusted accordingly.

Instead of saying "it can't be done," the superintendent can ask a more productive question:

"Which two are most important to you—quality, speed, or cost?"

That single question transforms the conversation from disagreement into decision-making.

It also encourages boards and committees to recognize that every choice carries consequences.

Leadership Through Expectations

The best superintendents understand that successful projects are measured not only by finished results but also by how well expectations were managed throughout the process.

A project completed one month later than originally hoped may still be considered a tremendous success if the craftsmanship exceeds expectations and the budget remains intact.

Likewise, finishing early means little if quality suffers or future repairs erase any initial savings.

The superintendent's role is to help decision-makers understand those trade-offs before work begins.

The Bottom Line

Golf courses are among the most complex outdoor facilities to manage. They combine living plants, heavy equipment, unpredictable weather, high demand/expectations, and finite financial resources into one constantly changing environment.

The Iron Triangle doesn't eliminate those challenges.

It simply provides a framework for making better decisions.

Every renovation, every improvement project, and every capital investment ultimately asks the same question:

Do we want it good and fast? Good and affordable? Or fast and inexpensive?

For golf course superintendents, understanding the Iron Triangle isn't just good project management. It's one of the most effective tools for building trust, setting realistic expectations, and delivering successful projects. ✓

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Lucy Witte-Krantz
Office Manager
(262) 903-0911
office@ips911.com

BADGER STATE TURF CLIPPINGS

Congrats to **Scott Bushman**, Superintendent at Fox Valley Golf Club, for being named the Northeastern Wisconsin Golf Association's (NEWGA) Man of the Year. According to the NEWGA website, "Each year since 1947, N.E.W.G.A. has made a Man of the Year Award to that golfer who, in the opinion of the directors of N.E.W.G.A., has best exemplified during the year the spirit of N.E.W.G.A. and has made the most significant contribution to N.E.W.G.A. and to golf at his own club. The award is made annually where the recipient is awarded the jacket and emblem representing the highest award that N.E.W.G.A. can give to its members."

Former WGCSA president, **Jeff Millies**, recently certified as a CGCS with GCSAA. Jeff has now been a CGCS for 30 years which means that he was about 10 years old when he was first certified. ✓

WELCOME TO OUR NEW MEMBERS:

- **Dominic Ellis**, Sand Valley, Student
- **Carson Hillery**, Green Bay CC, Assistant Superintendent
- **Joe Lofland**, UW-Madison, Student
- **Andrew Powers**, Mayville GC, Assistant Superintendent
- **Thomas Schmidt**, Mendakota CC, Superintendent
- **Bryan Wasilewski**, Thornberry Creek at Oneida, Superintendent
- **Gary Wurtz**, Green Bay CC, Assistant Superintendent



Bushman NEWGA Man of the Year: Scott Bushman looking dapper in his new green blazer!



The WGCSA continued our support of the Wisconsin Club Managers Foundation Annual Golf Outing that was held this year at Green Bay CC. Pictured are President Luck (left) and Kevin Kramp, PGA Professional at Hidden Glen.

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If you have news to share regarding your personal life (big achievement, trophy buck, marriage, baby) or your professional life, please send it my way! It's always fun to hear what WGCSA members are up to.



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THE GRASSROOTS

The Official Publication of the Wisconsin Golf Course Superintendents Association

COLOR - Ad specifications and info

PUBLICATION DATES -

4 quarterly issues per year – Issues are printed March 1st, June 1st, September 1st, & December 1st

DEADLINES FOR ADVERTISING -

To reserve ad space please submit electronically to the Grass Roots Editor 30 days prior to the print dates above.
Example, to change ad for 2nd issue of year submit by May 1st.

FORMAT -

PRINT READY PDF FILES ARE PREFERRED. (distill with embedded font and images)

FINAL (Flattened) TIFF or JPEG FILES (300 dpi or more preferred)

SEND ADS TO -

Send new and replacement ad copy to Editor Jake Schneider at grassroots@wgcsa.com

Please CC Executive Director Jake Schneider at jschneider@wgcsa.com

SIZES -

Full Page: 8.5 x 11 (with bleed 8.8 x 11.3)

Half Page: 7.375 x 4.75 or 3.5 x 9.1875 or 4.875 x 7.25 (half page bottom with bleed 8.8 x 4.8)

Quarter Page: 3.25x 5 or 2.333 x 6.667 or 4.017 x 4

Eighth Page: 3.625 x 2.25 or 2.333 x 3.333 or 4.917 x 2

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Bleed allows ads to extend to the edge of a page, giving a bigger appearance and eliminating the chance of a white narrow edge when the pages are trimmed.

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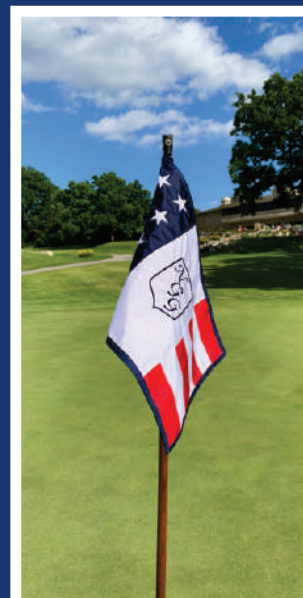
Bleed is preferred on all full page ads half page bottom ads, and available on other ads when available. Please email the editor with questions regarding format or bleeds.

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