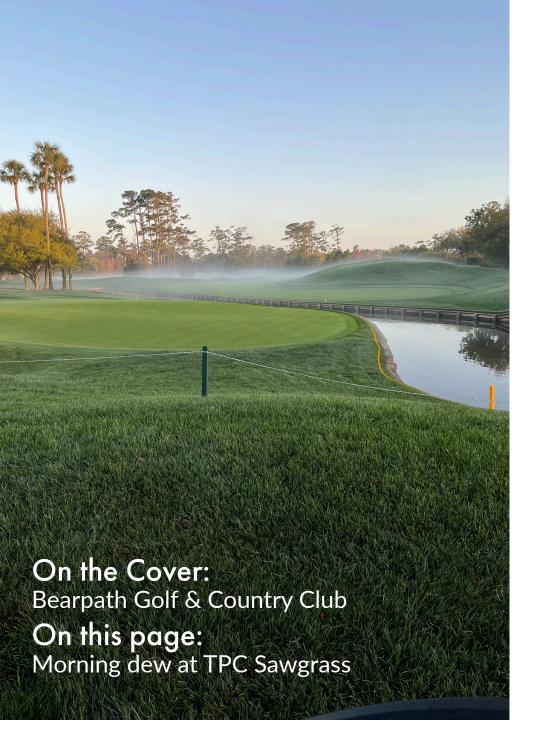
HOLENOTES

The Official Publication of the MGCSA V. 57, #3 April 2022



Renovating Bearpath Roll it Forward: James Bezanson

UMN WinterTurf Sensor Data



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HOLENOTES

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Presidential Perspective

Mike Sonnek, Royal Golf Club

It will warm up again! I find myself reassuring people that yes, it will warm up again. As I write this, spring is playing it's familiar practical joke on us. A tease of nice weather but plenty of cold, gray, and less than inspiring days. We all know that all it takes is a nice day or two and its ladies and gentlemen, start your engines. On top of that, our members and guests have spent several days gazing longingly at the beautiful scenery being broadcast from Augusta. Before you know it, we are in the familiar routine of hurry up and wait, followed by how can we possibly keep up. On a side note, the poor weather gave me time to enter four different Masters pools. The success of which, I am not overly confident.

I don't expect anyone to feel sorry for me, but I was out of town for our 3 nice days in March that got everyone excited. Unless I missed something, I believe these are the only nice days we have had since Decem-



ber 1. Not much of an exaggeration. Quite a contrast to the 80 degree weather we had the first week of April last year.

Speaking of last years April weather, I missed that as well because I was fortunate to join the maintenance team for The Masters. Due to the pandemic, they were shorthanded, and I received a call to come help. As a lifelong golf fan who had never been to Augusta, I was thrilled to go. The first morning I joined the bunker crew and headed out in the dark. My first view of the property occurred later that morning at sunrise as we were raking the bunker along 8 fairway. Sunrise from the middle of Augusta National was an incredible sight. Due to the limitation of the number of patrons, the usual grandstands and other infrastructure were not set

up. All you saw was the beauty of the golf course. Spring was very friendly there, so the flowering of the dogwoods and azaleas was spectacular. Another of my jobs was grabbing a push mower to hit some rough areas. This job is much less mundane when you are crossing the Hogan bridge to mow around 12 green and exiting across the Nelson bridge after mowing around 13 tee.

I was able to take in some interesting civic activity this past week. I attended a public hearing held by the Minneapolis Park Board. A master plan for Hiawatha Golf Club and Lake Hiawatha Park has been in the works for approximately eight years. As I understand, the master plan involved the golf club being reduced to nine holes. The master plan was not passed when voted on last fall. At the most recent hearing, a new proposal was brought forth to keep Hiawatha Golf Club as an 18-hole course and still accomplish the needed improvements to the park and the control of water on the property. Part of this group with the new proposal is our favorite Gopher golfer, Tom Lehman. Very

excited that he has joined this cause. Hopefully a vision that includes preserving Hiawatha Golf Club will prove feasible.

The assistant's forum in March at Pinz in Woodbury was a great time. We were all grateful to be there as we watched the all-day rain event outside. Much thanks to Matt Cavanaugh for his always humorous contribution, moderating the Superintendent/ Assistant Superintendent panel discussion. Much thanks as well to Dan Kampa, Superintendent at Stoneridge GC, Mitch Linnerud, Assistant at Rochester Golf and CC, Craig Hendrickson, former Superintendent currently with SiteOne, and Kevin Milbrandt. Assistant at Rush Creek Golf Club. Additional thanks to our presenters, Maggie Reiter from the University of Minnesota, and Mark Koepsell of Frost Inc. Great information, great food, and interesting bowling.

Hopefully you can join us next time around.
Good luck to everyone on getting the season started and hopefully spring will have sprung by the time I join you next month.

2022 Legacy Scholarships Deadline for Application: June 1st, 2022

The Program: The Minnesota Golf Course Superintendents' Association offers a scholarship program designed to assist children and grandchildren of Class AA, A, B, C, D, EM, Associate and Affiliate members. The MGCSA provides scholarships to students at-

tending college or vocational programs at any accredited post-secondary institution. The program is independently managed by a group of select, unbiased academic advisors. Awards will be granted without regard

to race, color, creed, religion, sex, disability, national origin or financial need.

The Joseph S. Garske Legacy award, named after the founder of Par Aide Products Company, Joe Garske, is committed to furthering the education of children and grandchildren of MGCSA members through financial contributions. This is the 24th consecu-

tive year for these awards. Par Aide is located in Lino Lakes, Minnesota and owned by Steve Garske, son of Joseph.

The late Mr. Garske, who died at the age of 76 in 1982, started Par Aide

in 1954 with plans to make a "good" ball washer. A foundry man and avid golfer, he knew little about the golf business, tried to sell his ideas for design and tooling to two accessory companies, was turned down by

both and so began Par Aide Products Company. Steve Garske started The Legacy Scholarship in his father's honor in 1996.

Selection of Recipients: Scholarship recipients are selected on the basis of academic record, potential to succeed, leadership and participation in school and community activities, honors, work experience, a statement



of education and career goals and an outside appraisal. Selection of recipients is made by a select group of academic professionals. Applicants will be notified by the end of July whether they have been awarded or denied a scholarship.

Eligibility: Applicants for the MGCSA Legacy Scholarships must be: children/grandchildren of Class AA, A, B, C, D, EM, Associate or Affiliate members who have been members of the MGCSA at least five years; High school seniors or graduates who plan to enroll or students who are already enrolled in a full-time undergraduate course of study at an accredited two or four-year college, university or vocational-technical school, and under 23 years of age.

Awards: Three awards will be given to children and grandchildren of Class AA, A, B and C members. One award of \$1,500 in the name of Joseph S. Garske will be given to the highest

evaluated applicant. That award will be renewable for one-year contingent upon full-time enrollment and satisfactory academic performance. One other \$1,000 award will be given to other qualified applicants from this group. One, \$1,000 award will be available to children and grandchildren of Class D, EM, Associate and Affiliate members. These awards are not renewable. However, students may reapply to the program each year they meet eligibility requirements. Awards are for undergraduate study only.

Obligations: Recipients have no obligation to the MGCSA or its members. They are, however, required to supply the MGCSA with current transcripts and to notify the MGCSA of any changes of address, school enrollment or other relevant information. Except as described in this brochure, no obligation is assumed by the MGCSA.

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7

















Assistants Pro Forum & Bowling Event PINZ, March 22, 2022

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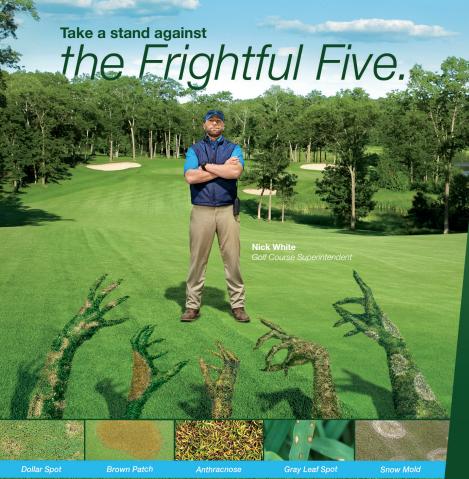
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Renovating Bearpath Golf and Country Club:

By: Jim Snell with Joe Berggren



Bearpath Golf and Country Club has committed to a Nicklaus Master Plan for a full renovation of their entire golf course. Grounds Superintendent, Jim Snell was hired in fall 2020 and the project discussion had already begun. "The vision of the project really started about 6 years ago when

Kevin Cashman, Director of Golf, initiated and worked with Nicklaus Design to complete a Master Plan for the future groundwork of the Bearpath Signature Design Championship Golf Course" he said. The plan and concepts were under the close eye of Mr. Jack Nicklaus and coordi-



nated by Lead Architect Chris Cochran of Nicklaus Design.

Along with moving forward with the Master Plan, Bearpath has been working closely over the past three years with the Riley Purgatory Creek Watershed District on a major restoration project affecting holes #16 and #13. With the project and partnership moving through RPCWD Board approval and Bearpath ownership in 2021, the construction wheels were turning.

Bearpath began meetings with Duininck Golf, and Chris Cochran,

from Nicklaus Designs in May of 2021 and the project was ready to become reality. The goal of the project was to update the course and to create the ownership's vision of having the best private club in the Midwest.

The Bearpath project partnered and will lean on Duininck Golf to do much of the heavy lifting. They will be restoring the greens back to the original dimensions, leveling tees and reducing the original bunkers, that were from 1996 along with creating fresh design concepts from Nicklaus. New irrigation green loops start-

ed in phase 1. Phase 2 will include new irrigation laterals on the entire front 9 with mainlines staying intact. When the project is finished, every hole will be touched. "It has been an exciting transformation to refresh this course. Many courses of this age haven't received much attention and now we have the opportunity to highlight a Nicklaus Signature Course." Judd Duininck said.

Snell and his staff will be install-

ing the Klingstone bunker system in house. Snell has experience with the product since using it at Spring Hill Golf Club. "I am comfortable with Klingstone, it works well in our environment. It has some challenges on steep faces, but overall, it's a great product," he said. Snell chose 007 bentgrass for the greens and Dominant Extreme bentgrass on the tees and fairways. All of the bentgrass greens, approaches and tees will be sodded



with larger areas being seeded. The project is almost halfway there with the back 9 being finished in fall of 2021. The front 9 remained open to the membership throughout the season. "Jim came in and, without ever maintaining the golf course, he jumped into a huge

construction undertaking. He really has knocked it out of the park." Chris Kleinsmith, Duininck Project Manager said. "This is really a great Master Plan project with a great group of people." He continued.

The Bearpath plan in 2022 will



be to offer 18 holes of championship golf to its membership for the summer with the opening of the back nine later into spring. The Master Plan project will restart in late August of 2022, with closing the front 9. Once again, keeping the back 9 open for play through the fall golf season.

In 2023 the full project will be completed with some final irrigation, range work and finishing touches. The goal is to have the spring of 2024 with a full season of golf for everyone to enjoy. The future at Bearpath is very exciting!



2022 Affiliate Appreciation and Member Carnival





Monday May 2nd, 2022 TPC Twin Cities Practice Range Host Superintendent: Joe Rolstad

11:00 - 2:00 Trade Fair and Demo's

Games of chance, treats, and social interaction

11:30 - 1:00 FREE LUNCH****

Grilled Burgers, chips and soft drinks

1:00 - 2:30 Games of Skill- \$\$ Prizes

Long drive, chipping, and putting events

Games of skill open to all MGCSA members

This opportunity is intended to bring our membership together in a fun and casual environment. Also, another chance for individuals to greet retiring ED Jack Mackenzie, as he will be in attendance!

MGCSA members only please

****FREE - BUT MUST REGISTER FOR FOOD COUNT****

Register online at mgcsa.org and contact chris@mgcsa.org with any comments or questions.

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Inside the ropes at TPC Sawgrass: Photo Journal by: Mike Sonnek & Kevin Malloy





Check out the drone video, with the extended making of: from TPC Sawgrass. Look for MGCSA board members; Mike Sonnek and Kevin Malloy working hard on Holes 16 & 17!









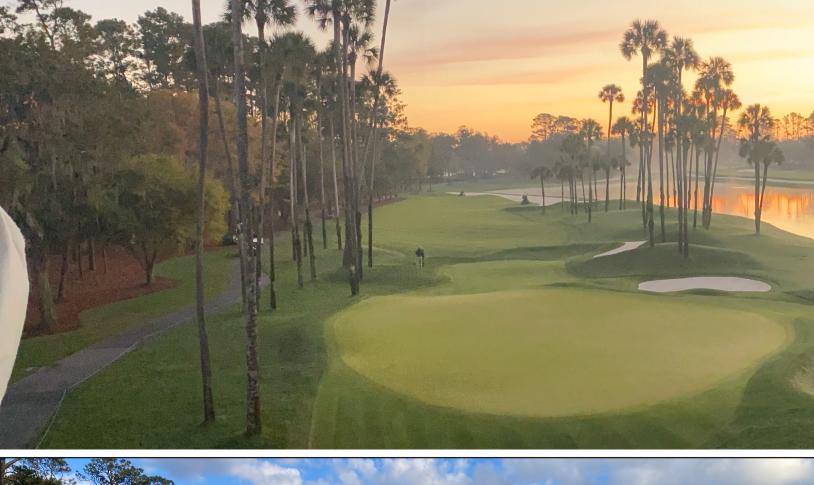




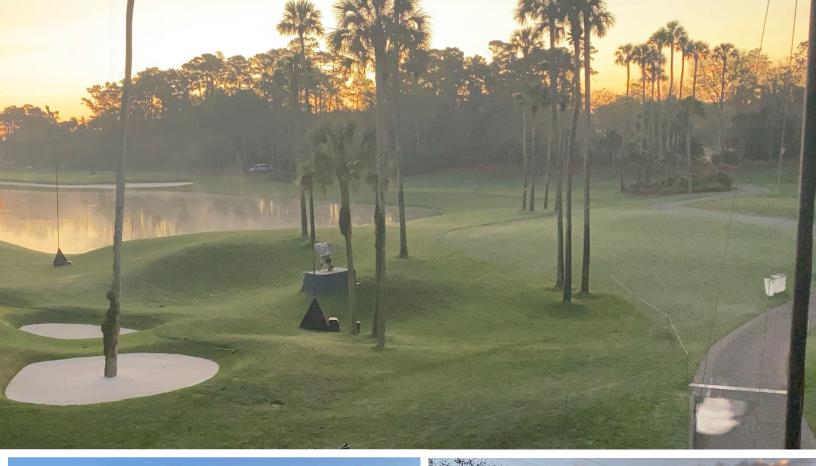


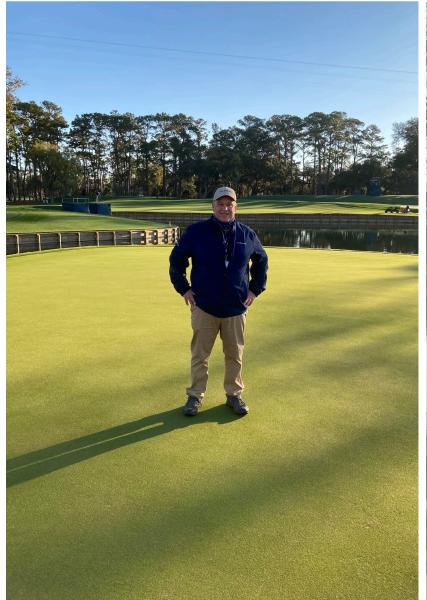














Importance of Water Use Efficiency

By: Carmelita Nelson, Water Conservation Specialist,
Minnesota DNR



Over the summer of 2021, stream flows dropped below minimum protective flow levels throughout much of the state, resulting in hundreds of temporary permit suspensions. Actions were also taken to protect groundwater levels and municipal water supplies in several areas of the state with limited aquifers. These suspensions impacted golf course operations and many others, highlighting the need for water use efficiency and contingency plans.

As required by the State Drought Plan, all public water suppliers in the impacted watersheds were asked to implement water use reduction actions with a goal of reducing water use to 25%-75% above January levels depending on the severity of the drought in their watershed. Cities serving over 1,000 people were required to implement demand reduction measures from their Water Supply Plans. The DNR has started the process of updating our statewide drought plan



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WE ARE SOIL EXPERTS

that will focus on preparedness of Minnesota communities and businesses and planning for resilience as our climate changes and water needs evolve.

A free resource that can provide guidance and track progress is the new Water Conservation Reporting system. Minnesota is the first state in the nation to measure water conservation on a statewide basis. The statewide Water Conservation Reporting system, is a tool available for DNR permitted golf course operators, to showcase their best practices and measures their conservation progress.

From mid-October through March 30 each year, golf course irrigators can report their water efficiency measures they are implementing. This web-based Water Conservation Reporting System complements the water use reporting system.

The goal in gathering this data is to measure water conservation actions, track success and encourage efficiency. Ensuring sustainable use of waters, reducing losses and waste of water is everybody's responsibility. The data will be aggregated, summarized and used in various legislative reports, conference presentations and other outreach with partners.

Golf courses will continue to report their monthly water use totals to the DNR through the existing Minnesota Permitting and Reporting System (MPARS) and pay the annual water use fee. Once this is completed, there will be a link taking water users to the Water Conservation Reporting system.

For additional information please see the <u>DNR water conservation reporting system webpage</u> or contact Carmelita Nelson, DNR water conservation specialist, at 651-259-5034 or <u>carmelita.nelson@state.mn.us</u>.

While water is not unlimited, Minnesota is taking action to ensure we manage it sustainably. Continued vigilance and coordination with Minnesotan's and water users is essential.





Roll It Forward

By: James Bezanson





Roll it forward will be an on-going series in Hole Notes that in theory, should be self-sustaining, and ideally engage all sectors of the memberships. The nature of it will be to explain why you joined this industry, what you enjoy most about working in it, and what keeps you motivated about working in this industry. Then, follow that by nominating someone you worked with, worked for, a mentor, any friend in the Minnesota turf industry, and tell a story about them. In the subsequent issue, they will follow by talking about themselves and nominating someone else and telling a story about that person and so on.





Name: James Bezanson, Superintendent, Highland National Golf Course

I grew up in Nova Scotia, Canada and really didn't have a career direction until a neighbor encouraged me to go to college to study Landscape Horticulture. While at college I had the opportunity to work at The Mountain Golf Course in Bible Hill, Nova Scotia, on the maintenance department. The golf course wasn't anything special, but it's where I began to appreciate working outside and enjoying the variety of work. During the next summer I worked for a landscape company build-

ing a golf course. After graduating from the Nova Scotia Agricultural College, I had the opportunity to travel around the United States performing Lumberjack shows. I met my wife while working as a Lumberjack in Hayward, Wisconsin. While I enjoyed my time traveling and seeing the country, I quickly got tired of living out of a suitcase and realized I wanted to pursue golf as career.

I was hired as a Spray Technician at Glen Arbor Golf Course in Hammonds Plains, Nova Scotia and spent 2 years learning as much as possible while continuing a long-distance relationship with my Wisconsin girl. We were married in June 2002 and moved to State Col-

lege, PA that fall where I studied Golf Course Turfgrass Management. I worked as an intern at Saucon Valley Country Club in Bethlehem, PA for one summer before graduating and moving to Hudson, WI. I was hired by Dave Kazmierczak as an assistant out of college and worked at Prestwick Golf Course for 6 years. I became the Superintendent at Oneka Ridge Golf Course in 2009 and spent 8 years honing my skills before becoming the Superintendent at Highland National Golf Course in Saint Paul.

While I enjoy working outside and the day-to-day challenges of managing the maintenance department of a golf course, the thing that I'm most proud of is the process which lead to me





becoming a Golf Course Superintendent. I worked hard, paid my dues, and took advantage of every opportunity. A lot of people have given up on becoming a Superintendent, and I feel blessed to reach my goal and manage a property that provides an immense amount of enjoyment.

I enjoy being on the course in the morning watching the sunrise and seeing the wildlife. I also





appreciate all the relationships I've gained and sharing my knowledge with others.

Roll it Forward: Dave Kazmierczak, Prestwick Golf Course

When I graduated college, my first full-time job was working for Dave Kazmierczak at Prestwick Golf Club in Woodbury, Minnesota. Dave and I struck it off right away when I found out he had gone to high school in Ontario, Canada. Dave didn't know who I was, and I feel fortunate that he was willing to take a chance and give me an opportunity to be his Assistant Superintendent. I admit, I was inexperienced when



I first started working for Dave, but over the 6 years I worked at Prestwick, Dave provided me the confidence to become a Superintendent. Dave allowed me to be part of his family and has been a friend/mentor to me throughout my career. I have fond memories of playing golf with Dave on Friday afternoons. He is someone who I trust and call when I need advice. Dave's laid-back leadership style has helped mold me into the person and leader I am today. I look forward to the times we get together and talk.

James Bezanson
Highland National Golf
Course superintendent
864 Snelling Avenue South
Saint Paul, MN 55116

Email: james.bezanson@ci.stpaul.mn.us



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MGCSA Southeast Exposure Golf Event Austin Country Club Tuesday May 24th, 2022 Host: Brandon Bergene

Only \$35 for 18 holes of golf, cart, and lunch! Register you and your staff for a casual round of golf with a random draw, two-man scramble format. Proximity prizes available. 9:30 Registration.





Non-MGCSA members welcome

Partners in Turf:

lowa Chapter

Register online at MGCSA.org

GOLF COURSE ANOMALIES

Whats the strangest, funniest, most unique thing you've seen on the golf course? Send your images to chris@mgcsa.org.



Get to Know 'em: Brandon Gauster By: Joe Berggren, Hole Notes Editor

FACILITY INFO

Golf Course: Oak Marsh Golf Course

Public or Private: Public

Number of Holes: 18

Fulltime employees: 2

Seasonal employees (not including full time): 11

Number of employees of entire facility at peak season: 19

Types of grass: Bentgrass (Greens, collars, ap-

proaches, tees) and Bluegrass fairways.

Total course acreage: 155 acres

Greens acreage: 4 acres

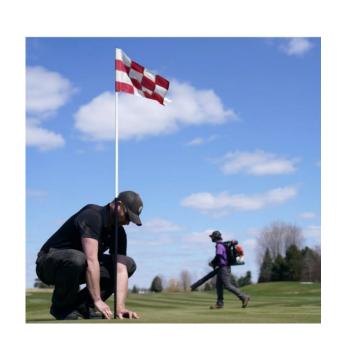
Tee acreage: 4 acres

Fairway acreage: 24 acres

Rough acreage: 57 acres

Driving range acreage: 7.5 acres

Range tee acreage: .50 acres





Personal Turf Facts:

How many years have you been in your current position? 14 years

How many years have you been in the turf industry? 24 years

Where else have you worked? Mississippi Dunes, All Seasons Golf, Pebble Creek, The Ponds (Saint Francis), and Lost Spur.

Turf School Attended (if any)? Anoka Technical College

INDUSTRY THOUGHTS

What is one "master plan" thing you would like to change at your golf course?

Bunker renovation, better drainage, up-to-date irrigation system, and cart path relocation.

What concerns do you have the turf business and the future of golf?

The lack of young people wanting to enter the turf industry. Golf courses closing to be sold to housing developers.

What is needed to bring more young professionals into the industry?

We need to stay up to date on so-

cial media and other technology that young professionals approve of. Millennials are just like everyone else, they crave the sense of purpose through their job and it is up to us as leads to provide them with that level of satisfaction.



What piece of equipment do you want? Not a need, a want.

I would love to have a sod cutter rather than a sod kicker for projects. Reliable work carts would be crucial in help-



ing staff complete tasks on schedule. An irrigation or spray tech, and a full time mechanic would be crucial to help me manage staff and complete projects.

FUN FACTS

Have you ever met a celebrity? Who? Frank Beard (Drummer from ZZ Top), Ron Gardenhire, Jesse the body Ventura, and of course The Common Man.

What is your favorite vacation spot?
On a lake with a

fishing pole in my hand, or in a deer stand.

What is your favorite memory of starting your turf career? Taking over a golf course where my brother was a superintendent before me. What is your favorite job on the golf course? Admiring a finished project or mowing with the Z-turn putting down new laser lines.

What is your least favorite job on the golf course? Irrigation repair!

Have you played any famous golf courses? Which ones? No.

Who is your dream foursome? My Grandpa Schmitty, Jack Black, and Marcus Foligno

2020- What a year! Would you like to comment on it? The year of COVID restrictions. Oak Marsh opened, then closed due to COVID restrictions for a couple weeks, and then reopened with ever changing guidelines.

Not touching flags, riding together or separate in golf carts, no ballwashers or rakes. We had to come up with different ways to get the course ready for play and let people know what our course was doing to keep people safe. Because it seemed like every course did things a little differently within the guidelines that were constantly changing.

If you would like to participate in a future Get to Know 'Em, please reach out to Editor Joe Berggren at jberggren@golfthewilds.com



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Chapter Leader Symposium

Mark Michalski, MGCSA Secretary/Treasurer
Chisago Lakes Golf Course

I had the opportunity as the secretary/treasurer of our association, to attend the GCSAA Chapter Leaders Symposium recently, with our new Executive Director Chris Aumock. It was a very enjoyable and informative trip.

We had never been to GCSAA HQ before, and it was very cool to see everything that goes on behind the scenes with all the staff members that serve us as members of GCSAA. One of the ladies, who heads up the GIS planning, was heading to Phoenix the day after we were there, to work with hotels in planning for the 2024 GIS. Cool to see not only the potential layout for the trade show for the upcoming Orlando show, but also for the one in Phoenix.

It was a fairly short trip, but a great deal of information

was packed into the day and a half that we were there. The first day started off by hearing from the COO Bob Randquist. He spoke about the future of GCSAA and what they are working on. Specifically, an upcoming meeting with the USGA leadership and working to further develop that relationship. He asked for input from the audience about things to bring up with them, looking for opportunities to increase the value of that relationship.

Next, we learned about some of the affinity programs that GCSAA offers to its members. Discounts through Office Depot, Batteries Plus, I have taken advantage of that one, Columbia for staff uniforms, as well as a health insurance program through GCSAA if your place of em-



Editors note: Yes, the Colonel John Morley statue is right next to this, and would be a better picture. Honestly, it was raining and there was a line, and one of us didnt want to pose for a picture!

ployment doesn't offer it. I haven't investigated the insurance, but it is a potential benefit to a member. The link to all those member savings programs is below. https://www.gcsaa.org/about-gcsaa/member-savings ship/membership-benefits/member-savings

The legal counsel for GCSAA gave a presentation on things that are very important for chapters to keep in mind. Information on how to best protect ourselves as a chapter in a number of different areas, including seemingly innocuous discussions like roundtables. Very interesting and informative perspective.

We were challenged about what a successful chapter includes. Two main topics of discussion came up, and one was about developing a vibrant and enthused leadership. If we aren't engaged as leaders of the chapter, it's difficult to have



an engaged and enthused membership. The other, provide valuable programming to your members, whether educational or opportunities for simple social gatherings. These ideas are not new, but the importance is reinforced given that all chapters and groups are striving for the same things.

Finally, it was great to hear from the government affairs staff about what they are doing on our behalf. The work they do to keep us up to date on potential bills that would be detrimental to our industry was quite impressive. They are here to help us, and it's important we support their efforts when requested. Our local advocacy efforts are supported from GCSAA behind the scenes. They have engaged with Chris several times recently as he moves forward through our transition.

Hearing from GCSAA staff was great, but hearing from other chapter executive directors as well as other chapter board members on what has been successful for them was a wonderful benefit. It was a very worthwhile trip, and the two of us had several interesting conversations along the way. We are excited to continue working on providing more value and opportunity to the MGCSA membership.

MGCSA NEW MEMBERS - April 2022

Alexander Gerdes Assocoate **Edina Country Club** Matson Gravelle Bemidji Town & Country Club Jordan Baribeau Associate Edina Country Club Joel Erickson Associate Edina Country Club Matt Mosso **Hyland Greens** Erik Nelson **Baker National Golf Course Affiliate** Ben Johnson Midwest Machinery Co

Winter Turf Injury Research Update: Scaling Data Collection Systems with Support from Superintendents Bryan Runck, Eric Watkins, Maggie Reiter University of Minnesota

Winter turf injury is a major challenge for golf course superintendents and so it remains an on-going research priority for the University of Minnesota. It's a hard problem to solve - winter injury changes from year-to-year and location-to-location, making it difficult to collect data. The specific plant biological processes that lead to winter injury are only partially understood. As a result, the only way we can study winter injury is by collecting a lot of data from a lot of different locations all over the world.

Three years ago, we started this process by developing new sensing systems from scratch that could target the environmental drivers and indicators of winter turf injury. These sensors are unique because they let us understand what the turf microenvironment is like moment-by-moment. Such detailed measures



let us do three things: 1) help superintendents know whether to take management actions that could proactively reduce the risks of winter injury, 2) build models that help breeders select winter injury-resistant plants that can be used to create new varieties, and 3) guide researchers to develop studies that help us learn more about winter injury.

What happened last year?

This past winter, we built on work from the last two winters (funded by MGCSA and the Michigan Turfgrass Foundation) to deploy just over 1000 sensors over 49 locations (funding from USGA; Figure 1). Each sensor collected data every 15 minutes and sent data back over cellular to servers at the University of Minnesota's GEMS Informatics Center. This resulted in over 10.25M data observations (as of March 25,

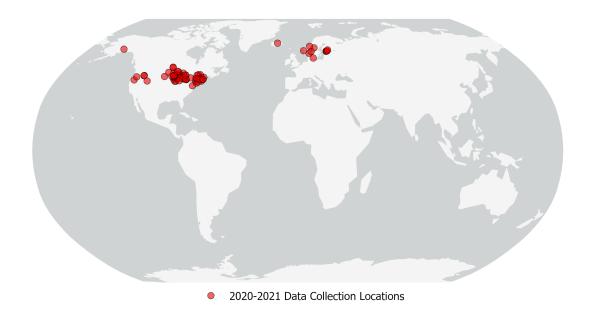


Figure 1. Data collection locations including sensors and surveys. Each location had one "node" consisting of a logger, telemetry, and 21 sensors.

2022) that we are now using to understand what the turfgrass experienced this last winter.

As we've continued to grow our data collection efforts, golf course superintendents have been essential to our success. Led by Andrew Hollman of the UMN turfgrass science team and supported by Jeffrey Bishop and Bobby Schulz of GEMS Sensing, the superintendents have deployed, monitored, repaired, and uninstalled sensing nodes across all our locations (Figure 2). For more on sensor uninstallation, see this video (https://z.umn.edu/sensor uninstall). We've received

substantial engagement from superintendents and look forward to continuing to expand oncourse research this coming fall.

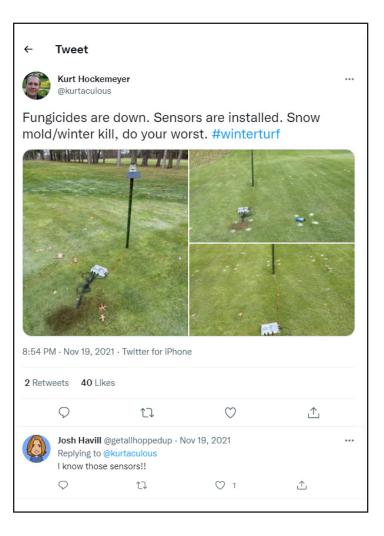




Figure 2. Tweets from collaborators with sensors helping to understand drivers of winter injury.

What have we learned?

While still in the early phases of research, the new sensing systems are allowing us to characterize the microclimatic dynamics that are driving winter turfinjury. We hypothesized that the microenvironment is affecting turfgrass survival through different temperature-mediated effects on plant physiological processes, which would be detectable through changes in the

oxygen and carbon dioxide gas changes in the plant rootzone.

Exploratory data analysis shows a negative correlation (-0.32) between subsurface log(oxygen) and log(carbon dioxide). Both oxygen and carbon dioxide appear to be mediated by soil temperature suggesting that ground freeze might be playing a role in transitioning the soil environment from one richer in oxygen to one richer in carbon dioxide (Table 1). This could be due to changes in the permeability of the rootzone itself or because of slowing of plant root respiration, and water and nutrient uptake. While the specific impacts of this shift on turf health and survival are not yet known, these results indicate the sensing systems we've developed are capable of detecting relevant microenvironmental signals that could be driving or indicating outcomes in turfgrass winter survival.

What's going to happen next year?

Because of the on-going support from the MGCSA and USGA, we were able to garner funding from

Table 1. Correlation coefficients of selected environmental parameters under green surface.

	log(O2)	log (CO2)	log (Temperature)
log(O2)	-	-0.32	0
log (CO2)	-0.32	-	-0.26
log (Temperature)	0	-0.26	-

the United States Department of Agriculture to scale-up our sensing and modeling work to predict winter turf injury (see March 2022 issue of Hole Notes). With this new funding, we plan to grow our fleet of sensors to over 100 locations, each having a node with over 20 different sensors. This additional data will help us to gain further insight into how turf's physiological ecology interacts with microenvironmental factors to affect winter survival.

The USDA funding is also going to let us expand our work with other sources of data. By working with U-Spatial at the University of Minnesota and industry collaborators, we will integrate both

public weather and elevation data with custom datasets. These additional data will help provide on-the-ground observations and additional remote observations for outcomes in turf survival.

We expect this rich public and private dataset to let modelers predict winter injury and help ease superintendents' minds that they're doing all they can to keep their greens healthy every winter.





Follow the UMN Turf Blog for project updates!

From the High Grass

By: Chris Aumock

How much time do we have to play golf? A loaded question that is often answered with, "none!" But is that entirely true? There are too many times where we account for the wrong amounts of time. Time off the golf course does not have to be in addition to, but can be part of the workday. I learned probably too recently that there could be as much learning away from the golf course, as there was with the time on it. We all know that it is vital to play our golf courses, one can't truly understand the playing experience without seeing for yourself. So why is it so difficult to get out there and play golf with our colleagues?

It doesn't have to be that way. Enter the Don White Match Play event. A simple, season long golf tournament that brings together new members and old friends. One match a month is not an unreasonable ask, at least for two matches! This event is only a few



years old, but it has the potential to be a signature event for the MGCSA. The opportunity to bring together foursomes of our members for slightly competitive golfing is an amazing opportunity. I have only played myself the last year, and I regret not playing the first few years. Maybe it's because we were incredibly lucky with weather last year, but the three matches we got to play were all on beautiful golf courses, with ideal weather conditions. Most of the matches were close and entertaining, until we eventually lost bad enough that my partner had to leave early, for another commitment, not embarrassment!

Why can't we also sell it as a learning experience. What bet-

ter way to grow than by seeing what your colleagues are doing up-close and personal? Not too long ago, I was guilty of always working while playing, No matter what course I was on, always looking for the things out of place or things I would change on my course. Thankfully, more recently I have been able to enjoy the properties, noticing those things still, but knowing that there is someone else that has a reason for this and that. Coming from a public golf course, it was easy to understand if I saw something a little off, because that may have been par for the course at my place, unknowingly or not! If you don't play in the event, use this as opportunity to host a match, and let people play your course. Gather their knowledge and insights, be open to and ask for comments and constructive criticism, which will only help grow yourself and your course.

It's important we remember why we are all here. There was some attraction to the game of golf. Whether that was through playing, or just through the understanding of agronomy and maintenance. I never took enough

advantage of playing my own golf course, maybe playing 2-3 times a year at most. Let's not forget about that initial interest and appreciate the opportunities we have to enjoy this game. As I come to understand my new role, it's very clear I didn't take advantage of the opportunities that were available to me. Participating in more chances to get together with fellow MGCSA members would have been invaluable. The opportunities that I have gotten involved with have always been immensely rewarding.

I encourage you all to consider participating in not only the Don White, but in any of our association events. Find yourself a playing partner and use this April to fine tune that handicap. Let's grow our network together, put a face to the name that you've only heard, and get out there with a friend and play some golf! We can still learn, grow, and develop while having some fun. Someone among us has a story or an experience that can benefit you and/or your property. You may never find the answers to your questions, if you're not out there looking for them.