

Better Analysis –

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rainfall event for total phosphorus, total nitrogen, total organic carbon, and conductivity.

Along with the lysimeters, testing was also required for three wetland-monitoring sites on the property and one site off the property near a beaver dam, where water flows from the wetlands into Upper Cullen Lake. Monitoring pipes were installed in these locations. Testing of the two irrigation wells and clubhouse well is required.

Because the soils in Crow Wing County are naturally high in phosphorus, the conditional use permit required The Preserve to conduct annual soil tests as well. Phosphorus is not to be applied to the golf course unless the soil test shows it to be deficient.

From 1996, when the course opened, until 2000, a local firm performed the required water testing. The firm submitted its annual report to the Crow Wing County Planning and Zoning Board and the Environmental Advisory Board. This report included test results and application records of pesticide, fertilizer, and irrigation usage as well as a summary and analysis drawn up by the owner of the testing firm.

Despite the extensive testing described above, Mike Bohnestingl, former course superintendent of The Preserve, was unable to find useful information in the data. The leachates were posted as total nitrogen, total phosphorus and total potassium. There was no way of determining from this data whether the leachates were naturally occurring or were coming from the fertilizer program. Thus, the testing program offered no direction. The whole point of the testing procedures was to use the data to better manage the fertility of the golf course while minimizing nutrient loading into nearby water-



A clubhouse view of The Preserve Golf Club

ways. In the meantime, opponents of the golf course believed the leachates were coming from fertilizers.

For the years 2000 and 2001, therefore, The Preserve decided to change testing firms in an attempt to learn more from the data collected. The course called in Craig Paskvan of Akeley, Minnesota, an independent soils consultant specializing in golf course fertility management.

Craig was asked to develop the data and break it down to answer the question: Where were the leachates coming from? Craig determined that the existing methodology and placement of measuring devices should yield the data required. But better analysis of the data seemed to be needed.

The first requirement was to break down the data on the main macronutrients – nitrogen, phosphorus, and potassium. A better data breakdown would allow the determination of where the nutrients as measured in the lysimeters

were coming from. By breaking down the macronutrients into their elemental forms, one could determine how much of the leachates found in the lysimeters came from organic or inorganic sources. Having a handle on those numbers would provide an important insight as to how the fertility program was working.

A second concern involved the interpretation and report of the results. Because of a possible conflict of interest, Craig felt it important to bring in a reputable analyst and report writer (Craig was also in charge of the fertility testing at The Preserve). With Michael's approval, Craig turned to Dr. Lam Ho. Formerly the Director of the Environmental and Industrial Division at Brookside Labs, Inc., Dr. Ho had recently started his own environmental consulting business. Dr. Ho was eminently well qualified to compile the data and do the write-up.

When the 2001 season got underway, Michael, for quality control reasons, was in charge of pulling the samples, filling out the chain of custody papers and sending them to the lab. Water samples were preserved at the time of collection as recommended by the U.S. Environmental Protection Agency and shipped to Brookside Laboratories, Inc.

Brookside Labs sent the results of its analyses to both Dr. Ho and Craig Paskvan. Dr. Ho and Craig discussed the results; then Craig reviewed them with Michael and reviewed any concerns or possible discrepancies in the results.

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Better Analysis—

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Michael also compiled all the irrigation, fertilizer, pesticide and rainfall records for the year. This information, along with a topographical map of the golf course was sent to Dr. Ho for use in his report. Monitoring of the lysimeters took place every six weeks between May 1 and October 10, or after every rainfall in which

"Dr. Ho concluded that the fertility program... did not increase the levels of nutrients in the lysimeters beyond the baseline concentration ranges."

the amount of precipitation exceeded one inch during a twenty-four hour period.

Conclusions

After looking at all the data and work that was done at The Preserve for the 2001 growing year, Dr. Ho concluded that the fertility program in place at the golf course did not increase the levels of nutrients in the lysimeters beyond the baseline concentration ranges. The baseline concentration levels are those levels measured when no fertilizer had been applied. He found that nitrogen leachates levels were more organic in origin than inorganic.

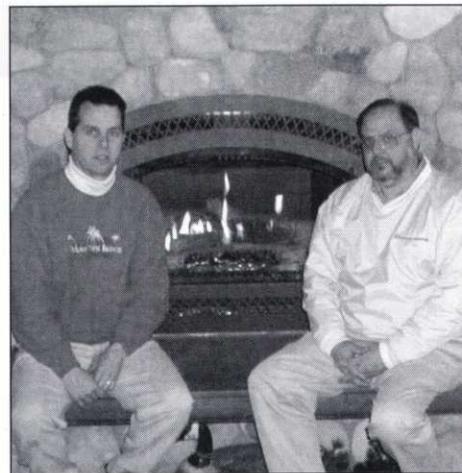
Phosphorus levels in the lysimeters were found to be in the range between normal and high to very high, even when no phosphorus fertilizer was applied. It appeared as if high phosphorus levels are normal in the soil at the Preserve; in fact, lowering the phosphorus in the leachate or lysimeters to a lower level may be difficult to do. Applying phosphorus fertilizers did not raise the level of phosphorus in the lysimeters; however, Dr. Ho recommended lowering the application rate of phosphorus when possible.

So what does this new information mean to Michael? For the first time, he has the ability to look at the data from the lysimeters and know that his fertility program is not contributing to any degradation of the environment. Second, it gives him knowledge of nutrient levels and possible nutrient problems in areas that he needs to be aware of. Third, he knows that even though there may be high levels of phosphorus in the leachates from time to time, those levels are reached due to the high levels of phosphorus naturally occurring in his soils. Michael also knows that

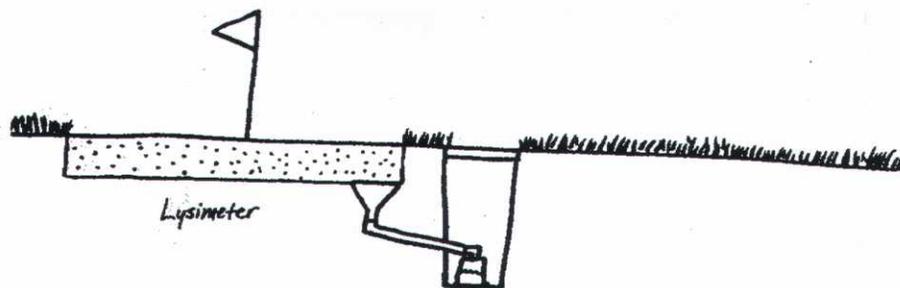
very little nitrogen is escaping into the lysimeters. That part of this fertility plan is working very well for him.

As a result of this new information, Michael and Craig have a new goal of trying to harness the naturally occurring high phosphorus levels to grow grass.

Why is the story of The Preserve important to golf course superintendents? It shows that there is more to the phosphorus issue than just not applying fertilizer. Organic matter and a soil's ability to give up nutrients need to be looked at before coming to any kind of conclusion that affects meeting the requirements of the new law or your ability to make judgments for your course. Also, better analysis of data showed that The Preserve was the not the "bad guy" with a poorly



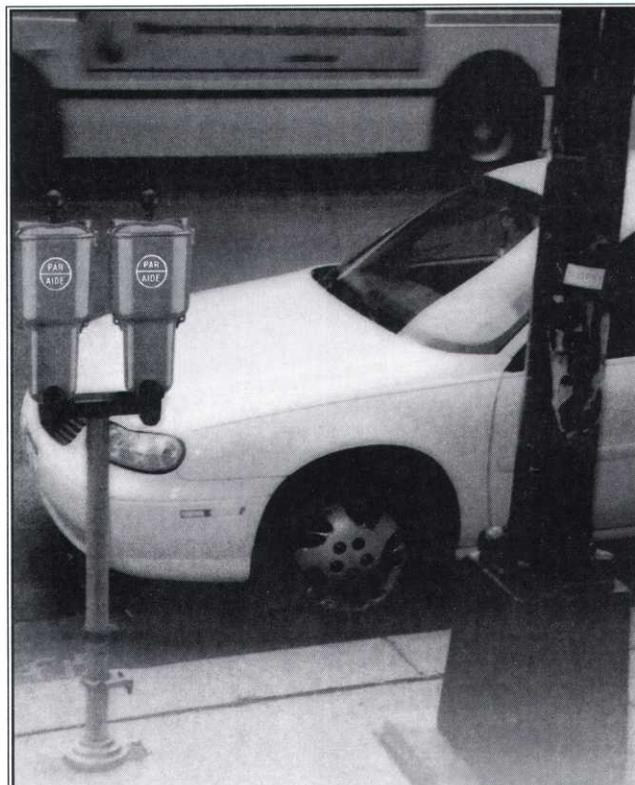
Superintendent Mike Bohmenstingl with consultant Craig Paskvan.



thought out fertilizer policy, but was in fact a good steward of the soil.

As a result of the environmental concerns at The Preserve, three additional golf courses constructed in Crow Wing County since 1996 have been subjected to similar constraints and testing protocols. Data collected at these sites and properly broken down help the superintendents better manage their fertility programs, thereby minimizing any adverse effects on the environment. Concerned residents are being shown that golf courses can indeed be operated in harmony with the natural settings they are built in.

The complete scientific data and analysis, including all graphs and tables of the testing done at The Preserve Golf Club, are available at www.paskvanconsulting.com.

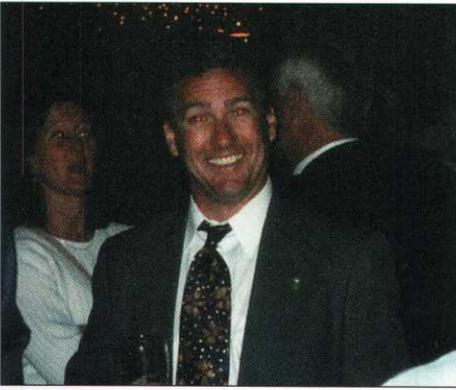


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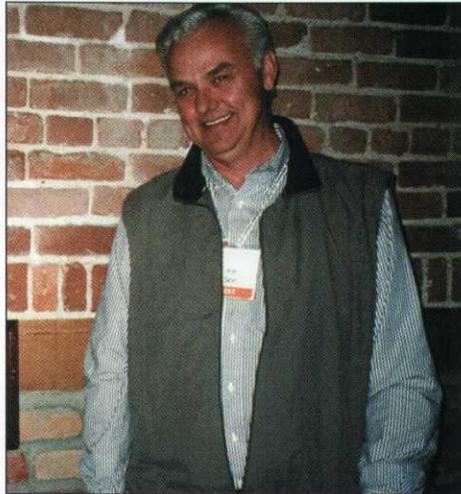
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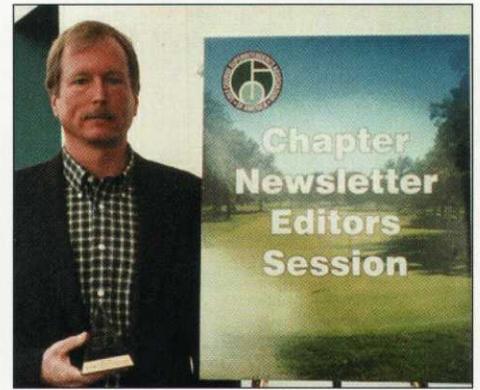
Windsong Farm Superintendent Scottie Hines enjoying the hospitality night at Rock Bottom Brewery in San Diego.



Longtime MGCSA member Mike Olson.

Smiling it up at the gala are Jeff Churchill and Renee Eckholm.

Fox Hollow Superintendent Charles Kormmann calls in for a weather update.



Jack MacKenzie, CGCS, editor of Hole Notes, displays a GCSAA trophy for "Most Improved" chapter newsletter.



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University of Minnesota Turf Talk

Informative Discussions from the Archives at www.turf.umn.edu

I was curious as to how many of you are spiking your greens on a regular basis? Timing, equipment, depth etc. I'm just doing some thinking about my aerification program. Oh oh, there I go thinking outside the box again! – *Jack MacKenzie, North Oaks Golf Club*

Funny, I too, have been thinking outside the box. Actually, I was having a discussion earlier this winter with my young assistant, on things I did when I first got into the business, and spiking was one of them. I am contemplating having my mechanic build a set for our Greensking. I am thinking to utilize this equipment as I do with everything in life, enjoy in moderation.

Great topic. Hope we get some feedback. Speaking of other old practices, does anyone still brush their greens? – *Kevin*

Clunis CGCS, Tanners Brook GC

We returned to spiking greens last summer. We used our Toro Sandpro with a spiker attachment. The spikes were well worn and did not penetrate as deep as we would have like so we are replacing them this winter. We spiked only three times. Once in May, July and September. With the sandpro it does take some extra time and we spike in two directions. The spiking in July was critical. We should have better results this next year with the new spikes.

How many guys still verticut? We do not have a set of verticutters but we do have groomers for our triplex reels. We adjusted the groomers according to our needs, some times double grooming the greens. First we broomed, groomed 2x, then topdressed. We did adjust our

aggressiveness depending on the weather conditions and growth of the turf. We did not broom or groom in July. We resumed this practice in late August.

The brooming before the grooming was critical to removing more leaf tissue and the second grooming actually removed more leaf tissue than the first cut.

Combining all of these practices led to what I felt was smoother more consistent greens. – *Jeff Johnson, The Minikahda Club*

We did spike last year - monthly, using the Sand Pro also. Brush occasionally, but lightly as a supplement when verticutting is too aggressive.

Last season we ended up settling into a routine of scheduling our practice of verticutting and topdressing around a needed watering of greens. Half of the prescribed

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Turf Talk—

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amount of water was applied between 4-6 am through the Site Pro scheduling and completed at least 1 hour before we got started with the verticutting on the respective greens.

We verticut in one direction, double cut to facilitate a thorough removal of debris, topdressed, and fertilized with .25lb of a balanced N:K, (NH₄)₂SO₄ granular. Using the handhelds, we then finished the needed watering cycle and effectively moved everything into the turf canopy without the need to brush.

Our topdressing amounts were relative to growth and ranged between 2 and 3 cu.ft/1000. The frequency of this procedure was usually 10-14 days. I have a question on others topdressing amounts and frequency, primarily on Penncross bent/poa greens. I am accused here of not putting down enough. Thanks, everyone. - Joe Buege, Pebble Creek Country Club

* * * *

Great posts guys. Joe, I topdress my greens almost every Sunday night through the season. Put down light using the SP1530 top dresser, the application is then watered into the canopy with the evenings irrigation cycle. We don't mow on Monday so the top dressing gets another sprinkling to knock it down further. No sand pick up on Tuesday! My mechanic's dream come true!

When I used to topdress heavily following 5/8th's core aerification, I would spike to break the matrix of sand that had developed over the aerification holes. Done soon enough after the first drag, the dry sand flows into the ground like sand in an hour glass. Drag again, and much of the top dressing has infiltrated the soil. -- Jack MacKenzie, CGCS, North Oaks Golf Club

* * * *

Greens- as needed, usually monthly
Tees- about same as greens
fairways- about three times/season-
roughs-as required.

Determined by quality of cut, turf den-

sity, and weather conditions. Too hot or too cold, don't touch.

Used to spike greens monthly to aid input penetration. With hydroject, frequent topdressing, and wetting agents, use has diminished. Besides, I sold the old GM3, these units were on! -- Greg Hubbard, CGCS, Manitou Ridge Golf Club

WILEY vs. SOLID ROLLERS

I was curious to see what most of you use for rollers on your walking greens mowers. We are currently using Wiley rollers on our toro 1000's and with the new expansions that we are building on our greens I am wondering if we would be better off changing to solid rollers to reduce the wear and tear on the clean-up passes? What are the pros and cons of these different types of rollers? -- Jeff Johnson, The Minikahda Club

* * * *

Jeff, I triplex my greens, but plan to start a clean-up walker program next year

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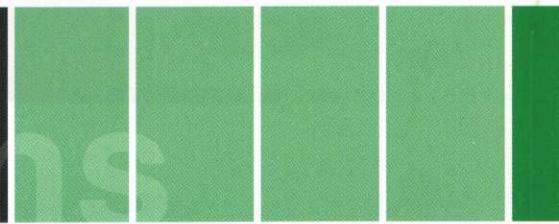
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INSIGHT

One Superintendent's Perspective

(Editor's Note: The following interview of Justin Gufstafson, superintendent at Ely Golf Club, was conducted by Jack MacKenzie, CGCS. This is the second in a series of State Superintendent interviews.)

Built in 1989, Ely Golf Club is a Par 36, 3,268 yd. layout cut through the Superior National Forest. The course features tall White Pine, ledge rock, water and plenty of wildlife. It is a very fun and challenging golf course.

Ely is located in the Arrowhead of northeastern Minnesota.

Justin has been in the golf course industry for 10 years. He graduated from Anoka-Hennepin Technical College's Golf Course and Grounds Management program in 1998. Justin moved into the Superintendent's position at Ely G.C. at the age of 21.

Why and/or how did you enter the turf management industry? I grew up next to the 9th tee at Swan Lake C.C. I spent a lot of time out there hawking balls and playing golf. My cousin, Jay Gustafson, was the superintendent at the time and he knew how hard I worked. He hired me for his crew that summer and my mind was made up by that fall what I was going to do.

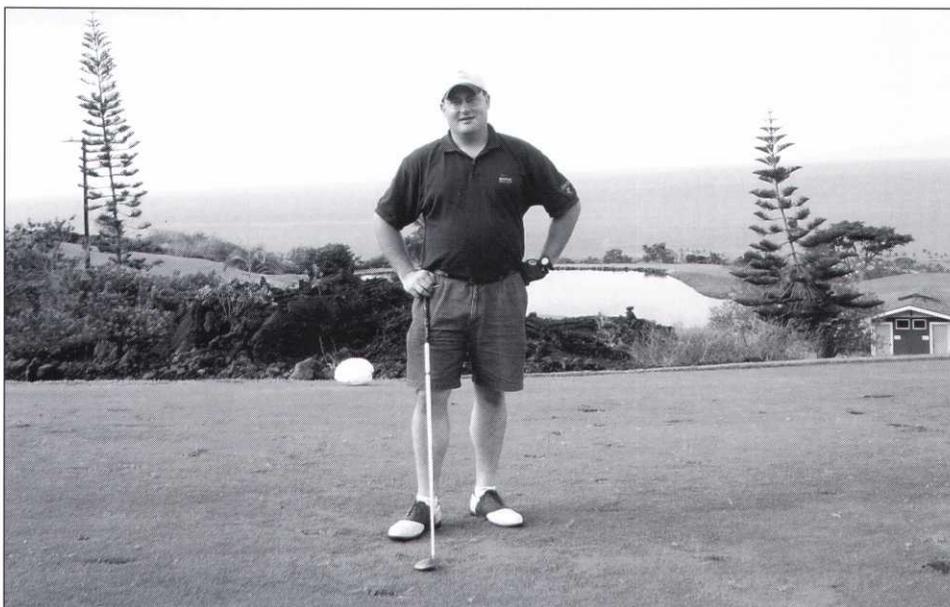
Who was your professional mentor and why? My cousin Jay. He knew I was excited about the trade and passed his knowledge and expertise on to me. I guess it didn't hurt that we were blood relatives, but he trusted me to carry out any task that needed to be done. If some grass got toasted, he was never too mad and always let it become a lesson.

What has been the highest point in your career? Turning a very forgettable 9-hole golf course into a showpiece.

What has been your lowest point? The summer of 2001. Everything that could have possibly gone wrong did that year. Lightning destroyed a huge chunk of the irrigation system, 6,500 square feet of sod washed into the woods, drain tiles failed plus huge hydraulic leaks and vandalism. I felt like I was in a John Carpenter movie and couldn't wake up from a nightmare.

Are your greatest challenges political, agronomic or managerial? Explain.

Political – no doubt about it. Trying to convince a board of directors why you need to spend thousands of dollars on a mower, or why they can't take their cart



Ely Golf Club Superintendent Justin Gufstafson enjoying some golf in Hawaii.

out after 2" of rain can be impossible at times. **What is the most difficult disease to manage on your course and how do you?** Snow Mold. The biggest challenge up here is timing your chemical application. Snow can stay from the middle of October until the first of May. You need to be prepared and not miss a single second of spraying opportunity when the time comes. Also, because the winter is so long up here, you need to have the turf hardened off and culturally sound if it is going to endure temperatures of -35 below.

Is it hard to find good help in your area of the state? Yes it is hard to find good help since this is a tourist driven economy up here. Resorts and outfitters tend to recruit young people at a young age and hold on to them until they have graduated from college. Fortunately, I have had an excellent returning crew the past few years and haven't had too many problems.

Do you have a dog on your crew? No, but we used to have a pet chipmunk who loved to eat Skittles.

Where will our industry be in ten years? I believe it will progress forward, there is no choice. Look at how far we have come in the last 10 years! I believe technology and innovation will push turf management further than we think is possible. My best guess is that it will come in

the form of better turf cultivars, disease control, growth regulation and equipment.

Where would you like to be in ten years? I'm not letting this question sound like a broken record at a job interview! Instead, I will say that I am happy where I am at for the time being. Everybody including myself has dreams of being the best at the best course. We are going to undergo some big renovations over the next 5 years and that will keep me focused and challenged. I love my job and the people I work for really appreciate what I do every day. That is what is important

What is your perspective of our state association and what would you change? I think our state association is great.

Many of you who are reading this are my close friends. I believe the networking that goes on throughout our association is second to none. We must also not lose sight of who we are and what we really do. Take your job seriously, but yourself not at all.

Name your foursome, who would you play with and why. Clint Eastwood, Alice Cooper, and my father-in-law Pat Miller. I am out to have laughs, good conversation, and a few beers when I golf. I cannot take the game seriously when I play; however, I do enjoy taking my father-in-law to the cleaners.

Turf Talk-

(Continued from Page 15)

My units will be set at .135 or so (a bit above my triple reels) and have solid rollers. Although my clean-up doesn't have the pronounced wheel marks often seen on triplex greens, I am concerned with the limited health of these areas. Also, I use Primo and will continue to mow the clean up on an every third day regime. -Jack MacKenzie, CGCS, North Oaks Golf Club

Jeff, If the area starts to show stress, solid is the way to go. Because we mow the clean-up pass every third day it has not been needed. -Jim Nicol, CGCS, Hazeltine National Golf Club

Jim, we also rotate the days we do the clean-up passes but now with the greens becoming more "squared" the mowers will put more stress on the turf in these areas. I will be watching closely for stressed turf and, if need

be, I might have to switch to a solid roller. Will the solid roller allow us to get as close of a cut as the Wiley at .125"? I ask this because I thought the reason for using the Wiley rollers was for the ability to get a better cut at a lower height. What are some of the down falls of the solid rollers? Debris collecting on the roller would be one of my concerns, what else can you veterans tell me? -Jeff Johnson, The Minikahda Club.

On two of my greens I walk mow 6x/wk (skip Monday) with solid rollers. Turf stays as good as I can (shade, air movement, etc). By bench setting (.140) at the same height it actually cuts higher thus better for the turf. We also use Primo @.08 bi-weekly and mow clean-up lap every other day. -Kevin Clunis, CGCS, Tanners Brook Golf Course.

(Editor's Note: You can access Turf Talk at www.turf.umn.edu Your input is wanted and needed. This is a great vehicle to learn what your peers are thinking and doing around the state.)

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