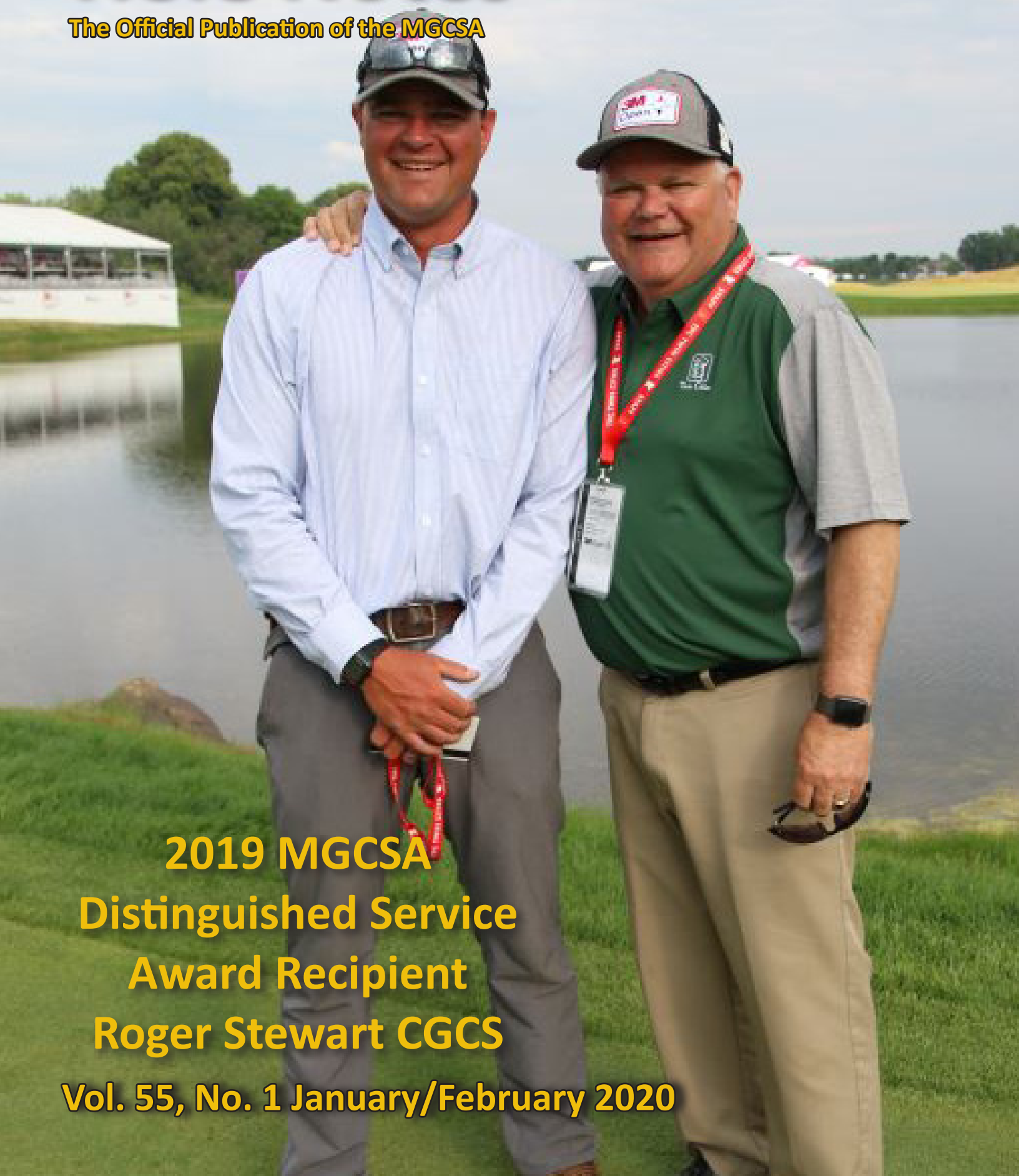


Hole Notes

The Official Publication of the MGCSA



2019 MGCSA

Distinguished Service

Award Recipient

Roger Stewart CGCS

Vol. 55, No. 1 January/February 2020



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Mark Your Calendar:

March 3rd

**Minnesota Golf Industry Day On The Hill
State Capitol, St. Paul, MN**

MGCSA Legacy Scholarship Program

Application period from April 1st through June 1st

April 8

**Spring Field Trip and Workshop
Sprayers and Spray Technologies
Frost Services in St. Croix Falls, WI**

On the Cover

***2019 MGCSA Distinguished Award
Recipient Roger Stewart CGCS,
right, and one of his mentee's,
Mark Michalski, Superintendent at
TPC Twin Cities.***

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Presidential Perspective

by Scott Thayer, Legends Club

As I enter my presidential term, I want to take a minute to thank the MGCSA Board

of Directors, MGCSA Class members and all MGCSA Affiliates for their support and service in the past and also in the upcoming year. I am excited to be your president and it is my wish that everyone has a successful season, especially those who manage turf on courses that came out of winter with damage in 2019, one of the toughest winters I have experienced. As I walked my course this snowy season, I have seen many signs of a “good” winter, but as we all know, it’s far from over.

Since beginning my presidency, the MGCSA has had two really good and very well attended events: National Night Out in Orlando at Itta Bena and the Shop Tours at Oneka Ridge, White Bear Yacht Club and Dellwood Country Club. Besides fun

and networking, National Night Out offered delicious food and beverages, was very well attended and at a great location. The destination, Itta Bena, was perfect. It wasn’t too small or big and that fit the MGCSA very well. We have already booked the venue for our next visit to Orlando in 2023.

The 2020 National Night Out got me excited about the upcoming year, because during the evening, I had many people come and offer up ideas and interest in helping the MGCSA. I encourage everyone not to be shy with ideas and volunteering. Getting involved with our association is a great thing and the Board and I want you to participate. Please reach out to a Board Member or me and let us know your intention to support the association.

Shop Tours was very well attended too. Over 70 individuals explored three very different shops and then enjoyed a delicious meal

of specialty pizzas from Dominos. For me, it is always good to see equipment managers, assistants, and superintendents looking around at all the different ideas the shops have to offer. Each destination had at least one unique and thought provoking element. Heading back to The Legends Turf Management Center with my staff, it was nice to talk about the different things we saw that we could incorporate into our space and everyday tasks. I want to thank the superintendents and their staffs at all the shop tour stops for letting us in to see where and how they operate.

Speaking of thanks, hey you annual and event sponsors... thanks for your support. Without your interest we honestly wouldn't have much of an association.

The next big event that we need all of the MGCSA's help and attendance at is "Day on the Hill" on March 3rd. I know you have heard about its importance, but this year the DOH is a really big deal and

could potentially affect us all in the long run. This year we have one very huge cause that we want to discuss with as many legislators as we can. It is opposition of a bill that would allow cities across the state to create their own pesticide rules and regulations, including prohibition.

We are already very well regulated through the Minnesota Department of Agriculture and do not need any more oversight. This issue, focused first on the large population centers in the state, could set a very ugly precedent. Just imagine having an ever-changing and under educated city counsel make rules about how you do business using pesticides that they regulate. Vocal, organized and extreme anti-pesticide groups could have a field day. What could be next? How about fertilizer regulations?

During this session, we are also continuing our effort to protect or provide assurances to your irrigation rights. We have been working hard for many years to secure our water

resources and currently have strong support in the Legislative Water Commission Subcommittee on Water Policy.

To those who have participated, “Thank you”. If you have never tried, this is a great year to give it a shot. Everyone that signs up meets with Jack and representatives from our Allied Golf Associations down by the capital in the morning to go over the script and meeting assignments. All of us are placed into groups with a team leader who directs the process. Thus, you will never be alone. The group goes over the DOH script, and everyone practices what part of the “story” they will share with the legislators.

It is very easy, a simple conversation, and the Legislators want to hear from those who live or work in their district. They usually have questions and want to learn more or discuss the information you provide them.

We really need support from the MGCSA this year. Please help. The deadline for registration is February 23rd. Get the form on our website and join the group. Together we can be very strong. Coming in from outstate? The MGCSA has you covered with one overnight hotel room and a group meal the evening prior to the DOH, just contact Jack.

Like I said before, it’s easy and the issues are very big. We need as many as we can from the Metro as well as outstate members. If you care about your access to pesticides and water you need to participate! Your support will be greatly appreciated.

Great events, exceptional participation and all of us working toward a common cause.

Hmm, isn’t that what being an Association is all about?



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THE SOIL EXPERTS.

Roger Stewart CGCS Honored with MGCSA 2019 Distinguished Service Award

by Jake Kocak, Superintendent at Somerby Golf Club

There is perhaps no bigger reward throughout one's career than to look back at the impact you've had on colleagues, peers and successors, seeing that the values you've based your career on have resonated. In other words, "Hey, they learned something from me!". In talking with Mark Michalski (Superintendent, TPC Twin Cities), it became evident pretty quickly that this applies to Roger Stewart, 2019 DSA winner, pretty aptly, and I would guess that these sentiments would be echoed by countless other people who have worked, either directly or indirectly, with Roger.

Mark first worked for Roger as an intern at TPC Twin Cities in 2009 and came back as an assistant in 2012. Mark recalls, while meeting Roger on his first day as an intern, "I said to Roger, I'm really looking forward to working for you and learning from you, his response was that's great Mark but I can learn just as much from you as you can from me. He told me to never forget that you will never know enough to not learn every day from those around you even if they don't share the same experience level as you". Mark continued to learn and grow from Roger at TPC Twin Cities until Roger's retirement in 2017, when Mark took the reins maintaining the private club and preparing it annually for 3M Championship, along with its transition into, what is now a PGA Tour event, the 3M Open.

Despite preparing the course for a Champions/PGA Tour event every year, one of the things Mark remembers Roger preaching is, "Never get too high on yourself. Everyone is replaceable. While you're working, you've got your hand in a bucket of water, when you leave you pull your hand out and the water stays the same, they just replace your hand with someone else's". It's interesting to hear Mark talk about Roger's philosophies on agronomy and work-life balance and how he must have been so far ahead of his time with his viewpoints. "Agronomically we shared the same thought: utilize the KISS (Keep It Simple Stupid) principle, it's so

easy to make things harder than they need to be. Concerning work-life balance, he shared a simple phrase with me, ‘don’t live to work, work so that you can live.’” Very apropos to the trends we see today on these issues.

If you’ve ever volunteered at the 3M Championship or 3M Open with either Roger or Mark, you can see some of the similarities in management style, organizational style, personality, etc., but the biggest similarity might be in how they carry themselves, which I’m guessing is a critical component to executing a Tour event every year. As Mark puts it, “The thing that I observed and was taught by Roger the most was to not let the obstacles, that can get thrown at us as Superintendents, knock you off dead center. Roger’s boat never felt like it got very rocked or, if it did, he was very good at riding out the waves. He said to think and talk the problem through and then make a decision and stick to it”.

Even though Roger lives in Chicago now, Mark says they still communicate weekly in some form or another, and I’d be willing to bet, Roger still keeps in contact with most of his former assistants that have now gone on to continue their successful careers. Because, as Mark puts it, “Rog was a heck of a boss, but he’s an even better person”.



Catching up with Roger

What has Roger been up to since retiring.... Well, plenty. He lives just outside of Chicago, which was always the plan with both him and his wife, as they spent nearly 20 years living in that area while Roger was superintendent early in his career. It's also where they have a lot of friends and family, and of course, the grand-kids are close by, so it has always been home.

The term 'retirement' could be used loosely in Roger's case, as he has kept busier than ever since his official retirement from the indus-



try in 2017. With the help/encouragement of friend and former colleague from his Chicagoland days, Bruce Williams, Roger has been busy with some consulting jobs, including spending 9 weeks in California as an interim superintendent, and was even an expert witness in a trial. Roger's long list of contacts has also led to him as a recruiter for some companies and helping other companies trying to expand their territory into the Chicagoland market. In between all of that, Roger finds time to volunteer at

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many Tour/Champions Tour/ TPC events that he can.

Because of the experience he has hosting similar events in the past, he makes the perfect volunteer, especially at data collecting, which is very structured and nuanced, and takes a trained and experienced person that knows what they are doing. If you are ever looking to catch up with Roger, chances are you can find him helping out every year at the 3M Open in Blaine. Roger finds time for his recreation hobbies as well, joining a group of neighbors for a round of golf at a different course every week, and he gets his fishing time in as much as possible too, with some future fly-fishing trips planned. As Roger puts it... "The days where you have nothing going on, you miss the hustle and bustle (of working on a golf course), but I keep busy most days and don't think about it." As you can see, Roger still gets plenty of his golf course fix in retirement.

Upon reflection of his distinguished career and all of his awards and accolades (and there are a lot of the them), from his Platinum Awards through the TPC, to Highest Players Rating for Champions Tour Event, to his Environmental Award from the GCSAA, they are all special to him and a reflection of the people that he's worked with and worked for. With his selection of the MGCSA Distinguished Service Award, he is honored and humbled to be associated with this prestigious award.



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President Roger Stewart CGCS, An Unpretentious Professor

By Dave Kazmierczak CGCS cover shot by Seefeldt Photo

“Hi Dave come on in and sit down, I’ll be with you in a second,” Roger Stewart, CGCS said to me, focusing on his computer in his immaculately kept office recently, as I had dropped by for a chat.

“No Problem Rog,” I replied,

shedding my winter apparel. “What are you up to on this (frigid) day?”

“Oh just finishing the weekly report,” he stated without so much as a look up.

“I sure am glad I don’t have that to do all the time,” I said back,



envisioning a constant stream of paperwork and red tape that I associate with working for a management company as Stewart has done for decades. The response I got back was not exactly what I expected.

“Nah,” he said in the most re-

laxed and nonchalant way. “You get used to it.”

Now given the opportunity presented, it wouldn’t be far-fetched to imagine that at least 80% of all superintendents asked the same question would have gone into a dissertation about their loathing of paperwork and red tape already mentioned, but for the current MGCSA President it was just part of the job, part of the tapestry of what has been a long and remarkable career—which isn’t surprising if you have ever been fortunate enough to talk with him.

It is hard to encapsulate what it is like to talk to Stewart without actually experiencing it. With close to a half-century of time spent in the golf course industry, numerous tournaments managed, four Presidencies of local GCS chapters and experience at TPC clubs in both the Northern and Transition Zones you might expect a sense of entitlement or even arrogance. That thought leaves you instantly the second you meet him. What does enter your mind is that he is as easy going and approachable as

anybody, and then you realize he is like E.F Hutton- the now defunct financial provider who's commercials became famous for the catch phrase: "When E.F. Hutton talks- people listen."

When Roger Stewart, CGCS talks- people listen.

...And for good reason. Stewart started out graduating from high school in his home town of Kankakee, Illinois. From there he enrolled in tiny Doane College in Crete, Nebraska trying to figure out what he wanted to do in life. After a couple years at Doane he came to the realization that he kind of liked his summer jobs spent in Illinois working at the golf course and decided to pursue a career in the field at the

University of Nebraska where he received a degree in Agronomy, Crop and Soil Science in 1973.

"By the time you get to the middle of your sophomore year, you are kind of feeling pressure to decide what to do. I said what the (heck), I kind of like working on the golf course " Stewart said.

From there it was back to Illinois. Stewart was hired by Bob Williams, a renowned area Superintendent and Past President of GC-SAA, as an assistant-in-training and with Williams' help, landed his first Superintendent job at Midlane CC in Waukegan, Illinois in 1975. From there he moved to Riverside Golf Club in North Riverside, Illinois where he worked for 10 years from





1978-1988.

“That was a real good job. It was a middle-of-the-road private club and the members really took good care of me. Moved my salary up every year, but I knew I was getting to the max of what they could pay so I started poking around, looking around a bit,” he said.

Despite the comfort of working at Riverside Stewart realized it may be time to move on to bigger and better things, so in 1988 he pursued and landed a grow-in job at Stonebridge CC that was a Tom Fazio design surrounded by a housing development. It was at Stonebridge that Stewart got his first taste of preparing for a big-time golf tournament,

hosting several Ameritech Senior Open events from 1990-1994.

In 1995, Stewart came to find out that Stonebridge was going to be sold to the membership, and while he had a good relationship with the members, he had always worked for the development company, and was the highest paid employee at the club. This was a recipe for unsteadiness in his mind. He remembered an old adage he had heard about the business that for many, stands true today.

“You know, there is a lot of talk in this business about that if you stay in a place longer than seven or eight years, it’s probably not in your best interest,” Stewart said.

Once again, Stewart decided to be ahead of the curve, and was hired by Cal Roth and the PGA Tour TPC management team to grow in the new TPC Jasna Polana club in New Jersey in 1996. The course opened in 1998 and hosted one of the last Shell's Wonderful World of Golf matches between Hale Irwin and



Tom Watson. It then hosted the Intinnet Classic until the fateful day of 9/11 occurred and all that went away. Even in South New Jersey, the tragedy was tangible.

“You could smell it, even where we were. It smelled like an electrical fire,” he said.

Stewart continued to manage Jasna Palona through the middle of the decade with several General Managers and Head Golf Professionals. That, coupled with close to a dozen years away from the Midwest got him thinking about a change. He knew he wanted to retire back in Chicago but the closest TPC course was in Moline, Illinois, followed by either Cincinnati or the Twin Cities. A phone call inquiring about his assistant's interest in the vacant job at TPC Twin Cities led Stewart to call back the inquirer and report that his assistant wasn't interested but guess what? Maybe he was. With the previous twelve years at Jasna Polana, and the seven year rule once again in the back of his mind, it was time for another change.

“I said to my wife you know, I think I have cheated the devil once when I got this job working for the tour, and I think I'm going to have to cheat him again,” Stewart said. “She looked at me like (I was crazy), and I said well hear me out- two of our kids are out of school and living in the Chicago area, that gets me that much closer to Chicago, and it's a hell of a lot easier to visit Chicago

from Minneapolis than from Philadelphia.”

That turned out to be Minnesota’s gain, New Jersey’s loss. Stewart started in 2008 and has hosted the 3M Championship as well as keeping the course perfect for TPC Twin Cities members ever since.

But with Stewart, taking care of his courses and running a tight ship only scratches the surface of what he is all about and what he has accomplished in the industry. He first started getting involved with the Midwest AGCS in the late 1970’s. Before long, he had worked his way up to President in 1984. That was also about the time he teamed up with Bruce Williams, CGCS, another Chicago area Superintendent at the time, and began teaching a seminar at the GCSAA National Show on organization and motivation of crews, geared for assistants. It is a class they still teach today some thirty plus years later, though it has been condensed from a two-day class to four hours.

“Early on I just tried to get involved in anything I could,” Stewart said. “Honestly, the seminar, the teaching has made me a better superintendent. You (think back) to

what you were teaching and it reminds you of what you need to get accomplished.”

Stewart followed up his Midwest service with the Presidency at the Chicagoland GCSA, a smaller, more intimate association than MAGCS 1990-91. Stewart said he really liked the Chicagoland group, based strictly on education and formal dinner meetings.

Naturally once he moved to New Jersey, the call to service would be right away and he served on their board until elected President in 2006. The same would hold true for the MGCSA, as Stewart joined the board in 2009, and was elected President for 2014.

When asked to give highlights and what he felt was his greatest accomplishments while serving and presiding on the various boards and committees Stewart was not quick with a list of great things. He generally stated that he was proud to be involved with all the boards and board members and felt each one accomplished a great many things. There was one curious answer he did relate however.

“You know while I was on the board of the Midwest, New Jersey

and Minnesota they all made major changes to the Executive Directorship, and all for the better,” he said. Modesty aside, there has been quite a few things he has helped accomplish for the MGCSA. Stewart was

at pursuing a BMP Certification for Minnesota Clubs. He also had major influence on the MGCSA’s Outreach program and Wee One support. The impact of his wisdom and leadership will be felt for years to come.



instrumental as Chairman of the Research Committee in driving the MGCSA member supported research at the University of Minnesota. He was also instrumental along with Scottie Hines, CGCS and Paul Diegnau, CGCS in the formation of the Environmental Stewardship Committee that is still working hard

Despite all that he has accomplished, and all the time spent at the course and in the board rooms, Stewart is at heart, a family man. He married Susan, his wife of 43 years in 1971. Being a native of the Chicago area, she helped lead Stewart back to Chicago where he started his Superintendent journey. His

daughter Lauren, resides with her husband Josh in Chicago, and has given Roger and Susan three granddaughters to visit and spoil. His second daughter Anne is engaged and also resides in Chicago while their son Roger III resides where he grew up in the greater Philadelphia area. When asked about the demands on family life the job imposes, Stewart conceded that it was not always easy finding the balance, but in the end his family understood the demands on him, and the benefits of the job.

“It has been a good (career) for

and my family and me in that it has provided a good livelihood for us. We put three kids through college at about 80 percent or so. (The kids) really never were wanting for anything. I remember my one daughter complaining once that we never had a summer vacation, and I said (to her) well, that’s not so bad,” Stewart said. “What you have to realize is that they have wants and needs too. You may have to work on a Saturday, but you don’t always have to work on the Sunday too. There are times you have to be (at the course), but you have to take advantage of



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the days that are not high stress times (and be with the family then). In the end, all my kids have done very well and are successful in their own right and you can't ask for more than that."

So what has been the key for Stewart's longevity? When asked, he really didn't have a definite answer. Certainly working within the TPC Network management system has presented a steady structure on how to accomplish goals. Stewart related he thought he was working for one of the best companies out there. He cautioned that working for a management company is not for everyone. It takes a certain skill set to handle the structure and requirements, but he seems to have adapted well to the business model. As for the job of Superintendent itself? "Don't let the job consume you," he

said.

When we were done with our chat I donned my coat and hat, bracing for the mid-afternoon chill as Roger escorted me to the door. I glanced across the room and noticed a very elegant trophy of marble and gold lettering. The GCSAA lettering stood out first followed by 2013 Environmental Stewardship Award.

"Oh wow," I said. "I completely forgot about your national award last year."

"Huh? Oh yea, that was quite a surprise," Stewart said in his unassuming way.

Like Stewart, the trophy and the honor, to be admired and respected but never to be thrust to the forefront or trumpeted in any way. That pretty much sums up the 2014 MGCSA President.

***Thank You
Roger Stewart CGCS
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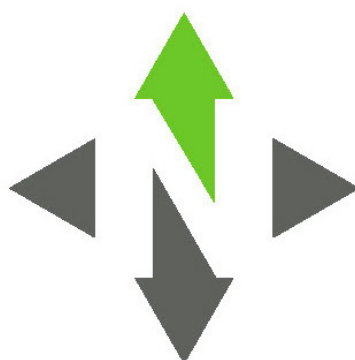
*An Important Editorial Comment from the President of the
Minnesota Turf and Grounds Foundation:*

The Unseen Benefits of the Northern Green

By Matt Cavanaugh, Assistant Superintendent at Rush Creek Golf Club

Why do you go to the Northern Green at the Minneapolis Convention Center every January? There are a number of reasons. The education, the tradeshow, the ability to connect with people you have not seen over the past year. There are many reasons, but for me personally I like to connect with people that I don't get to see very often.

However, as someone who has been involved with the Northern Green planning I also feel the brunt of the reasons not to come. "The speakers do not interest me". "The education topics do not interest me. There is not enough golf related education". "There is then of course the opinion of the Northern Green being too expensive".



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There are so many ways to get information and education these days. Much if it also seems rehashed or old information that you may already know. I have had the task along with the Education Committee with the MGCSA to put together the education programming for the Northern Green. This starts with the Master Classes on Tuesday (a.k.a. Super Tuesday providing 6 hours of dedicated education time) and continues through Wednesday (4.5 hours of MGCSA dedicated education time) and Thursday (5.5 hours of MGCSA dedicated educa-

tion time). This is a whole lot of time to fill for MGCSA members and something the committee takes a lot of pride in. Don't forget the other countless opportunities outside of the MGCSA committed sections.

I also understand the trade-show may not be the same for our group as well. As an industry we are very lucky to have the vendor relationships that we do. The timely interaction and information that the vendors supply me throughout the year is noticed and greatly appreciated. However, this great work often comes at the expense of the

Northern Green tradeshow draw for many people. “Why go to the tradeshow when I’ll see vendor XYZ next week”? I completely get that as well. Many of the other industry segments that attend the Northern Green do not get that same representation.

The unseen and often forgotten part of the Northern Green is the financial support that is received from the Northern Green in the form of research dollars. Support over the years has been received by many programs and entities.

- Turfgrass Research Support
- Youth Engagement In Arboriculture
- Elm Selection
- Pruning Workshops
- Sports Turf Field Safety Assessment
- Tree Trust Green Teens
- Tree Trust Gravel Beds
- Oak Wilt Study
- Mineralizable Nitrogen Study
- Plant Defense Study
- New Faculty Position Support
- White Mold Research
- Conversion to Low-Input Grasses

- UM Fellowship Endowment Fund

The list goes on and just over the past decade \$933,858 has been gifted to help enhance the green industry. None of this would be possible without the Northern Green every January. None of this would happen if the MGCSA went back to the old format at The Northland Inn with just the MGCSA members, an event that maybe broke even. There are so many ways to receive information and education these days and that are easier than going to the Convention Center and less expensive. However, the benefits of such things do not extend beyond the individual.

From an outside perspective people can’t believe how good of a regional show we have. The vendors that have come in for the first time are always amazed. With all that, we want to provide a Northern Green that you want to attend and be happy with the money that was spent. We are always looking for speaker suggestions, topic suggestions or even how the event is positioned. Please do not hesitate to send any ideas or thoughts my way (mattc@umn.edu).

Shop Tours 2020
Thank you host Superintendents
Oneka Ridge GC, Chris Michaelson,
Dellwood CC, Eric Peterson and
WBYC, John Steiner CGCS



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Monitoring and Managing Organic Matter in Putting Greens**

By Doug Linde PhD, Professor of Turf Management, Delaware Valley University

Organic matter production and accumulation in soils is a natural process that has many benefits. However, there are instances in which excessive levels in a sand-based putting green can lead to catastrophic turf loss, which is feared by many superintendents. Putting greens with excessive levels can lead to extended wetness, more disease, increased risk for turf loss, and reduced playability.

Regular monitoring is the first step in managing organic matter. Monitoring can identify and quantify problems, identify trends, and can



Organic matter naturally accumulates in a sand-based green. How much is too much?

***** Materials originally presented at the 2020 Northern Green,. You should have been there.***

be used as evidence to take action, to convince the course to spend more money, and to determine whether management changes have worked. For example, a superintendent I have helped that had higher levels of organic matter and soft greens, used the data to convince his club to allow him to core cultivate twice per year and to buy a sand silo.

Although there still is no standard sampling or lab method to measure organic matter in a sand-based putting green, here is an example program that I've have been recommending. Take eight core samples, each 0.75 inches in diameter, across each green with a core sampler. While in the core sampler, slice each core into 4 sections based on the depth from the surface (0-1 inch from the surface, 1-2 inch, 2-3 inch, and 3-4 inch) with a knife. Remove the verdure (shoots and leaves) from the top section using a knife and cutting board. Composite each section by depth into the appropriate sample bag so that 8 subsamples of each depth are in each bag. Each green will have 4 composite samples by



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Cores are split into 4 depths for more specific organic matter analysis.

depth. Air dry the samples and then send to a soils lab to be tested for percent soil organic matter by the loss on ignition (LOI) test.

Make sure to test your best and worst performing greens. Re-test the same greens 1 to 2 times per year. Since there is much variability in the sampling and testing, try to focus on data trends rather than specific values. On the sampling date, try to assess putting green performance. This includes variables such as green speed, trueness, firmness, time to dry-out, foot printing, ballmark size, and golfer feedback. Measure as many as you can using objective and/or subjective methods including golfer feedback.

When you get the organic matter values from the lab, compare the

values between greens and to the typical performance of the green. Although 4% organic matter has been an upper limit commonly recommended for years, values greater than 4% do not necessarily mean the green is poor performing or at risk of catastrophic failure. Likewise, low values such as 1.0-1.5% do not mean the green is a good performer. This is why it is important to test your greens that typically are your best and worst performing greens.

From 2016-19, I conducted a study to benchmarking putting green organic matter (OM) in the Philadelphia region. The objective was to benchmark current trends in organic matter, topdressing, and nitrogen on putting greens in the Philadelphia region. Below are listed some of the results and conclusions:

- 1. 52 courses (155 greens) were tested.***
- 2. 42 (81%) of the 52 courses had superintendent's that were members of the Philadelphia Association of Golf Course Superintendents.***
- 3. Greens were sampled from a wide variety of operating budgets, construction methods, and percent creeping bentgrass within 60 miles of Philadelphia.***
- 4. 75% of greens were cored aerated 2X/yr.***
- 5. Higher budget courses do more sand introduction and core aeration and have greens that are truer, drier, firmer, and use less N than lower budget courses.***
- 6. The top inch of soil had the highest %OM.***
- 7. Sand-capped greens had much higher OM levels in the 2 to 3-inch and 3 to 4-inch depths compared to California and USGA greens.***
- 8. Only 24% of the 155 greens had %OM levels \geq 3% in the 0 to 1-inch depth and only 17% had levels \geq 4%.***
- 9. Most greens (83%) had OM levels less than the USGA's standard recommendation of 3-4% in the upper rootzone.***
- 10. The average sand introduction rate was 15 ft³ sand/1000 ft²/yr with a range from 2 to 67. Only 6 of 155 greens (2 courses) had rates greater than the 40-50 ft³ sand/1000 ft²/yr recommendation by the***

USGA.

- 11. High amounts of regular cultivation and sand increase the green's potential for poor moisture and nutrient retention and an unstable surface often observed in a new sand-based green.**
- 12. OM data has much variability**
- 13. Be consistent with sampling method and use the same lab for OM testing**
- 14. Collect performance data, such as firmness, trueness, and moisture, various times during the season.**
- 15. Test the best and worst performing greens**
- 16. Find a % OM that works best for your greens**

Thank you to the PAGCS for helping fund this study and to all the superintendents that allowed access to their golf course.

For more information contact:

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Beyond 10,000 Lakes: Aquatic Invasive Species in Managed Landscapes

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Whether it be at the golf course, at home, or at the neighborhood park, chances are you've encountered an aquatic invasive species (AIS) in a managed landscape. So, how did that invasive plant or animal get there? What is an invasive species, even? What are common invasive species in managed landscapes? Now that I know what they are, what do I do about it? Read on to learn more.

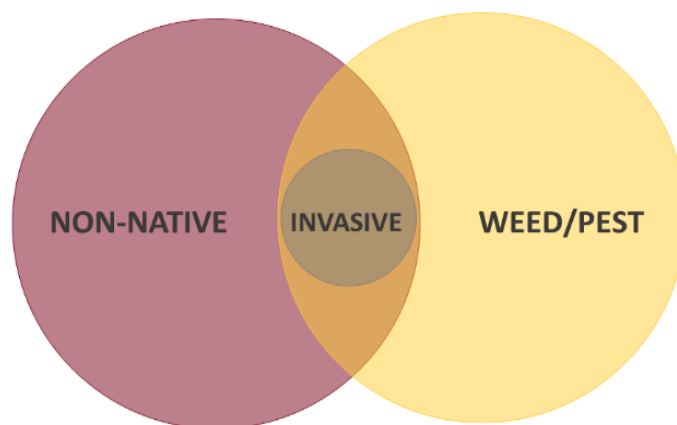
What is an invasive species?

Non-native, exotic, weed, invasive, pest. These are all terms that are commonly used interchangeably, but there are some distinct differences between them. Let's take a look at these terms a little more closely before we do a deeper dive AIS in managed landscapes.

Non-native species (*synonym: exotic*). These are organisms that are not indigenous to the region in which they are found. Non-native species may or may not be invasive. Many of the crops we grow and depend on like soybeans, wheat, and potatoes are not native to North America. Similarly, many of our favorite ornamental garden plants and even the famous honey bee were introduced here. Most non-native species are benign, or even beneficial and do not cause problems.

Invasive species. All invasive species are non-native, but what sets invasive species apart from non-native ones are their impacts to our ecosystems, economies, or even human health. For an organism to be considered invasive, it must be BOTH non-native and cause at least one of these types of harm.

Weed (*synonym: nuisance*). A weed is a plant that is considered to be undesirable in a particular location or situation. We call animals like this "pests". Weeds and pests can be either native or non-native. For example, many would consider poison ivy to be a weed and thirteen-lined ground squirrels to be pests, but both of these are native organisms in Minnesota. These terms can be subjective and not all people may consider the same species to be weeds or pests.



How do aquatic invasive species spread?

AIS find their way into both natural and managed landscapes through a variety of pathways. We know that the spread of many AIS are linked to recreational boat and aquatic equipment movement, but what about water features and other small ponds or water bodies that don't have recreational boating access? Here are some other pathways that AIS can move around:

- **Dumping of unwanted plants and/or animals from home aquariums or water gardens.** Occasionally when people close their water gardens down for the winter or decide they no longer want or can care for their home aquarium plants or animals they will dump them at a nearby waterbody (including the water features at your course). While they likely mean well, this can cause significant issues and contribute to the spread of invasive species as many common water garden and aquarium plants and animals are not native to Minnesota. For example, huge schools of goldfish have been found, like the one recently discovered in Carver County, that can compete with native species. Check out a 360-degree video of the goldfish invasion here: <https://z.umn.edu/360goldfish>
- **Importing or purchasing invasive species.** There are some invasive species that are legal for purchase and use in landscaping, home water gardens, and aquariums, but are illegal to introduce into a free-living state, for example, water hyacinth. There are also a number of invasive species that are illegal to possess, import, and sell, like purple loosestrife. The internet trade of plants, seeds, and plant parts has made it even easier for those prohibited species to find their way to places they don't belong.
- **Contaminated equipment and footwear.** Equipment used either in the water or on shorelines can spread invasive species through seed or plant parts if they are not properly cleaned. Mowers, rakes, pumps, docks/piers, even shoes can all be responsible for moving invasive species from one place to another.

The MGCSA wishes to thank Megan Weber for her educational support. The information presented in this article also was shared at the 2020 Northern Green. As mentioned in the Minnesota Turf and Grounds Foundation President's Column, there were great programs at the Northern Green. However, attendance was necessary to consume all of the information presented.



Figure 2: Muddy shoes and dirty equipment can both be responsible for spreading aquatic invasive species if they aren't properly cleaned before moving to a different site.

What are some common aquatic invasive species in managed landscapes?

In managed landscapes, many of the AIS we encounter are emergent or wetland species and are more visible and accessible from land than many other species we think of when we hear the term AIS. In Minnesota, these species include narrow-leaf and hybrid cattail, yellow iris, purple loosestrife, and invasive *Phragmites*. These easily accessible managed areas can often be common dump-sites for aquarium and water garden pets and plants like Brazilian waterweed, water hyacinth, goldfish, and koi (carp). Here are a couple tips for identifying some of these common invaders.

- **Narrow-leaf (and hybrid) cattail.** Both narrow-leaf and hybrid cattails have a leaf width less than 1/2" inch. They also have a gap between the female flowers (brown cigar-shaped structure) and male flowers (tan, fluffy structure above female flower). In narrow-leaf cattail this gap is typically at least one inch while in hybrid cattails the gap is less than an inch. Native, broadleaf cattail has no gap between the female and male flowers (or occasionally the flowers are nearly touching).
- **Purple loosestrife.** Purple loosestrife flowers grow in tall spikes with multiple rings of flowers blooming at the same time. The flowers are purple to pink with six petals. Purple loosestrife has square to 6-sided stems and opposite leaves (sometimes whorls of 3) with smooth edges.
- **Yellow iris.** Iris leaves form in a fan-like pattern. In yellow iris, there is a sharply thickened section in the center of the leaf. The flowers are also a very distinctive yellow.
- **Invasive *Phragmites*.** *Phragmites* is a tall grass that are often more than 10 feet tall. The invasive subspecies has large, feathery seed-heads that are sometimes purplish in color, a very narrow ligule, and has a stem with a more rough or ridged texture.



Figure 3: Pictured from left to right - invasive cattail (image: Ryan Hodnett, flickr.com) - purple loosestrife (image: Megan M. Weber) - yellow iris (image: christyjuice, inaturalist.org) - invasive Phragmites (image: Julia Bohnen)

What can I do about it?

Know and follow the laws. In Minnesota, most aquatic invasive species are regulated by Minnesota Department of Natural Resources (DNR), but some wetland invasives are also regulated by Minnesota Department of Agriculture (MDA) under the Noxious Weed Law. DNR also regulates the movement of water equipment, water, and crayfish to help prevent the spread of AIS. Take some time to review Minnesota aquatic invasive species laws and the Noxious Weed Law to make sure you are following the appropriate regulations to help prevent the spread.

Consider planting native alternatives. Many of the invasive species that are planted in landscaping and water gardens are selected for their beauty. Did you know that we have many native alternatives that can be planted instead? Here are some beautiful native alternatives you can consider for your next project:

- Instead of narrow-leaf cattail (*Typha angustifolia*) or yellow iris (*Iris pseudacorus*) try blue flag iris (*Iris virginica* or *Iris versicolor*), broadleaf arrowhead (*Sagittaria latifolia*), broadleaf cattail (*Typha latifolia*), or pickerelweed (*Pontederia cordata*).
- Instead of purple loosestrife (*Lythrum salicaria*) try blue vervain (*Verbena hastata*), spotted or sweet Joe-pye weed (*Eutrochium maculatum* or *Eutrochium purpureum*), fireweed (*Chamaenerion angustifolium*), or cardinal flower (*Lobelia cardinalis*).
- Instead of water hyacinth (*Eichornia crassipes*) or non-native water lilies (*Nymphaea* spp.) try American white water lily (*Nymphaea odorata*), yellow pond lily (*Nuphar variegata*), or American lotus (*Nelumbo lutea*).

Be vigilant when making purchases (especially online). If you are shopping at a physical greenhouse or nursery in Minnesota, chances are you won't have to worry about being sold a prohibited invasive species. You may still find some invasive species from the regulated list, which are legal to sell, so if you are trying to aim for planting only

native species, make sure you do your research beforehand or talk to an employee at the greenhouse or nursery to help you plan your purchases. While it is illegal for online vendors to ship prohibited invasive species or prohibited/restricted noxious weeds to Minnesota, not all may be familiar with the differing laws in each state, which can lead to those species being shipped into Minnesota. Understanding which species are invasive, which species are prohibited, and being able to identify those species will all help prevent the spread of invasive species when shopping for new landscape, aquarium, and water garden plants.

Dispose of unwanted shoreline landscaping, aquarium, and water garden plants and pets properly. Do not dump unwanted aquatic or wetland plants or animals into a lake, stream, pond, marsh, etc. If the species you wish to dispose of is a prohibited invasive species or prohibited/restricted noxious weed, chances are you'll need a permit for off-site disposal from DNR or MDA. For most other aquatic plants, you can secure the unwanted plant material in a plastic bag and throw it in the trash. If you have a fish or other aquatic animals you no longer wish to keep you can try to find it an alternate home or reach out to a local aquarium, pet store, or aquarium club for guidance. You may also find a surrender event in a local community. Always be sure to check local and state laws and regulations before disposing of an invasive species.

Clean footwear and equipment. Seeds and other propagating parts can get trapped in mud, treads, mowers, and other equipment parts. If that equipment or footwear gets moved to an uninfested part of the same property or off-site it can spread invasive species. PlayCleanGo has some great tips on cleaning footwear and equipment to prevent the spread of invasive species (www.playcleango.org).

Report suspected aquatic invasive species. In Minnesota you can use the reporting app Great Lakes Early Detection Network (<https://apps.bugwood.org/apps/gledn/>), the EDDMapS Midwest website (www.eddmaps.org/Midwest), or call/e-mail your local DNR AIS Specialist (<https://www.dnr.state.mn.us/invasives/ais/contacts.html>) to report a suspected AIS. All three of these methods will send the information directly to the appropriate person for dealing with new suspected populations of AIS.

What are my options for managing aquatic invasive species?

Your options for management will depend on where the AIS is occurring. If parts of your course include a public water in Minnesota, then plants from those waters are the property of the State of Minnesota and you will be required to obtain a permit from DNR for most types of aquatic plant control in those waters. Some examples of activities requiring a permit on public waters include: if you plan to remove emergent vegetation (like cattails) by any method, if you plan to make a chemical pesticide application over water, moving and removing a bog, transplanting aquatic plants into public waters, and more. Be sure to check the DNR website or contact DNR to be sure you don't need a permit prior to beginning any aquatic plant management activities (www.dnr.state.mn.us/apm).

Management of aquatic invasive species can present challenges. For example, there are only 17 registered herbicide active ingredients for aquatic use compared to closer to 180 for turf and ornamental uses. Also remember that when dealing in an aquatic environment you will likely have to calculate your pesticide usage and application rates based on water volume rather than just the area. Finally, pesticides will tend to drift and dilute more in aquatic environments than they will in land applications.

The best control method will vary from species to species. There has been a very successful biocontrol program for purple loosestrife in Minnesota using insects that selectively target the plant. Cattails and *Phragmites* can pose control challenges because of their underground network of rhizomes. Control of both these species typically requires a combined effort of chemical (herbicide) and physical (mowing) control. See the additional helpful resources section for more detailed information on control of cattails and invasive *Phragmites* as well as some identification resources.

Additional Helpful Resources

By Land and By Sea: Identification Guide to Non-native Species for Minnesota. A handy field-sized identification guide with photos and easy to read identification tips for 86 aquatic, wetland, and terrestrial invasive species. Available for purchase here: <https://z.umn.edu/BLBS>

AIS Identification Guide: A Minnesota Handbook. A larger format ID guide to common aquatic invasive plants and animals along with their native look alikes. Printed on waterproof paper with large, easy to compare images. Available for purchase or free pdf download here: <https://z.umn.edu/AISIDGuide>

Cattail Management in the Northern Great Plains: Implications for Wetland Wildlife and Bioenergy Harvest. A great, detailed resource about cattails and common management techniques (and challenges). Available online here: <https://z.umn.edu/HoleNotes-Cattails>

Non-native *Phragmites* Management Recommendations. A seasonal guide to the most effective methods for managing invasive *Phragmites*. Available online here: <https://www.maisrc.umn.edu/phrag-management>

AIS Detectors Program. The AIS Detectors program at the University of Minnesota creates educational resources, volunteer programs, and citizen science opportunities to increase the capacity to respond to AIS issues in Minnesota. Learn more here: www.aisdetectors.org

Aquatic Invasive Species Laws. This is the DNR website that explains laws relating to AIS regulated by DNR including lists of prohibited and regulated AIS. Available online here: <https://www.dnr.state.mn.us/invasives/laws.html>

Noxious Weed Law. This is the MDA website that explains laws related to noxious weeds as regulated by MDA including lists of prohibited, restricted, and specially-regulated noxious weeds. Available online here: <https://www.mda.state.mn.us/plants/pestmanagement/weedcontrol/fsmnwp>

Introducing the New: **Two-Year Turfgrass Certificate Program at UW Madison**

Doug Soldat, Dept. of Soil Science, UW-Madison

In 1959 O.J. Noer had a conversation with Dr. L.E. Engelbert (at the time, Chair of Soils Department), which resulted in the founding for the Turf and Grounds Maintenance Specialization in Soil Science. That

program, which produced its first two graduates in 1964, has been the academic training grounds for a small but steady stream of turfgrass managers who've gone on to do great work in Wisconsin and beyond. The small numbers of students in the program relative to

others was designed to match (not exceed) the demand of turf related job openings in Wisconsin, and the program has typically graduated four or five students a year. However, because of recent changes in

the job market, the cost of education, and the economy in general, the enrollment in the program has declined to the point where it has been consistently unable to meet demand. Job searches are going un-

filled, and internship offers pile up with fewer and fewer students to accept them.

Because of the very close relationship between the Wisconsin turfgrass industry and the University of Wisconsin, the University felt obligated to try something new. In the fall of 2020, students interested in learning about turf-

grass management will have the opportunity to do that through the UW-Madison's Farm and Industry Short Course. The Farm and Industry Short Course is a historic program that has been going strong



in the College of Agricultural and Life Sciences for over 130 years. In 1885, the Board of Regents accepted the recommendation that “a shorter course for the winter months confined to the term of two years, would be more popular and appropriate” for the education of farmers. The program was taught by UW faculty like F.H. King, Stephen Babcock, CALS Dean’s Henry and Russell, who all have buildings or malls named after them on campus today. When thinking about how to expand our turfgrass program, we wanted to find a way to educate students in a compressed period, but without compromising the quality of the instructors or the content. We felt the Farm and Industry Short Course would be the ideal place to try this new idea.

The Farm and Industry Short Course is in-session over two 8-week periods (early-October through mid-December) and (mid-January through mid-March). This timing works well for prospective students who already work in the turf industry and want to their work experience with their Short Course education. We are hoping to draw students from three main areas: 1)

high school graduates interested in a career in turfgrass management, but without the means or desire to complete a four-year degree, 2) working turfgrass professionals interested in a certificate for career advancement, and 3) students that have earned a degree in a different field, but wish to switch careers.

Upon completion, the credential will not be a bachelor’s or an associate’s degree, but rather two certificates. The first certificate (earned in year 1) will be called the Foundations of Farm and Agribusiness Management, the second certificate (earned in year 2) will be the Turfgrass Management Certificate. The two certificates are designed to be taken sequentially. Students must complete the Foundations certificate in order to enroll in the Turfgrass Management Certificate.

The Farm and Industry Short Course offers over 40 courses taught by 25 faculty and staff at UW-Madison, all highly regarded in their fields. The faculty teaching the turfgrass courses will be myself and Dr. Paul Koch. While actual schedules will vary from student to student, here is a sample of the course work for the two certificates:

Year One	Year Two
Foundations of Turfgrass Management	Professional Turfgrass Management
Introduction to Soils (2 cr.)	Turfgrass Nutrient Management (2 cr.)
Agribusiness Communications (2 cr.)	Precision Agriculture (2 cr.)
Plant Science (2 cr.)	Turfgrass Irrigation and Drainage (1 cr.)
Agricultural Safety (1 cr.)	Farm Power (2 cr.)
Weather and Climate (1 cr.)	Safe and Effective Use of Pesticides (1 cr.)
Business Principles (1 cr.)	Turfgrass Integrated Pest Management (2 cr.)
Agricultural Human Resources Management (1 cr.)	+ Electives
Turfgrass Management (2 cr.)	
+ Electives	
Total: 12 or more credits	Total: 12 or more credits

As the program grows, we will be able to add more courses to suit the needs of our students. That said, we feel this is a solid start. While I am not able to quote exact costs for this article, the cost of the program will be significantly lower than the cost of attending UW-Madison's normal turfgrass management program. In-state tuition for each certificate will be around \$5,000. Students housing is available at the Lowell Center for \$5,500. Approximately \$200,000 of scholarships are available each year, and several awards are ear-marked

for students studying turfgrass. The average student receives \$3,000 in support each year, which covers a substantial part of the total costs.

We are very excited about this new direction but without strong enrollment, it may not be around long. Please help get the word out. Any student interested in enrolling in Fall of 2020 can start by visiting the Farm and Industry Short Course Web Site at www.fisc.cals.wisc.edu and/or contacting me at djsoldat@wisc.edu. The enrollment deadline for the fall semester is August 1, 2020.

Great news for an industry struggling to find quality professionals on a timely basis. Thank you for initiating this educational opportunity Dr. Soldat.

In Bounds

by Jack MacKenzie, CGCS

We have an identity crisis and nobody gives us a damn.

Although not currently a golf course superintendent, I was a professional turf manager for thirty-three years. Like many of you do today, I literally “farmed” turf on several golf courses and always viewed my vocation as agriculturally based. Unfortunately, the industry we represent tends to be viewed as recreation by those without a, “green side up” attitude.

Fair enough, the industry may be recreational, but the properties are agriculturally managed.

I did not enter this field because I enjoyed playing golf, I pursued the position of a golf course superintendent because I took great pleasure in working out of doors, being surrounded by nature, smelling freshly cut grass, feeling the soil, listening to birds chirp, thunder rumble,

breezes in the tree tops and watching local animals proliferate and mature. All the while balancing resources and Mother Nature to create what I thought was a pretty darn nice product.

Maintaining a golf course during roller coaster economies, shifting player expectations and tightening policies was not magic, it was hard work.

Beyond a limited budget, my management style was stringently regulated by the Department of Agriculture, as overseeing a cover crop of turfgrass demanded licensure in pesticide and fertilizer use. Beyond a budget conscious “waste not, want not” mentality, I employed Integrated Pest Management and Best Management Practices to limit inputs,



while enhancing so much more than a fine playing surface.

As a hydrologist, intimately managed by the Department of Natural Resource, I developed the necessary skills to judiciously apply a critical resource to maintain my crop, while appreciating that water removal was just as important. As a naturalist, I created acres of ecosystems to protect and enhance the wildlife, flora and fauna that profited from my properties as much as I did.

Considering myself an environmentalist, I took pride in generating oxygen, sequestering carbon, mitigating ground water pollution, buffering heat, reducing noise, enhancing wildlife and pollinator habitat, protecting green space, planting trees (often too many!) and using my education and experiences to limit the footprint created by my vocation.

I always considered myself to be an agronomist, one who managed a property for crop production. Did I not earn the sheepskin from an ac-

claimed University to prove it? Did I not manage the input of MDA regulated and specialty taxed materials (pesticides and fertilizers)? Did I not balance the inputs of water, seed and organic and synthetic products upon my properties to maintain a consistent ground cover of turf-grass? Did I not employ cultural practices to enhance the soil upon which I practiced my trade? I was an agronomist, yes I was. Wasn't I?

Apparently the answer to these questions is a simple, "no".

What?

Neither the Department of Natural Resources nor the Minnesota Department of Agriculture consider professional golf course turf management to be an agricultural industry.

So what is "my rub" here? If golf course management could be defined as an agricultural business it would bump our water use permit from a category six, non-essential user to a category three, agricultural

user. That leap would protect your access to water long into the future. Our greatest resource, water, which is managed by golf course superintendents to sustain a perennial ground cover, is permitted through the DNR. Unfortunately for us, should we require a modicum of water in times of drought crisis to sustain our agricultural business model, to the DNR we are nonessential.

To the MDA we are..., well, I don't think they know what we are, but they sure are comfortable defining us as NOT agricultural. This, despite the fact that our fertilizers and plant protectants are regulated by the MDA. To the point, we even pay a premium tax on these materials... monies that go to agricultural interests.

The idea that golf course management isn't agricultural based blows my mind away. Did we not help create and continue to support and maintain a multi million dollar turf research facility upon the UMN's agricultural campus? Does "golf"

not sit upon relevant MDA committees? Are we not regulated by the Department of Agriculture? Are not the products we use to manage our "crops" specialty taxed by the MDA? Do we not help garner research grants through the USDA for turfgrass studies? Are we not represented by some of the finest minds in the country at legendary institutes of agriculture? Are they not teaching agronomy?

We have really tried hard to exchange BMP's, IPM's and environmental stewardship for water assurances. We have looked at rules, regulations and definitions until our eye bugged out. The simple solution may be to re-define us as agriculture, my mission for the next couple of years.

In hindsight, always 20/20, perhaps for the last decade I should have been pursuing Explore Minnesota or Trip Advisor for industry support, instead of roaming the halls of our agencies.