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THE WORST-CASE SCENARIO

ARE YOU PREPARED?

GCI's Bruce Williams outlines crisis scenarios that'll test the mettle of the steeliest superintendent.


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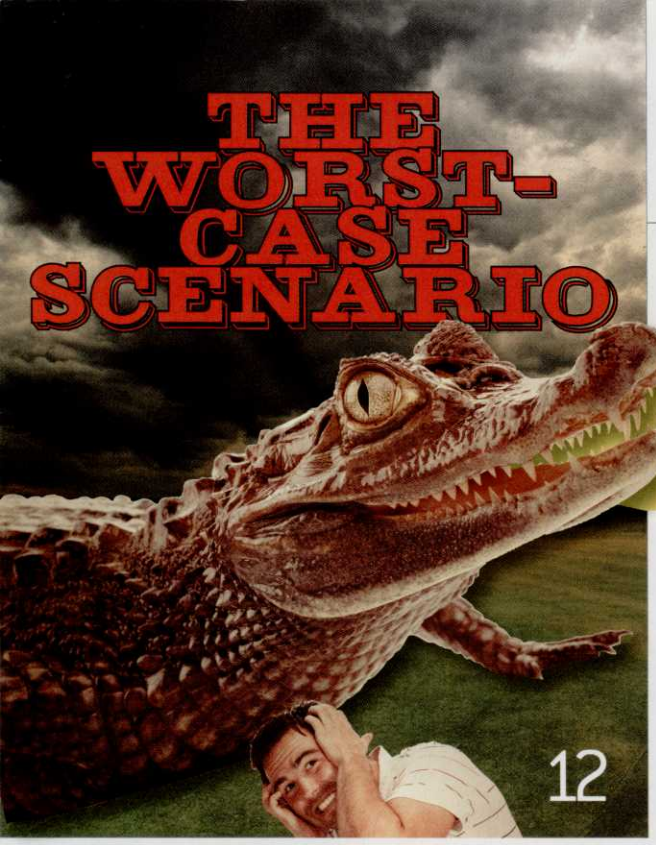

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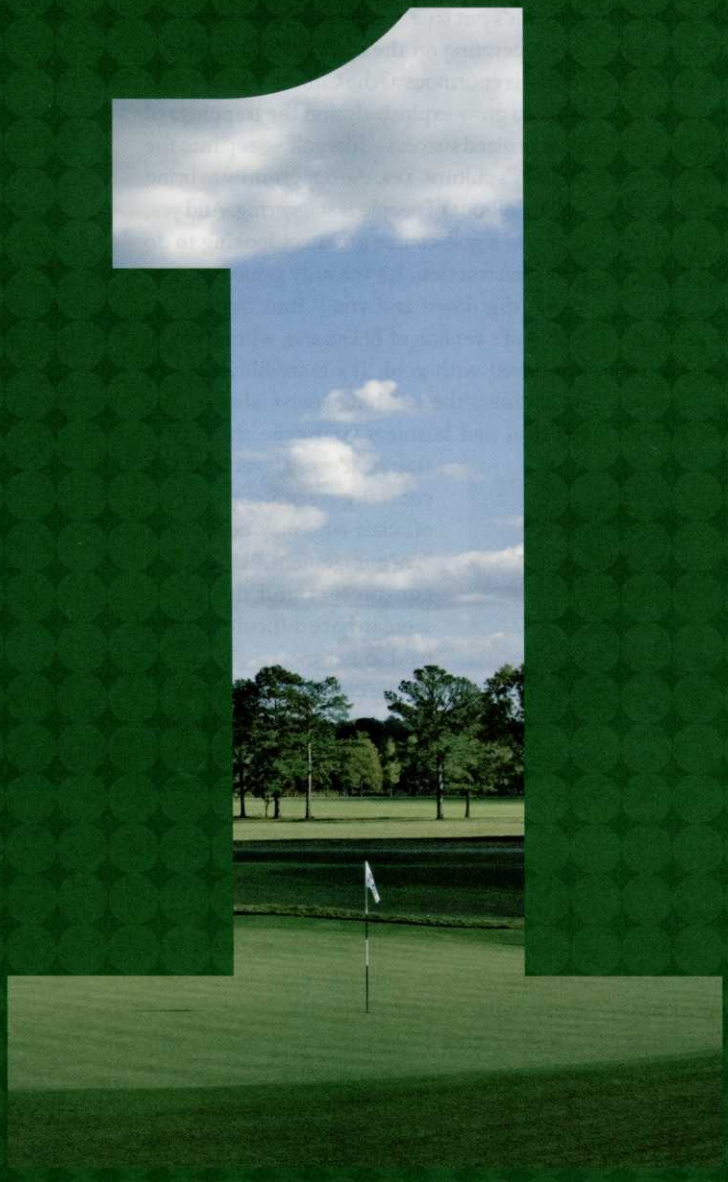

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GCI GOES GLOBAL

Over the past decade, there has been a steady migration that's a little like the pioneers who crossed North America 200 years ago to stake a claim on new ground and build a new life. But this time, the movement has been West to East and – instead of settling new lands – these pilgrims are bringing golf to millions of new potential players.

With the U.S. golf market dogpaddling to stay above water, designers, builders, suppliers and even superintendents have packed up and headed to the new promised land…Asia.

And now, GCI is heading Eastward, too.

I'm pleased to announce that we are partnering with the Singapore-based Asia Pacific Golf Group to publish GCI International, a digital magazine that will bring relevant and much-needed turf and course management content to the region. The first issue will be published next month and distributed electronically to 30,000+ folks at more than 4,300 courses in eight countries. APGG has vast Asian experience, connections and circulation reach. We bring content, industry knowledge, U.S. relationships and (ahem) a little attitude to the party.

Pat Jones
Editorial director and publisher

GCI International will combine original stories, technical features, product guides and more from U.S.-based experts with localized content created by our APGG partners. The core magazine will be in English, but technical and how-to pieces will be translated into Mandarin, Korean and Bahasa Indonesia so a superintendent in Seoul or a course manager in Beijing can get the core information they need to better manage their turf and operations.

By the way, if you work regularly in Asia as an agronomist, researcher, consultant, designer/builder or supplier, we want to hear from you NOW! We want you to share your expertise, ideas and experiences with our new readers there. Email me please.

We've been considering going international for a long time, in big part because everyone keeps yapping about how "China is booming." We've published stories and talked at length about how the People's Republic is the only place on the planet new courses are being built and how, despite a government moratorium on new construction, facilities were still springing up like lotus blossoms across the vast nation.

The only problem with "China is booming" is that it's not true. Yes, about 500 courses are now operating on the mainland. Yes, the potential is enormous as the Chinese middle class is set to grow explosively and the trappings of Westernized success – like golf – seep into the country's culture. Yes, the opportunity to bring golf to billions of people is staggering. And yes, if you're a golf course architect looking to do new construction, it's the only game in town.

But dig down and you'll find that China isn't golf's version of El Dorado, where streets are paved with gold. It's incredibly hard to do business there. Things move slowly. The political and business landscape shifts constantly at every level from the central government to local officials who may need some "encouragement." U.S.-based contractors and designers seem to have difficulty getting paid sometimes.

The courses that have been built struggle with achieving quality conditions because maintenance staffs simply are inexperienced, can't get the products they need and are sometimes using the wrong products because of kickback-driven deals done by higher-ups. As a result, despite incredible demand and amazing designs, the golf experience isn't always what it should be.

And another thing about the China boom myth – as my new friend Mike Sebastian of APGG has tried to show me – is it obscures the fact that the wider Asian market is perhaps even more interesting and more promising in the long run. Business practices are more predictable, golf is growing nicely and maintenance is appreciated by players and operators.

So, let's replace "China is booming" with "Asia is growing and learning" and start with the simple goal of giving our brethren there solid information about turfgrasss management.

So, we're off like Marco Polo on a bold, adventurous voyage into the unknown – well, admittedly more likely a United 747 to Beijing via Heathrow. Tag along – figuratively, of course – and together we'll figure out what golf and turf maintenance looks like in a global era. **GCI**

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Serving the Business of Golf Course Management

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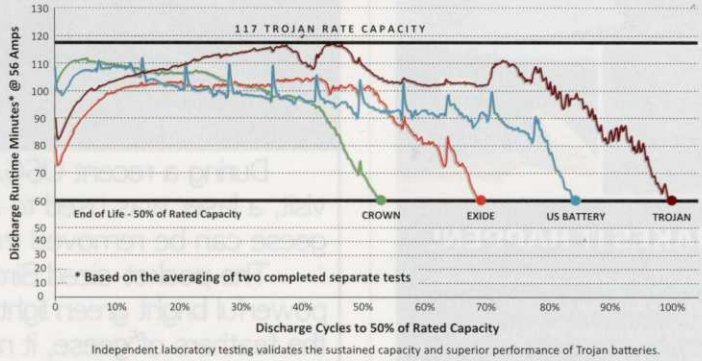

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We'd like to hear from you.

E-mail us at gci@gie.net with your thoughts and opinions.

Reading glasses required

Nice job on the January GCI. Great writing, nice mix of editorial topics. Keep it up!

Wait, I forgot you're an old fart now...

Nice job on the January GCI. Great writing... nice mix of editorial topics. Keep it up!

Brian Rund
Director, branding and marketing services
Nufarm

Senioritis

In anticipation of you becoming a "senior," welcome to my world. I used to think turning 50 would be the end of the world... but the sun comes up in the morning and sets in the evening. After 35 years as a superintendent "I" get to play in the Super Senior flight. How does that grab you? And if you look at some of the handicaps, these guys are good. A lot of single-digit handicaps. Not mine mind you, but it is better than 20.

Alan Culver, CGCS
Mahoney Golf Course
Lincoln, Neb.

P.S. You should be getting something in the mail shortly from AARP. Please join. We seniors need all the help we can get.

To read "Sandbagging Old Fart," enter http://tinyurl.com/6loyord into your Web browser.

Got something to say?
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Honest assessment

Thanks, Nate, for that honest article ("Stopped In My Tracks," January 2012) that many people would not open up about, such as Pat Jones did about drinking (Catharsis, August 2010) I hope a lot of young superintendents take note of your article and you will then have made a life difference for them. Thanks again.

Joseph Hubbard, CGCS/CEMP
Director of golf maintenance
Broken Sound Club
Boca Raton, Fla.

To read "Stopped In My Tracks," enter http://tinyurl.com/6qdl7b8 into your Web browser. To read "Catharsis," enter http://tinyurl.com/29f8obe into your Web browser.

Profane, funny and entertaining

I enjoyed reading the November Whiteboard item "Ammo Attitude/Super With Attitude." Maybe it would be of interest to know that the ground on which the Wawashkamo Golf Club (Mackinac Island, Mich.) stands was a battlefield during the War of 1812…

Your editorials, while somewhat profane, are always funny and entertaining. Keep up your good almost work.

Douglas W. Jetter
Clayton, N.C.

To read "Ammo Attitude/Super With Attitude," enter http://tinyurl.com/6scks86 into your Web browser.

Support system

Thank you for your support and coverage of the CGCSA Conference and Show. Your support helps make our C&S a success and our job a little easier. Thank you again for everything that you do for the Carolinas and especially for our industry.

John F. Davis
Director of agronomy
Secession Golf Club
Beaufort, S.C.
Past president
Carolinas Golf Course Superintendents Association

A bird's eye view

The seasons may be throwing everyone else off, but the birds know when it's time to nest. A pair of bald eagles made a home out of Bear Trace Golf Course, part of the Harrison Bay State Park in Harrison, Tenn., last year, hatching their clutch of eggs not too far off from the greens. As bald eagles typically do, they've returned to the area this year to raise some new eaglets.

And, if you're an aspiring birder, the best part is you don't even have to go all the way there to watch. Superintendent Paul Carter set up live streaming webcams high among the course's treetops to chronicle the majestic birds, which they've named Elliott and Eloise, and the stream is available online at www.harrisonbayeaglecam.org. One camera focuses on a side view of the nest, and the other – which can be streamed on mobile devices, is aimed from directly overhead.

Carter funded the project with help from the Friends of Harrison Bay State Park and the USGA Green Section, the East Tennessee and Middle Tennessee superintendent associations, Toro and Smith Turf and Irrigation and the local Volunteer Electric Cooperative, along with others. While the cameras do watch the happy couple (which are currently taking care of another clutch of two eggs), Carter is careful not to reveal the actual location on the course to protect their privacy.

If just watching the eagles isn't enough coverage for you, Carter also blogs about the family's progress at hbspeaglecam.blogspot.com and tweets updates at @HBSPeaglecam.

The Great White (green) North

Although all the golf courses in Alaska have unique weather and seasons compared to everywhere south of there, they take on the same struggle with the environment. The Anchorage Golf Course, however, now has a new distinction: It's the first course in the state to receive a certification in Environmental Planning from Audubon International.

The certification comes through the Audubon Cooperative Sanctuary Program for Golf Courses, and the plan for working with an eye to the environment comes from course assistant superintendent Jeff Buelow.

The program provides advice for courses working on projects that enhance habitat for wildlife along the course, including things like placing nesting boxes, conserving water and maintaining food and cover for wildlife.

AUDUBON INTERNATIONAL

ROLL CALL

The Georgia Golf Course Superintendent Association named Coosa Country Club golf course superintendent **Tim Cunningham** its Superintendent of the Year.

Shackamaxon Country Club, Union County, N.J., named **Richard Tacconelli** superintendent.

The Iowa Golf Course Superintendents Association named **Nick Cummins**, golf course superintendent at Westwood Golf Course in Newton.

Jay Nalls, superintendent, Norbeck Country Club, Rockville, Md., has been selected to receive the 2012 Excellence in Government Relations (EGR) Award from the Golf Course Superintendents Association of America (GCSAA).

The United States Golf Association (USGA) elected **Glen D. Nager**, of Washington, D.C., to serve a one-year term as its 62nd president.

Jim Kirchdorfer, Sr., founder and chairman of ISCO Industries, a Louisville, Ky.-based pipe supplier and custom manufacturer of high-density polyethylene (HDPE) piping products, passed away.

Wes Pitts has been appointed to golf course superintendent for Lagoon Park and Gateway golf courses, which are part of the City of Montgomery Golf Courses, Birmingham, Ala.

"Games we play for charity"

While most everyone was focused on the game of golf at GIS 2012, GCI associate editor Kyle Brown was had a different goal Thursday afternoon: The top of the Superintendent Pyramid.

Superintendents at the show had the chance to play the game, based on the TV game show "The $10,000 Pyramid," at the BASF Professional Turf & Ornamental booth throughout the week to win money for their courses. At the end of the show, industry media professionals were invited to play to raise money for charity in their own special rounds hosted by Tom Hill, communications manager for BASF.

Brown and Tunstall joined other golf media professionals in raising money for charity.

Brown and Heather Tunstall, web content manager, teamed up to play for The Movember Foundation, raising money to support research and treatment of men's cancers. Given just 30 seconds, they guessed clues based on the category "Worth your salt," including pretzels, margaritas and even sailors. Correctly naming five of the six responses in the time limit, they won $1,750 for the charity.

"I usually have pretty bad luck, so I was worried we wouldn't be able to win anything for the Movember Foundation even in Las Vegas," says Brown. "I'm glad we were able to raise money for them and have fun with BASF at the same time."

"Getting off the show floor for a bit of excitement and friendly competition among fellow industry media professionals was a nice complement to a great GIS, and I very much enjoyed the experience," says Tunstall.

This year, the combined total of winnings going to charity for media pros is $7,550.

STOP, TURF!

We know times are tough for courses everywhere, and theft of course equipment is more and more common.

Theft of the course's *turf*, however, is pretty unique.

Someone broke onto the Waiehu Municipal Golf Course in Wailuku, Hawaii, through the beach access and peeled up an 8x8 piece of a common Bermudagrass from the sixth tee, according to county spokesperson Rod Antone.

"It was the weirdest thing," says Doug Myers, superintendent. "There were other areas just nearby that were more valuable grass, but they took that."

The purloined turf, valued around $150, is long gone, but the course crew has a positive outlook on the theft.

"We've been having a rough time and the course has been kind of going downhill a little and we've been really fighting to bring it back," says Myers. "When this happened, someone taking our turf, we actually took it as a compliment that we've improved."

THE WORST-CASE SCENARIO

ARE YOU PREPARED?

GCI's Bruce Williams outlines crisis scenarios that'll test the mettle of the steeliest superintendent.

Strange and unexpected things happen on golf courses. Some are weather related while others are incidents that test the tenacity of the golf course superintendent and call for quick thinking. Generally speaking, the best way to deal with crisis management is to think ahead and consider what the worst case scenarios are for your golf course.

TOAST

Imagine going home for the day and driving away from the golf course as the sun sets. The irrigation program is set to start at 9 p.m., giving you plenty of time to run your full cycles before dawn. The next morning you pull into the golf course drive just before sunrise to see a large plume of smoke coming from what was formerly your Turf Care Center. All that is left is a flickering flame and some burning embers. All is lost — equipment, supplies, office records, fertilizers, pesticides… The irrigation central control system is melted. Oh, and it's the middle of the summer and your region is experiencing drought conditions.

The first thing to do is collect your thoughts after a few tears and then take a few deep breaths. This is the time when a good leader needs to concentrate on the task at hand and have logic override emotion. Quick decisions need to be made to get things back on track as best you can.

Two major factors come to mind: prioritize and delegate. Make an overall list of things that need to be done and then prioritize those tasks. No superintendent can do all the work themselves so it will be necessary to delegate that work to people on your staff, within the club staff and also to outside agencies.

At the top of the list are items that protect your greatest asset: the golf course. After safety checks are done to ensure utility shutoffs then it is time to take care of top priorities. What will it take to allow your golf course to survive and stay open for business while alternative equipment, supplies, etc. can be dealt with? My list would include irrigation and mowing as top items. If you are lucky, then the irrigation system can be operated from the satellites. If not, then outside agencies will need to know there is a "rush order" to replace the central control and any cables or wiring leading to the field or the pump station. A smart superintendent thinks this scenario through ahead of such a crisis and is confident the local distributor has the capability to get them up and running within 24 to 48 hours.

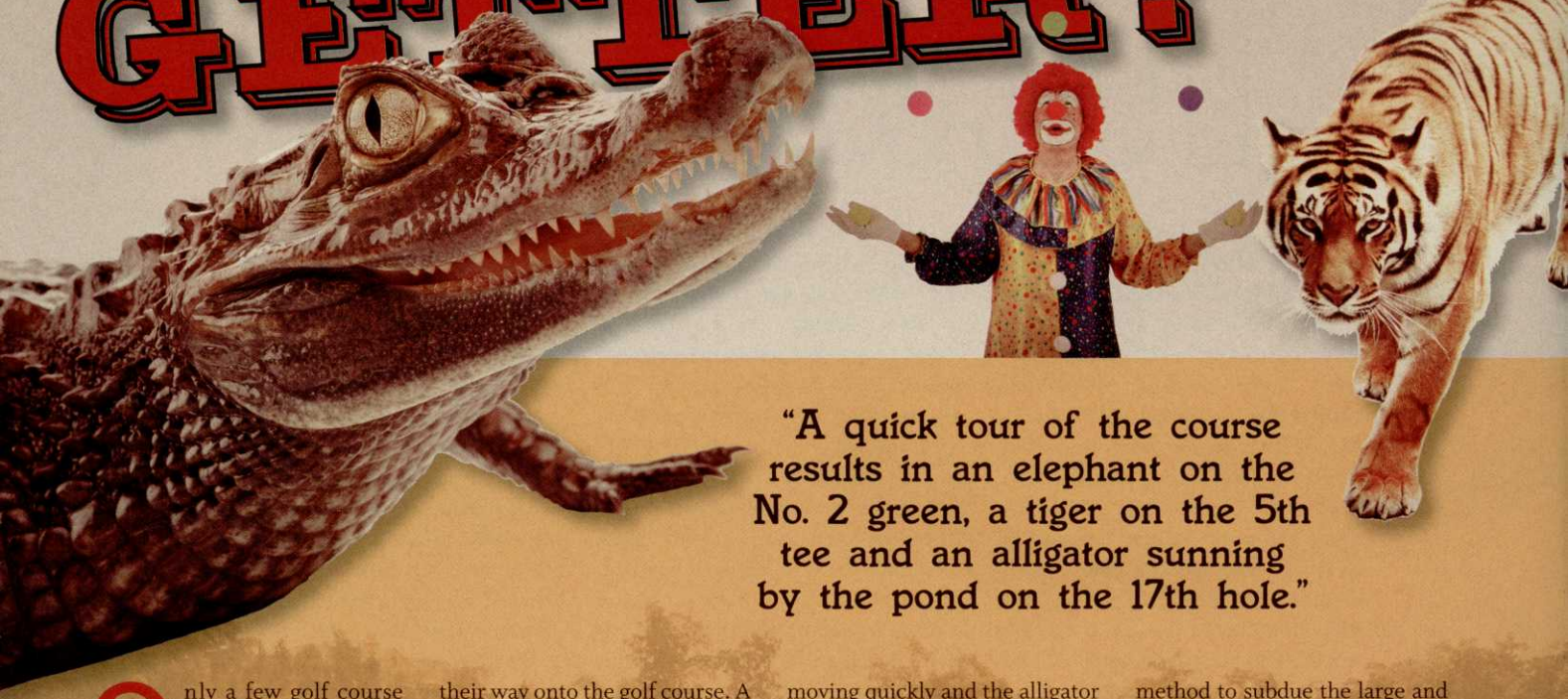
In the event of an emergency, the ability to obtain loaner equipment is paramount. A network of equipment dealers, leasing companies and peers is a good start. Bare essentials to keep the course mowed should be available in fewer than 24 hours. Hopefully, pictures are taken of the fire scene and a secondary set of records is available for inventory purposes which can be shared with your insurance company. Within a week you should be able to get permission to make purchases or leasing arrangements that will get you up and running with a long-range plan for recovery.

Temporary storage is possible with sea or cargo containers and even temporary rental buildings, if necessary. Be sure equipment that is loaned, rented, leased or purchased is kept secure while you transition to a new building. It is a great idea to keep a list of newly constructed turf care centers in your area and who the architects and builders were. This saves quite a few steps in the first few days. Of course, if you keep that information only on your office computer and without a backup system or cloud, then it will be much more difficult for you to get the ball rolling on a new facility.

I have read many stories about superintendents that have been through the loss of maintenance buildings through fire, hurricane or tornado. Through GCSAA forums and other communication tools like Facebook it is likely that there is no need to reinvent the wheel and many will reach out to help you that have been through this type of crisis before.

"This is the time when a good leader needs to concentrate on the task at hand and have logic override emotion."

CRITTER GETTER?



"A quick tour of the course results in an elephant on the No. 2 green, a tiger on the 5th tee and an alligator sunning by the pond on the 17th hole."

Only a few golf course superintendents have the skill set of Crocodile Dundee. Most are not skilled in crisis management when it comes to taking care of critters and the danger they create or the mess they make.

Imagine coming to work to prepare the course for an 8 a.m. shotgun start. There has been a truck accident on a nearby highway. Seems that circus animals were in transport to a local carnival and when the accident occurred a few escaped and found their way onto the golf course. A quick tour of the course results in an elephant on the 2nd green, a tiger on the 5th tee and an alligator sunning by the pond on the 17th hole. Coincidentally, the local animal officer is on vacation and you have to deal with it.

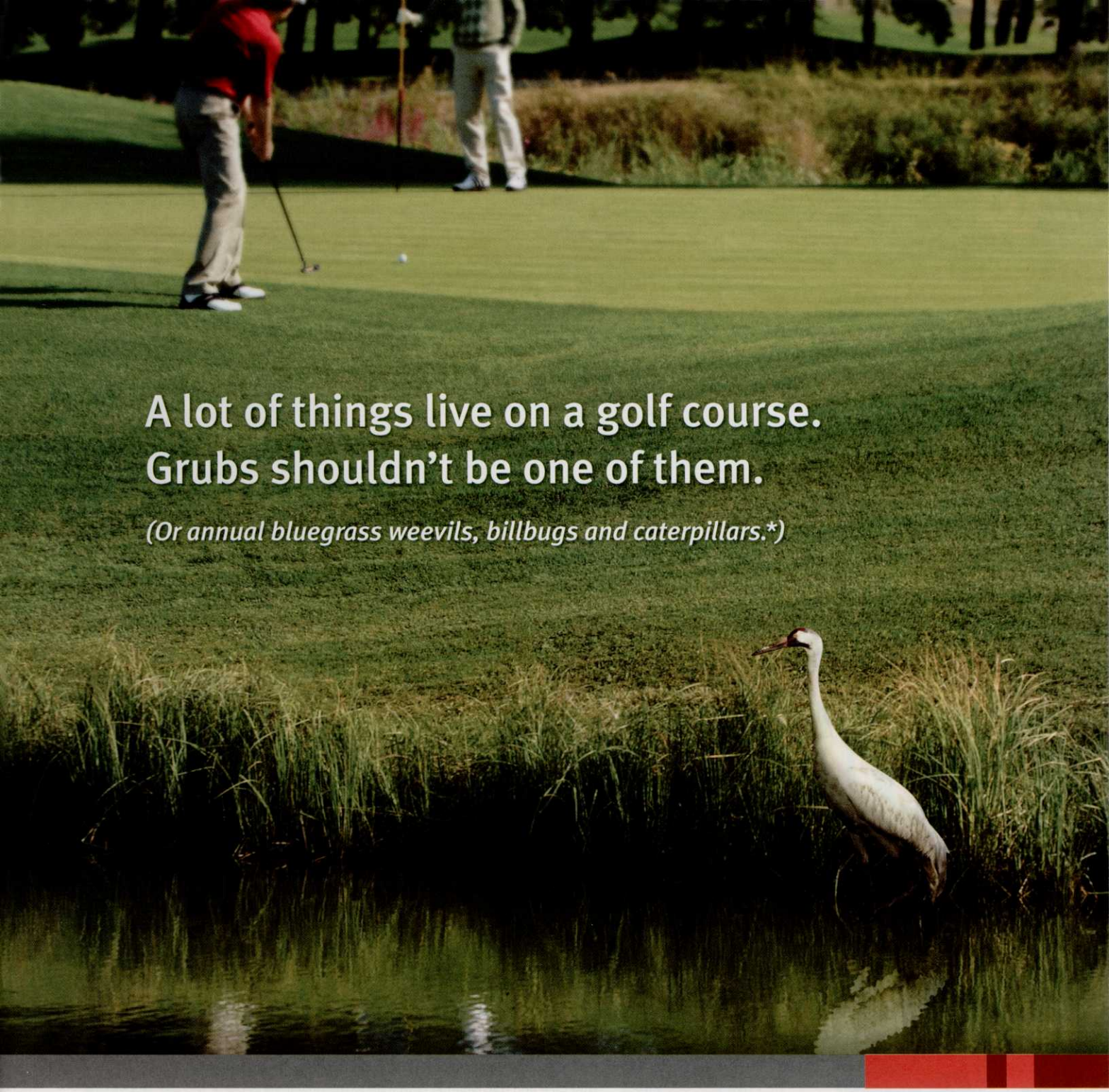
No book or written plan is available to refer to as nobody could foresee this potential crisis. You call your green chairman and he is supportive and tells you that the elephant can be used to firm up the greens before the event, the tiger should keep the crew moving quickly and the alligator will keep the crew from hawking balls in the ponds.

God loves a green chairman that is an optimist!

While this is a bizarre set of circumstances to have happen at any one course at the same wild boars, horses and cattle have found their way onto a few golf courses over the years.

Bottom line is to manage the problem at hand and that is the critters themselves. It might take a vet with a tranquilizer gun or some other more drastic method to subdue the large and dangerous pests. Hopefully there is a humane way of dealing with the dangerous situation. Know the laws in your area to handle animals that are a nuisance. Have phone numbers handy of trappers, hunters, nuisance animal control agencies and such.

Once you have the animals under control then fix the damage and get the course ready for play. A good super will have it all under control by the shotgun and the players will never know what happened.



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Why do natural disasters seem to happen so frequently?

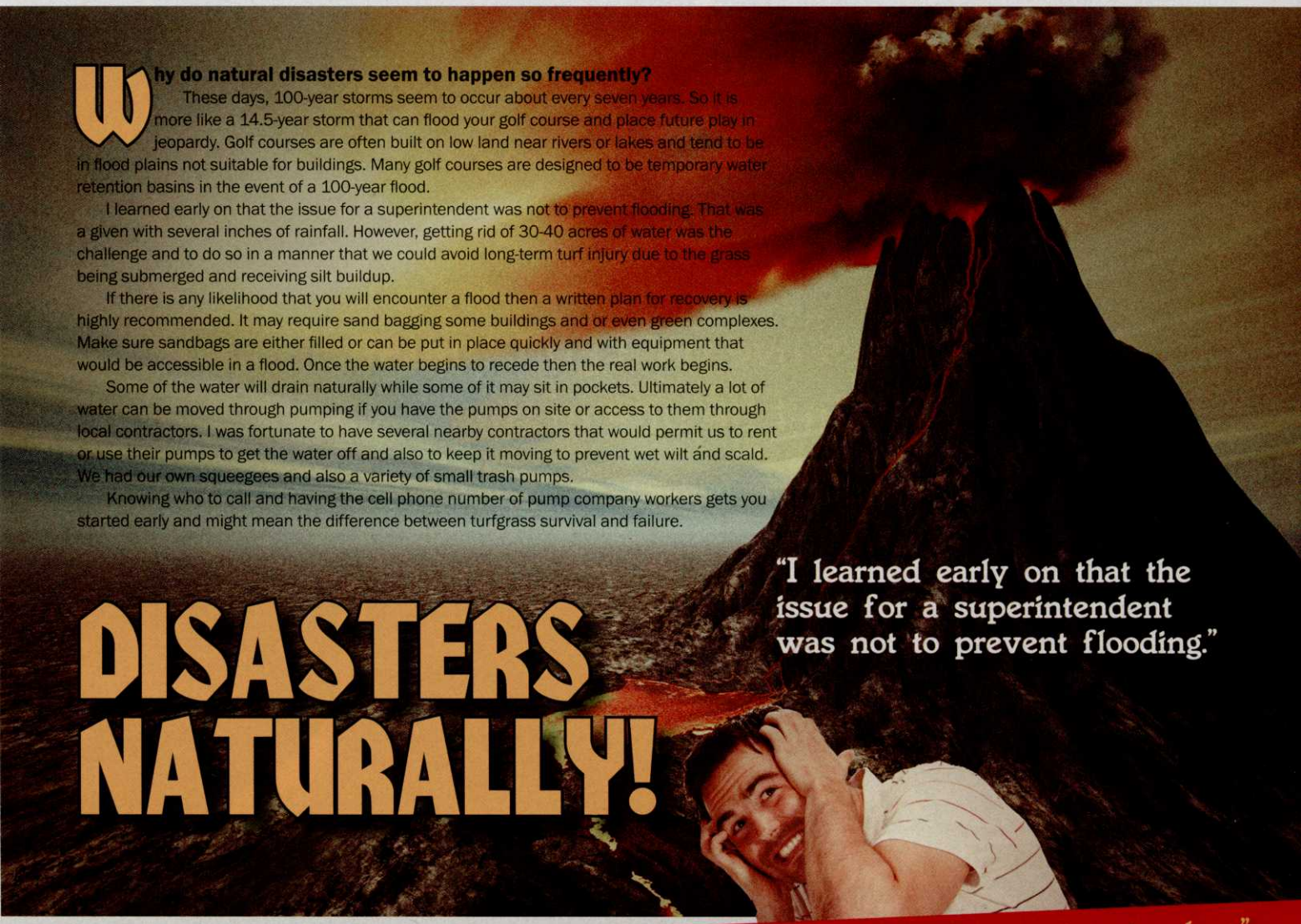
These days, 100-year storms seem to occur about every seven years. So it is more like a 14.5-year storm that can flood your golf course and place future play in jeopardy. Golf courses are often built on low land near rivers or lakes and tend to be in flood plains not suitable for buildings. Many golf courses are designed to be temporary water retention basins in the event of a 100-year flood.

I learned early on that the issue for a superintendent was not to prevent flooding. That was a given with several inches of rainfall. However, getting rid of 30-40 acres of water was the challenge and to do so in a manner that we could avoid long-term turf injury due to the grass being submerged and receiving silt buildup.

If there is any likelihood that you will encounter a flood then a written plan for recovery is highly recommended. It may require sand bagging some buildings and or even green complexes. Make sure sandbags are either filled or can be put in place quickly and with equipment that would be accessible in a flood. Once the water begins to recede then the real work begins.

Some of the water will drain naturally while some of it may sit in pockets. Ultimately a lot of water can be moved through pumping if you have the pumps on site or access to them through local contractors. I was fortunate to have several nearby contractors that would permit us to rent or use their pumps to get the water off and also to keep it moving to prevent wet wilt and scald. We had our own squeegees and also a variety of small trash pumps.

Knowing who to call and having the cell phone number of pump company workers gets you started early and might mean the difference between turfgrass survival and failure.



DISASTERS NATURALLY!

"I learned early on that the issue for a superintendent was not to prevent flooding."

"First and foremost every golf course should have written emergency plans in place."

YELLOW TAPE IS WORSE THAN RED TAPE

Imagine you arrive at the front gate of your golf course and find some yellow tape across the driveway. Your first thought may be somebody did some parking lot striping or paving that you were unaware of and it is still drying. But after closer inspection the tape has a few acronyms of a regulatory agency and obviously there is something amiss.

News crews from the local TV station arrive on scene and stick a microphone in your face and the cameras start rolling. The questions come at you fast and furious and are far beyond your scope of knowledge. What do you do?

First and foremost every golf course should have written emergency plans in place. Some of those plans should call for a defined set of steps to be taken in case of a spill, explosion or environmental mishap. A part of that plan should have details about emergency communication. It should state who speaks for the facility in the event of such a disaster. If you are not the proper spokesperson and do not have the proper training then it might be best to defer all questions to those who can speak for the facility. Do not feel obligated to speak on behalf of the golf course unless you know what to say and are authorized to do so. There is no reason the golf course superintendent cannot do this, but training is usually necessary.

At this point you don't even know what the problem is until you can gain entry to the golf course. If a spill threatens a waterway, then immediate steps should be taken to contain the spill. Most golf courses should have written emergency plans for such events and appropriate spill management kits. If that is the case, then the crisis can be resolved quickly. An ounce of prevention is worth a pound of cure and likely will avoid bringing in local hazard material teams that can be very expensive and also take a lot of time to allow you to open up your golf course.

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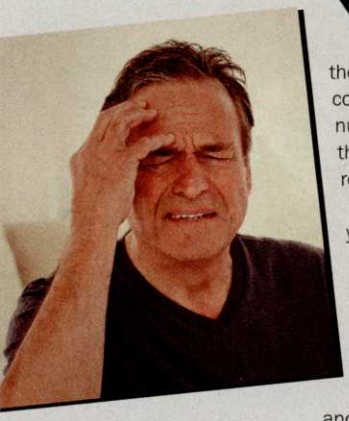

You are set to host the local qualifier for a regional golf tournament. You are the assistant superintendent and have been at the course for less than a year. Your boss is a wonderful coach and mentor but you have yet to learn all the nuances of the golf course. The boss comes down with the measles and you are now in charge with three days remaining before the tournament.

Don't panic! This is a wonderful opportunity for you to step up and make the event a huge success. My first suggestion is to not change the plans or programs now that you are in charge for a week. Instead I would suggest utilizing the WWTBD concept — What Would The Boss Do? Carry out normal programs for irrigation, spraying, mowing and bunker maintenance. Don't try to get cute and add another foot to the stimpmeter readings and dry the greens back. Above all protect the asset and make sure your boss has a living golf course to come back to.

Reach out to neighboring superintendents for advice and counsel. Ask your staff to step up and give you all they can for this event. Together you will succeed and you will be amazed at how well you operate under pressure. Delegate most of the assistant superintendent responsibilities as you will now have your hands full as the interim superintendent.

Give the credit to the superintendent and the crew for the success. Everyone will know it was you at the helm, but being humble is prerequisite for any now golf course superintendent if only for a few days.

We had a little bit of fun and also worked through some serious scenarios for crises at a golf course.

Be prepared and plan ahead for things that could happen at your facility. It is so much easier to remedy a problem with a well thought out set of solutions... before the crisis hits. **GCI**

Bruce Williams serves as principal for both Bruce Williams Golf Consulting and Executive Golf Search. He is a frequent GCI contributor.

"The boss comes down with the measles and you are now in charge with three days remaining before the tournament."

HAVE THE ANSWERS

Heaven forbid any of us face a crisis but surely we will all have problems at a bit lesser level. Be ready, be steady, and have a plan. While we did not mention much about communication while in crisis remember that you should have the answers to these 5 questions that will surely come up when problems occur.

- What happened?
- What are you going to do about it?
- When will it be right?
- When can we play?
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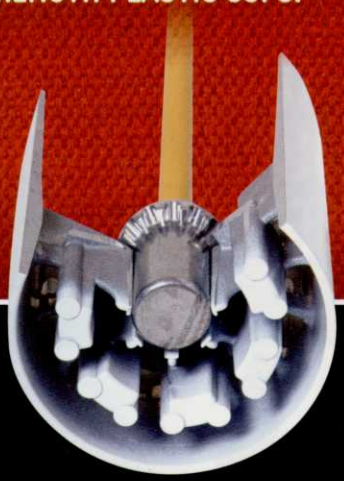

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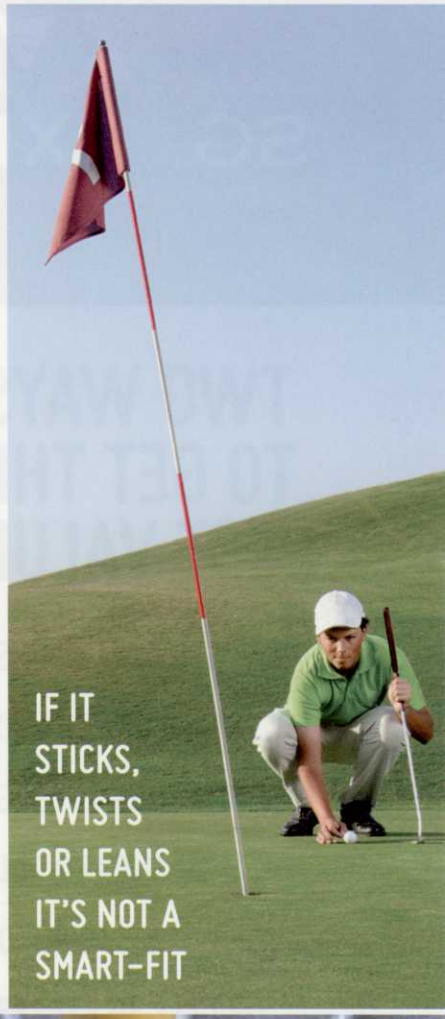

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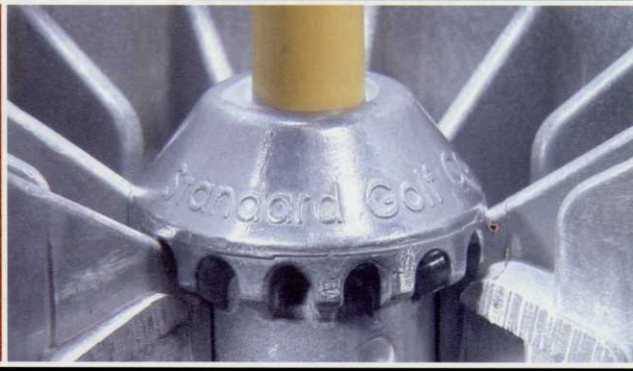

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WHAT WOMEN WANT (GOLF DIVISION)

The golf industry has recently focused – again – on women. Perhaps with play down, we are desperately seeking women more than in past efforts, I don't know. Golf seems an inherently attractive sport for women, and it shouldn't be that hard a sell, should it? Nevertheless, translating great ideas from numerous industry golf conferences to real results hasn't happened, and I wonder if it ever will.

At the PGA Show, the National Women's Golf Alliance (NGWA) announced it will establish base standards and best practices that should enhance golf's overall appeal to women. Actually, much of that kind of work is already out there. If you want some advice from real experts, I suggest checking out www.golfwithwomen.com or www.nancyberkley.com.

While I will never be confused as an expert at understanding women, I do get design feedback from my forward/family tees (*They like them. They really, really like them!*). And, I have asked a lot of the questions they will be asking as part of those formal surveys! Asking women about golf is always a revelation about course and service shortcomings! The most typical answers I get when asking why women don't play more are as follows:

I don't have the time….Golf is too hard….I feel like a second class citizen on the course.

I am not sure any of us can answer the "don't have the time" complaint, for men or women, and golf could sure be easier for all of us. New generation clubs and balls help, of course. But, design plays a part, too. We need far shorter forward tees to start.

Golf still puts in only indifferent effort at designing the course and gearing the golf experience around women. This indifference manifests itself many ways. An example, I recently proposed forward tees at 4,100 yards, and the manager's response was "Isn't 5,000 yards good enough for the women?"

Well, um, "no." Merely advancing a ball on a par-5 second shot has less inherent appeal than the drive or approach shot. At 5,000 yards, most holes play like par 5's – or more – for women, making nearly half their full shots dull.

The math is simple – with 140-yard-average tee shots, and a variety of second shots averaging 2/3 of that, or about 90 yards, forward tees on a par 72 course should be about 4,140 yards to allow women a chance to reach every green with two good shots. Where I have shortened tees to this length, I find that mid-handicap females are "thrilled" to reach holes in regulation, and wonder why more courses aren't like this (and why I didn't shorten even more holes below 280 yards).

They say length alone doesn't please women. They note that many forward tees force shots into ponds, or play from behind trees, or cause blind shots up steep hills, etc. In other words, after over 100 years of "women's tees" evolution, they are still largely afterthoughts, and not designed for the way women play.

I am not sure any of us can answer the "don't have the time" complaint, for men or women, and golf could sure be easier for all of us.

Approach shots aren't "woman friendly, "either – many greens have only a narrow fairway opening to the green, and many "perfect" shots (i.e., airborne and nearly straight) end up in green side hazards. When you hit about less than ten good approach shots per round, you don't want the good ones trapped. Yet, at one club, female members who complained about a deep bunker in front of their par 3 9th hole caused most to just quit there because they couldn't either clear it or play out, they were told "the architect should have put it in front of the first green."

Beyond design, wooing women starts with changing the prevalent male attitudes…also a hard sell. As one example, a course marshal approached the female in my group to note our slow play, even though she was far from the problem.

Then, we need to start designing service around their likes. Think ultra clean restrooms, and menu items other than hamburgers and beer. Think Sak's Fifth Avenue before the first fairway. Think of this scene from "Pretty Woman":

Edward: I think we need some major sucking up.

Clerk: Very well, sir. I could see the second you walked in here; you were someone to reckon with--

Edward: Not me. Her.

Women sense that they are not welcome, which is a big buzz kill out there. The most important factor is replacing the "No Girlz Allowed" signs currently hanging at most golf courses with a true welcome sign. **GCI**

holes in ● none

Increased outings combined with reduced maintenance budgets and less staff make it difficult to maintain recommended, aggressive aeration in the spring and fall. Will courses suffer?

by Rob Thomas

The only thing constant is change. While superintendents continue aerification as a must in maintaining a healthy course, the last five years has seen quite a bit of change.

Agronomists Ty McClellan, manager of the USGA Green Section's Education Program, and Adam Moeller of the USGA's Northeast Region, have both seen growing differences on when courses are being aerated.

TIMING. McClellan has found many golf facilities aerate less frequently in the spring and fall than they have in the past. "Much of this movement to aerate less was in response to a challenging economic climate," he says.

Increasing challenges prevent supers from doing recommended, aggressive aeration.

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A soil sample reflects sand movement into the soil.

Equipment innovations

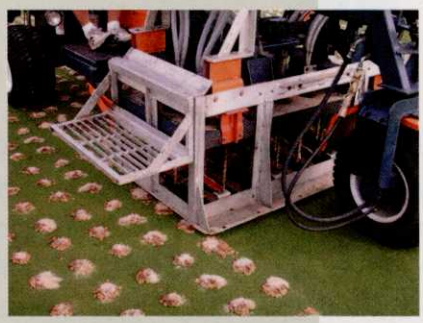
Improvements in walk-behind aeration equipment have provided numerous benefits to the golf industry, says USGA agronomist Adam Moeller. Easy tine type – hollow, solid, large, small – and spacing adjustments, allow for a good pace while creating a clean and deep aeration channel. Likewise, offset tires – so cores are not run over during the process – are some of the improvements in modern walk-behind aeration equipment.

"Better topdressing equipment has also allowed for more accurate and efficient applications of sand to back-fill the aeration channels without applying too much material, which could compromise turf health and delay the process," Moeller says.

Improved core harvesters, sweepers and counter-rotational brushes to incorporate topdressing to fill the aeration channels are other items that have improved the core aeration process.

"New ideas such as using pull-behind and/or back-pack blowers to help fill aeration channels have also become popular among superintendents, improving the core aeration process," Moeller says. "The availability of bagged sand and/or kiln-dried sand has also helped improve the success and speed of backfilling core aeration channels because the dry sand works into the aeration channels and turf canopy much easier than moist sand."

While every situation is different, the USGA's Ty McClellan says if deep soil modification is necessary — usually on soil-based greens that suffer from poor internal drainage — then the Drill-N-Fill option is very effective. This has become increasingly popular and is usually performed on a contract basis and involves a series of drill bits approximately ¾- to 1-inch in diameter on 6-inch spacings. Holes are created to an 8 to 12-inch depth and backfilled with sand.



Better equipment has improved the core aeration process.

"Never before has there been such a selection of sophisticated aerators to choose from that will likely meet the specific needs of each golf course," McClellan says. "Modern aerators are more efficient than older models and create cleaner holes which leads to less golfer disruption and faster turf recovery."

An increase in scheduled outings to make up for lost revenues, declining membership and fewer rounds played all contribute to the economic shortfall. Increased outings combined with reduced maintenance budgets and less staff make it difficult to maintain recommended, aggressive aeration in the spring and fall.

"When aeration is performed it seems the golfing calendar trumps sound agronomic principles, meaning aeration has been pushed earlier into the spring and later in the fall so as to lessen the impact on play," McClellan adds. "Unfortunately, when aeration is not performed at the ideal times of year, i.e. when the turf is most actively growing, recovery of aeration holes is slowed from as little as 7 to 10 days to a month or more."

Aerating too early in the spring or too late in the fall, while trying to maintain pure bentgrass greens, is an open invitation for *Poa annua* encroachment into slow-to-heal aeration holes because it is actively growing, while bentgrass is not.

Moeller has seen the same push of "off-season" aerifying to better accommodate golfers, but understands the dilemma.

"Core aeration when the turf is actively growing and moderate air temperatures occur – late April/early May and late August/early September in the Northeast – is optimal for fast recovery with the least amount of risks," he says. "These have been the traditional timing for the last few decades, but some are changing primarily to reduce disrupting the golf calendar. Clubs weigh the risks of core aeration in sub-optimal times with the potential benefits of non-disrupted golf in April/May and September and make their decision.

"Core aeration in a sub-optimal time is better than no core aeration at all, though," he says.

While spring and fall aeration seem to have decreased, minimally disruptive aeration performed in the summer months is on the rise. This is generally performed using small-diameter tines – also referred to as needle or pencil tines that are approximately ¼-inch in diameter – slicing tines or water injection, Moeller says.

"Using these options there is very little, if any, impact on playability of putting surfaces," he says. "The purpose is to safeguard turf health against summer heat stress by increasing oxygen levels in the rootzone, promoting gas exchange and minimizing root dieback."

OBSERVATIONS. There are many theories regarding aeration strategies, McClellan says. And while some work, many do not.

The most successful aeration programs for bentgrass or *Poa annua* greens generally involve a combination of core aeration and deep, solid-tine aeration each spring and fall using tines ½-inch in diameter or larger combined with minimally disruptive aeration techniques (i.e. summer venting) every three weeks or so throughout the growing season, he says. For Bermudagrass greens, the most aggressive aeration practices are performed in the summer during active growth.

"Any aeration program that deviates too much from these standard aeration schedules probably isn't all that successful long-term," McClellan says.

Because solid-tine aeration is a very clean process that does not bring soil to the surface, many facilities have gotten away from using hollow tines, or core aeration, he says.

"In very few instances can a golf facility get away from core aeration for more than a few years, but the need to use hollow

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"Unfortunately, when aeration is not performed at the ideal times of year, i.e. when the turf is most actively growing, recovery of aeration holes is slowed from as little as 7 to 10 days to a month or more."

— Ty McClellan, USGA Green Section's Education Program

tines can be reduced if an excellent sand topdressing program is in place," says McClellan. "With more sand applied more often there is better thatch dilution, less layering in the rootzone and a playing surface that is more traffic-tolerant because sand resists compaction. This means there is less dependency on core aeration, but it does not mean it can be eliminated, just possibly reduced and substituted instead with solid tine aeration more often."

Moeller, too, has seen increased interest with superintendents following a non-disturbance or zero-disturbance philosophy and thatch control only through dilution with regular topdressing. "This theory supports the idea of thatch dilution and solid tine aeration only; never pulling a core through tradition core aeration," he says. "While this may work on a limited basis, the concept is largely unsuccessful in the field and increases the chances of thatch buildup."

In most instances, superintendents adopting the non-disturbance theory benefit from happy golfers when other courses are dealing with core aeration disruption, but at some point they realize thatch is building despite topdressing routinely.

The absence of core aeration concerns Moeller because thatch removal is one of many benefits from core aeration: compaction relief, soil modification, alleviating layering issues and improved rooting are lost or greatly reduced if this process is abandoned.

"Solid-tine aeration in place of core aeration can aid in compaction relief and rooting, but soil modification and addressing any layering issues is very limited unless core aeration is used," he says. "If people are going to follow the non-disturbance theory, it is essential to frequently test the soil's physical properties in the upper profile to ensure thatch, porosity and infiltration are not moving in the wrong direction."

RESULTS. There are few shortcuts when it comes to aeration that won't ultimately result in deteriorating course conditions down the line, McClellan says. "Whereas a number of golf facilities have remained committed to sound agronomic principles throughout difficult economic times, during my travels and onsite visits to golf courses in recent years, it is obvious that turf problems resulting from soil-related problems are on the


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rise at a majority of courses visited," he says.

Less aeration and less sand topdressing leads to higher organic matter accumulation in the root zones and increased soil layering problems. In fairways and approaches, soil compaction problems are becoming increasingly apparent if aeration programs are scaled back or eliminated. Increased organic matter levels and more soil compaction leads to increased soil moisture, reduced soil oxygen and stunted root systems.

"Combine this with record-breaking heat each of the last two summers for much of the United States and it is no surprise that golf facilities experiencing devastating turf loss generally were those that were not on excellent aeration and topdressing programs," McClellan says. **GCI**

Rob Thomas is a Cleveland-based freelance writer and frequent GCI contributor.

SUMMER DUSTINGS

There is a discrepancy in topdressing programs between golf facilities with varying budgets. "Courses with large staffs and modern topdressing equipment can easily administer sufficient quantities of sand each spring and fall in combination with aeration," says Ty McClellan, manager of the USGA Green Section's Education Program. "On the rise at higher-budget golf facilities is the application of light quantities of sand every 7 to 14 days throughout the growing season."

Often referred to as "summer dustings," these small applications are an excellent way to keep pace with ongoing organic matter production, which is needed for new bentgrass and Bermudagrass cultivars that are extremely dense and prolific thatch producers.

"Additionally, these frequent, light topdressing applications throughout the growing season actually lead to consistently faster greenspeeds and results in smoother, truer putting surfaces since minor surface imperfections – such as those caused by ballmarks – are leveled frequently," McClellan says.

Summer dustings of sand have little impact on play and require little to no brushing or dragging to work sand into the turf canopy.

Adam Moeller, agronomist with the USGA's Northeast Region, sees a downside to dustings, which actually stems from improved equipment.

"In past decades, superintendents could not apply topdressing too lightly (because the equipment wasn't that good) where it would have little benefit," he says. "This has changed with improved topdressing equipment and kiln-dried sand. Unfortunately, this means superintendents can be topdressing every week, but if the application rate is too light, the benefits with thatch dilution and smoothness/firmness are not being realized."

These ultra-light applications may have some minor benefit in surface conditions, but if the application is so light that it is undetectable, it is too light to be really helping improve turf conditions, Moeller adds.

This means an application rate of 0.75-1 cubic feet per 1,000 square feet every 7 to 14 days. Those topdressing at <0.5 cubic feet per 1,000 square feet fall in the ultra-light category where the benefits are not likely to be very noticeable.

Similar to aeration, topdressing requires resources and time and it, too, has been scaled back in many instances as golf facilities try to navigate through a difficult economic climate, McClellan says.

"Sand topdressing is preventative against excessive organic matter accumulation because it dilutes it each time sand is applied," he says. "When topdressing programs do not keep pace with turfgrass growth, organic matter content increases in the rootzone and more aeration and topdressing will then be required in the future to correct the problem. This is the position in which many golf facilities now find themselves."

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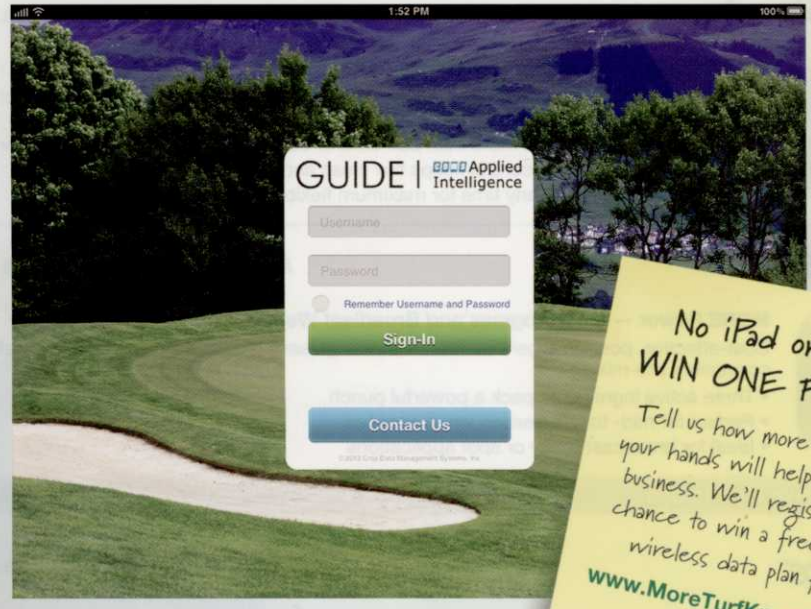

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Monroe Miller is a retired golf course superintendent. He spent 36 years as superintendent at Blackhawk Country Club in Madison, Wis. Miller can be reached at groots@charter.net.

PRESIDENTS I HAVE KNOWN

One of the hallmarks of my 40-year membership in the GCSAA has been the acquaintance of most of the GCSAA presidents during the period 1973 – present. The presidents are a group that mostly reflects our members – different in many ways but bound together by a love of golf and golf courses. And clearly each was a leader in his own right – you'd have to be to endure the effort required to reach the presidency and then execute the duties of the office.

Over the years I also had an occasional chance to meet a past president from a year well before my career started. Some GCSAA members will remember the annual banquet and show. Seating tickets were required, and I would usually be first or second in line, early in the morning, to get a good ticket. Since past presidents were automatically seated near the front stage, I frequently filled out one of those tables. What a deal – seated among the men who helped write GCSAA's history. I met Chet Mendelhall, Bob Williams, Sherwood Moore, and John Spodnik that way. And I came to know Cliff Wagoner and Bob Michell even better at those banquet dinners. As I think about it, GCSAA should honor Cliff Wagoner and his wife for their sterling GIS attendance record, which extended well beyond his retirement.

The only president from the 1970s I haven't met is George Cleaver, but almost as an offset was a very warm relationship with Ted Woehrle. One of the earliest GCSAA seminars in the mid-70s was in Champaign, Ill., and Ted was the GCSAA officer hosting it. From that time on, through our mutual interest in chapter publications, Big 10 sports and golf, we remained good friends. I still miss seeing him. I think that Palmer Maples made very significant contributions during his time at headquarters, including serving as the GCSAA exec during a transition period. He was a good guy and always had a smile and kind word.

The presidents of the 1980s were a superb group; Jim Wyllie is the only one I never knew. But to this day I treasure the friendship of Mel Lucas and Don Hearn. Both are great men who have contributed mightily to our profession over the years, and have continued to do so in their "retirement." Mel is a book and history guy, like me, only I am strictly am amateur when measured to the enormous knowledge he has. I visited the USGA Museum years ago, and there was an upstairs display of turf equipment from years gone by – "On loan from the collection of Melvin B. Lucas." No one will match his collections or his library (unless they buy his!) because Mel started collecting so long ago as the son of a superintendent just outside NYC.

The presidents are a group that mostly reflects our members – different in many ways but bound together by a love of golf and golf courses.

Don Hearn is a smart, sincere and friendly man who exemplifies what a GCSAA president should be, in my eye. It is always a good thing to be represented by someone with his class and personality.

Mike Bavier often interacted with Wisconsin superintendents and he's also been someone I have enjoyed knowing better than most of the past presidents. The same is true for Jim Timmerman, a person I teamed up with to solve what became a difficult problem. He was Dr. Paul Reike's first grad student at MSU and worked for a time as a Green Section agronomist. He's a good man. Riley Stottern hired my assistant at a time he wanted to work and live out west, and Gene Baston was an excellent example of southern hospitality, I learned.

John Segui was a link to the past since he was a little older when he served; I really liked John and enjoyed talking to him about the personalities of our profession from years earlier. I didn't get to know Dennis Lyon until we both were near retirement. I liked his military service and have come to enjoy his writing.

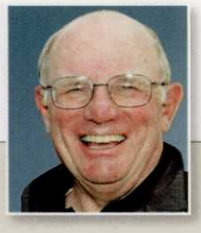
The 1990s, from my view, was a period of conflict in the GCSAA and as a chapter publication editor I had a few open spats with some of the presidents.

Jerry Faubel worked in Wisconsin for a few years, so we were proud when he was elected. That was even more true when Bill Roberts, a past president of our chapter, made it to the top of GCSAA. He has done well, is still tangentially involved in golf turf and practices law in a Chicago suburb. Steve Cadenelli was another Midwest guy that I served with on a couple of GCSAA committees and made his acquaintance that way.

Joe Baidy really grew during the time he served on the board, through to his service as president. He was an exceedingly friendly guy in my eyes, but I haven't seen him for a few years.

Gary Grigg visited Wisconsin while he was on the board, speaking at a chapter meeting in Lake Geneva one spring. His family had Wisconsin ties with the potato industry in the central sands region of our state, and we had a great talk about that. During his term

(continued on page 36)



(continued from page 35)

A term as president takes a strong sense of leadership and duty, a huge work ethic and a vision of the direction our profession should go.

and Bruce Williams' term, the controversial chapter affiliation legislation was enacted and I was openly strongly against it. Neither man was happy about that, and I never really recaptured a relationship with Gary.

Bruce was different, however. We battled during that time and from some subsequent time, but got back to normal somehow. Bruce has a great sense of humor can take a shot and give one right back. He has definite skills as a storyteller and skilled writer. My wife and I visited with him for a couple of hours at the GCI booth last year. He's easy to be around and I enjoy seeing him these days.

The opportunity to meet George Renault never happened for me, but I was around Paul McGinnis enough to know he was a really super person who represented the association well in his time.

Dave Fearis and I shared some common threads in our lives that made friendship with him natural. We were both members of Alpha Gamma Rho fraternity – when he was at Purdue and I was at Wisconsin – and we won a GCSAA scholarship the same year – 1967. We had mutual friends in a golf course construction company that did work for him often in the fall of the year. The company was based in my town. Dave had a tough job when he was involved on the board and as president – selling PDI. I know he was frustrated when he asked me to support it and I told him I didn't even know what it was! I guess I was an uninformed member that year.

The new century started with Scott Woodhead, a friend through the chapter publication fraternity that so many past presidents belonged to at one time or another. Mike Wallace and I were on a committee together, as was Sean Hoolehan. I never knew Mike well; Sean appealed to my sense of values of what a president should be. He spoke with confidence, had wide experience as a superintendent and a wonderful personality. Tommy Witt, on the other hand, booted me off the 75th anniversary committee when he was president, claiming I "wasn't doing enough." I was incensed, not just because it wasn't true but because I suspected some politics at work. When I documented my contributions to both the 75th anniversary committee and also our local chapter 75th anniversary celebration, he reinstated me. We have had a cordial relationship since then.

I never met Ricky Heine or Tim O'Neill but went through a GCSAA mission/goals exercise with Dave Downing. He was sharp; he also was the one who called me about the Morley award – I'll always remember that call. Mark Woodard and Jon Maddern are two others whom I missed knowing.

I met both Mark Kuhns and Bob Randquist when they came to speak at our Wisconsin Golf Turf Symposium, albeit years apart. Mark spoke about his clandestine tree removal program at Oakmont – fascinating! – and Bob gave an excellent lecture on bunker work, years before bunkers garnered the attention they have of late. To me, Bob Randquist embodies the highest personal qualities one could expect in a president; he should consider a run for an office at the state or national level. Plus, the man can really sing.

I had to go out of my way to introduce myself to Jim Fitzroy in Orlando last year. Jim was walking down a hall in the convention center when I stopped him. He was very pleasant, significant because he has been our leader during an extremely difficult economy. I believe he has done well. He was another of those 1967 GCSAA scholarship winners.

Four years as an AA member has moved me away from the GCSAA somewhat, but past involvement lingers. I once had dinner with Sandy Queen at a GCSAA conference banquet – he was watching Dave Fearis' son while Dave and his wife sat at the head table. Once again, I came to know Pat Finlin during his years as editor of the Heart of America's chapter publication. Their histories tell me that they will do a good job as the GCSAA president.

Some time ago a GCSAA member went to considerable effort to detail what each GCSAA president "gets," – clothing allowance, travel, tournament attendance, etc. It was a fairly long list, but even that list times ten would not be enough to inspire a superintendent to serve as GCSAA president. A term as president takes a strong sense of leadership and duty, a huge work ethic and a vision of the direction our profession should go. It is an enormous job that demands a lot of each president, his family, his employer and his chapter. Very few among us is up to the task. Collectively, the presidents whose pictures hang on the walls of the association headquarters are quite a group.

It has been my pleasure and privilege to have known so many of them. **GCI**

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A BALANCING ACT

Chemicals or *au naturel*?

Superintendents discuss the merits of both when controlling unwanted aquatic weeds.

Ponds on golf courses represent different things to different people. For architects, it's a feature that can add to the aesthetic beauty and design of a golf hole – turning an easy par 3 into a frightening experience, or on a short par 5, forcing a player to choose the risk/reward choice of laying up short of the water hazard, or going for the green in two. For superintendents, these bodies of water, while beautiful to behold, represent just another course component they need to manage. Pond management is a low-cost item in budget dollars, but it's a line item that can't be neglected.

"You have to invest in your ponds," says Bernie Hertzman, president and owner of AMA Sales, a Toronto-based company that specializes in pond management for golf courses. "If you don't, you are just masking your problems. The more ponds you have, the more potential problems,

By David McPherson

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and the more maintenance that is required."

Superintendents should not take a short-term view to their pond issues. As Hertzman says, you need to invest in this asset for the best long-term results. Nor does he recommend assigning this job to your summer seasonal help by telling them to throw on some hip waders and skim the pond; all that will result in is algae and a host of other problems coming back.

HOW I DO IT

Controling aquatic weeds with fish

At Westhaven Golf Club, we have been using Tilapia for the past three years in any water feature that has algae or duckweed problems. I researched information first and then contacted a few local fish suppliers to take a look and place bids. The fish are the only cost involved and run about $250 per acre.

The fish suppliers deliver the fish in a truck, which we take to our lakes that are reachable, and then carry the rest in carts to the remaining water features. It takes the fish about three weeks to clean a pond completely, but you will see the amount of coverage on your lakes decrease week by week. Tilapia breed quickly and can easily double or triple the amount of fish you bought.

A word of warning: You must be careful if you have bass in your pond. The Tilapia are small and the bass will eat them. Also when the temperature drops down below 45 degrees, you will lose most of your fish and have a huge mess to clean up. To avoid this mess – and questions from members – we host a fishing tournament for our maintenance staff on a Monday when we are closed. This provides us another way to show our staff we appreciate them.

The tilapia have worked out great for us.

Josh Hastings is directory of agronomy at Westhaven Golf Club, Franklin, Tenn.

ATLANTA ATHLETIC CLUB, TOP RIGHT: AMA SALES

Algae is the top problem when it comes to ponds, since everything pours into it, from soil to fertilizers to animal waste. So, where do superintendents begin? Should you go *au naturel* or use chemicals, or use a combination of both? These are the key questions superintendents must first answer. Some superintendends get away without having to worry about pond issues, since there aren't any on their courses. But ponds are a pleasing aesthetic addition to any golf course, as well as a breeding ground for insects, algae and a host of other bacteria. It's important to leave money in the budget for their maintenance. Depending on how many ponds you have, approximately $10,000 annually is a good, average estimate to maintain your ponds. Some superintendents keep the job in-house while others outsource this dirty work to someone like Hertzman. The avid golfer started AMA Sales several years back after noticing the globs of algae in the ponds at courses he frequently played and how unattractive it looked. Hertzman's client list has grown each year to the point where today AMA Sales services nearly 40 courses in southern Ontario, including Hamilton Golf & Country Club, which is set to host the PGA TOUR's Canadian Open later this summer. AMA Sales specializes in the elimination of algae and duckweed to improve the overall look of a golf course. Hertzman has developed his own, unique product that he says is environmentally safe and effective. Currently, he's in the process of getting a patent for it. Like most maintenance and management practices, Hertzman takes a strategic approach to pond management – each course is different and each pond is different, so there is no umbrella solution.

Before treatment and after shots. Some supers treat their water features in-house, while others enlist the services of an outside company.

Hertzman uses three ways to treat ponds. First, it's about balancing the water. "You need to have balanced water, which means pH," he explains. "That's our scale of measurement and it needs to be balanced properly. If your ponds have a high pH level, you have a low level of oxygen and if you have low pH

levels, your water will be more acidic."

According to Hertzman, algae starts appearing when the pH levels creep up to 8.0 or 9.0 – that's when you need to balance the water to where it should be by cleaning out the pond. Hertzman recently partnered with a colleague, which gives him access to two boats, equipped with algae-cutting grills to rebalance the pH levels in the water.

"That gives you instant, visual, positive results," he says. "We clean it out, get rid of bulrushes and cut down the algae all the way to the bottom. After it's cleaned out, you can see all that came out of pond."

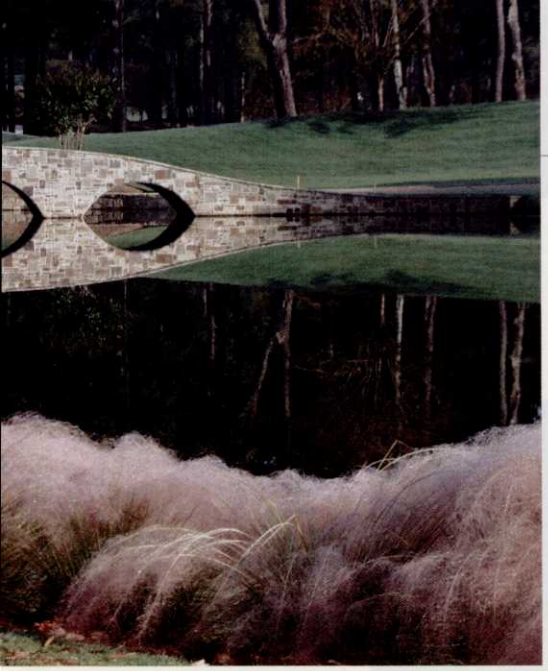
Once the dirt settles, Hertzman has a better view of what's going on. At this point that he treats the pond with his chemical product. The final piece is to get more oxygen in the ponds, which is achieved by adding aerators. Hertzman says there are so many of these devices on the market now that some research should be done to find the correct aerator for the ponds in your course.

Ken Magnum, superintendent at The Atlanta Athletic Club, has 13 ponds on his property. As the home club of one of the most revered golfers in the history of the sport (Bobby Jones) and host of many major championships (last year's PGA Championship being the latest), it's crucial that these bodies of water look good on TV. All of them are in play in some form or fashion. Most have rock walls around the in-play areas, then use iris around edges to keep edges from showing because water levels fluctuate – these provide color and filter from anything running into the ponds. Members use the ponds to fish, so it's important to be careful about what chemicals he puts into the water. Algae is Magnum's biggest problem. He puts dye in the lakes to keep them dark and looking good for major championships, but he knows that this is only a short-term solution. Longer term, he says aerators have made the biggest impact.

"One of the best things we've done is added aeration and oxygen diffusers," he says. "This cuts down significantly on the amount of chemicals we need to add to keep algae down. It's amazing to see how much better the aerators make our ponds. Last year, we added aerators in three more lakes and it has taken what used to be a real problem lake and made it an occasional treatment lake."

When chemicals are necessary, copper sulphate is the product of choice at the Atlantic Athletic Club, who hires a lake management company that performs these treatments once per month or more as needed.

ATLANTA ATHLETIC CLUB



At Atlanta Athletic Club, the addition of aerators have made the biggest impact on controlling algae and aquatic weeds.

Mangum has six lakes with aerators installed and he hopes to add an additional three or four this year if the budget permits. Aerators are also beneficial to the fish population in the club's lakes since they circulate more oxygen.

"Some of the ones that don't have aerators have fish that die of oxygen depletion," he reveals. "We have a lot of people that fish, so keeping up the fish population is important."

Robert Ackermann is new to the whole pond debate. The bodies of water at his course (Weston Golf & Country Club), in Toronto's west-end, are only three years old. The superintendent says, so far, he prefers to go *au naturel* – that is, when it comes to managing his ponds.

"My experience with ponds and keeping them clean is all natural," he says. "We use 15 hp pond aerators. One is placed in each of our two main ponds. This constant aeration, plus a three-meter depth, seems to work well."

In terms of other natural solutions, Ackermann hasn't stocked the ponds with any fish yet, but will look to add some this season. "Believe it or not there are already many that have found their way in," he says.

At the end of the day, Hertzman says it pays to hire a specialist like him who offers a pond management service that begins opening day and lasts for the whole season, continuously inspecting and maintaining the ponds as needed.

"I am specifically in the pond treatment business," he says. "I don't sell anything else, so as soon as a club hires me, I take responsibility for their pond problems. There is no question that a disgusting pond is a station for feeding every mosquito and bug there is, so in my option, there is no room for algae on golf courses." **GCI**

David McPherson is a Toronto-based freelance golf writer and regular GCI contributor.

BY DARIN S. BEVARD

Diffusion aerators (subsurface bubblers) efficiently mix the water column and prevent stratification without the potential visual or noise distraction of a vertical water display.

Selecting an aerator to enhance water circulation

The proper type of water aeration can improve circulation and help lake quality, but it is far from a cure-all for ugly water features.

Water features are an important part of architecture on many golf courses. Well-placed lakes and ponds add to the strategy of golf and provide penalties for errant shots. More importantly, water features collect drainage water from golf course property and surrounding areas. Often, this water is the primary irrigation source on the golf course. Water features are an important aesthetic, environmental and practical feature on golf courses. However, they can become an eyesore if algae blooms and other aquatic weeds transform them into a green mess. When this occurs, golfers become irritated and the perception of the golf course (and the superintendent, in some instances) can suffer. A strategy to improve water quality as well as the appearance of the water feature needs to be developed.

Before going further, it should be noted that I am not a lake expert, and, in researching this article, I quickly realized that lake management is a lot like turf management. Many different factors contribute to the occurrence of aquatic weed problems and poor water quality. Weather is a huge contributing factor, and there are exceptions to every rule. Additionally, the end user often dictates the treatment strategies that are implemented to address short-term problems that may or may not be the best long-term solution for the water feature. Rarely is one single factor the cause of water quality problems. This sounds an awful lot like managing turfgrass.

However, they can become an aquatic eyesore if algae blooms and other aquatic weeds transform them into a green mess.

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Top: While circulation may not be the only issue affecting water quality, without good circulation the odds of a pond being unhealthy and an aesthetic nightmare are high. Bottom: Enhancing circulation with a fountain or other aerator cannot overcome other water quality problems, such as shallow pond depth or high nutrient load.

Moving water discourages the development of many common aquatic weed problems. During the summer months, sunlight warms the surface and upper layer of the water. Because warm water is less dense than cold water, a warm upper layer is formed and sits on top of a cold lower layer. Bacterial decomposition of organic matter can deplete the oxygen in the lower layer, creating a dead zone. This lack of oxygen may, in turn, lead to a phosphorous release that can fuel additional undesirable aquatic growth. Artificial circulation equipment increases oxygen levels and prevents stratification in the water column by providing a mixing effect. However, different types of aeration/water circulation devices offer advantages and disadvantages, depending upon the size of the water feature and other factors.

FLOATING FOUNTAINS. Floating fountains are very popular on golf courses, and are installed as much for their aesthetic appeal as for their benefits for a lake or pond. These fountains effectively increase oxygen levels and improve circulation in smaller bodies of water. Water features five to eight feet

5 KEY POINTS

- Water features are an important aesthetic, environmental and practical feature on golf courses.
- Moving water discourages the development of many common aquatic weed problems.
- Floating fountains, while aesthetically appealing, effectively increase oxygen levels and improve circulation in smaller bodies of water.
- Diffusers that create smaller bubbles provide better mixing than those that create larger bubbles.
- Pond aerators are very efficient for adding oxygen to water.

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Floating fountains can be attractive, but for larger bodies of water, other forms of aeration/circulation equipment may be more cost-effective.

in depth that have surface area less than one acre may benefit from a floating fountain. Although larger bodies of water can benefit if fountains are used, the cost of electricity to power a fountain (or fountains) that provides adequate circulation may be prohibitive. Floating fountains can be attractive, but for larger bodies of water, other forms of aeration/circulation equipment may be more cost-effective.

DIFFUSION AERATION. The bubblers used for diffusion aeration are located at the bottom of the water feature. This allows the mixing of the water column as bubbles ascend to the surface. Diffusers that create smaller bubbles provide better mixing than those that create larger bubbles. Smaller bubbles provide greater surface area, which increases their impact as they rise through the water column. Diffusion aerators do not increase oxygen levels to the same extent as fountains or bubblers. However, they do an excellent job of preventing stratification of water features, allowing the water column to contain sufficient oxygen from top to bottom. The power source for diffusion equipment is located on land, which makes maintenance easier than floating fountains or surface aerators whose power sources are contained within the unit located in the water feature. Compared to other options, diffusion units require lower power inputs to treat the same surface area.

POND AERATORS. Pond aerators, sometimes called high oxygen transfer units, are very efficient for adding oxygen to water. On golf course water features where fish populations are a significant consideration, aerators may be extremely beneficial. These units generally propel water above the surface of the lake or pond, but not in the manner of a fountain. The aggressive circulation provided around these units increases oxygen content most effectively. Multiple units may be needed for larger bodies of water.Keep in mind that increasing pond circulation and aeration may not cure a particular problem. Improved circulation helps with overall pond quality but may not be enough to combat algae and other pond weeds. Depth of water, as well as the continuing input of plant nutrients such as phosphorous and nitrogen, is a major contributing factor to the overall chance of maintaining a clean, healthy water feature.

When circulation is not adequate, biological applications of barley straw and other non-chemical techniques can help with water quality. In some instances, chemical treatment may be the only way to control a pond problem. Also, chemical treatment may be the only method that is quick enough to satisfy the aesthetic desires of the golf course clientele. Pond/water quality consultants can be an excellent resource for determining the best circulation units for a particular application as well as the best long-term approach to improve overall water quality.

So which unit is right for you? Many factors need to be considered. For example, in some instances on a golf course, a floating fountain or pond aerator may be annoying or distracting. A diffusion aerator may be more

desirable in that situation. Conversely, if the interest is an aesthetic display, a fountain is the best choice. For larger water bodies, it may take a combination of different circulation equipment to achieve aesthetic and water quality goals. Considering all options with the input of a knowledgeable lake/pond consultant will provide the best opportunity for long-term success in managing the appearance and water quality of golf course water features. GCI

This article originally appeared in the Green Section Record Vol. 49 (28) July 15, 2011 and is reprinted with permission.

Darin Bevard is a senior agronomist in the Mid-Atlantic Region, where pond and lake management are becoming more challenging. Don Fulmer from Lake Doctors also provided input for this article.

A healthy water feature can add architectural challenge and great aesthetic value to the golf course landscape.

Brian Vinchesi, the 2009 EPA WaterSense Irrigation Partner of the Year, is President of Irrigation Consulting Inc., a golf course irrigation design and consulting firm headquartered in Pepperell, Mass., that designs irrigation systems throughout the world. He can be reached at bvinchesi@irrigationconsulting.com or 978/433-8972.

DO YOU HAVE A DROUGHT MANAGEMENT PLAN?

If you don't, you should. Most courses only have a drought management plan if required to by an authority having jurisdiction over their water, such as a state or federal entity, but every golf course should have one. It is a lot easier to be prepared then to have to think on the fly when it is too late. Additionally, a drought management plan identifies and sets triggers to reduce water use long before you might find yourself in a drought situation.

Drought comes in many forms, not just when it stops raining. An emergency could occur that reduces or eliminates your primary water supply; mainline pipe failure on the golf course or in the municipally supplied lines, pump failure, treatment plant failure, a fire or a sink hole can all cause a drought-type condition. You never know what might happen – the trick is to have a plan.

Most states that require water-withdrawal permits for irrigation require a drought management plan as part of the permitting process. These states have certain levels of reduction that become mandatory by certain stages of drought as declared by the state, local government or water supply. With each subsequent stage of drought, water reductions increase.

For example: in San Antonio Stage 1 requires that golf courses submit a drought management plan for in-play areas of the golf course – landscape must follow a one-day-a-week restriction for landscape irrigation. Stage 2 requires, in addition to Stage 1 requirement, no watering between 10 a.m. and 8 p.m. Stage 3 is watering only allowed per city ordinance. The various stages are automatically triggered by the level of the Edwards aquifer, which is the city's main water supply. Stage 3 is 640 feet, Stage 2-650 feet and Stage 1-660 feet above sea level. So the smaller the number the more impact. There is no subjectivity to these numbers as they are science-based.

In Las Vegas, each golf course must submit a water-use reduction plan. Minimally, the plan must contain a physical description of the course with detailed descriptions of irrigated areas, itemized accounting of water use for the calendar year, a review of spray irrigation efficiency, and a description of key water-use reduction

(continued on page 52)

Massachusetts Drought Levels

Action Levels	Irrigated Tees & Greens	Irrigated Fairways	Irrigated Roughs	Irrigated Landscape & Ornamentals
Normal	100%	100%	100%	100%
Advisory*	100%	80%	50%	No Irrigation Allowed
Watch*	100%	60%	No Irrigation Allowed	No Irrigation Allowed
Warning*	100%	40%	No Irrigation Allowed	No Irrigation Allowed
Emergency**	TBD	TBD	No Irrigation Allowed	No Irrigation Allowed

*Nonessential outdoor irrigation use shall not occur between the hours of 9 a.m. and 5 p.m., except that hand-watering of hot spots may occur at any time.
** Mitigation actions to be determined by the Governor's Emergency Proclamation.

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(continued from page 50)

strategies and timelines for implementation.

We all know Texas is going through severe drought and Las Vegas is a dry city, so drought restrictions are to be expected. Let's look at water use restrictions for a wetter climate. In Massachusetts, as the drought worsens (advisory, watch, warning, emergency) the amount of water used is restricted by percentage as shown in the table on page 50.

So what are the major components that might go into a drought management plan? Well, if you are in a state with very specific reduction points like Massachusetts, then the water-use reductions in your plan would mimic their requirements. Pennsylvania has similar percent reductions, as do other states. These type reductions can be ambiguous, though. What if you have sprinklers that throw both on the fairway and in the rough, such as on a double row system? Can you operate any of these sprinklers if you are not allowed to water the rough?

Best management practices are the best place to start for any water management or drought plan. You should also list all of your water-conservation practices. Here is a partial list of items that may be required or should be included in the plan:

- Metering your use – if you don't know how much you're using how can you manage it?
- A calibration schedule for your meters
- Lining ponds
- Irrigation system maintenance and inspection schedule
- Installation of moisture sensors and weather stations
- Central control systems
- Aeration schedule
- Use of non-irrigated area (natural areas?)
- Alternative water sources
- Raising turf height
- Drought tolerant turf species
- Employee training

The plan should also outline your procedures and process that you will undertake when there is little or no rainfall even before there is a drought declaration. If your plan doesn't start until there is a drought, then it may be too late. Keep in mind also that a drought management plan doesn't just entail water and irrigation systems. It includes an overall approach to reducing the use of water on the golf course. To accomplish this, you may need to train your members/customers. They will need to understand that in a drought the amount of water you have to work with is less than ideal. This can be accomplished with informational sheets, email, blogs, newsletter articles and social media.

With a little thought and some staff input a drought management plan can be developed. It is much better to develop the plan when you are not in a drought and have it on the shelf then be forced to quickly come up with a drought plan when you're already in one. **GCI**

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A STREAM runs through it

by Shandor Szalay

A suburban Philadelphia course looks to stream restoration to solve flooding and erosion problems and enhance course value.

Many golf courses have small streams running through them. These water features have the potential to either wreak havoc with course operations or become key course assets that enhance play and course value.

At Whitford Country Club in suburban Philadelphia, course managers had long been dealing with recurrent flooding problems and increasingly severe erosion from a small stream, Colebrook Run, which bisects the course. Over the years, portions of the stream had filled in with sediment and, as a result, flooding began to occur more frequently. In one location, flood waters would frequently run over the stream banks and flow down the 6th fairway. The 6th and 11th greens were also frequently inundated, causing significant down time, frequent course closures, and diverting staff away from other critical course maintenance activities. Accrued sediment was also frequently clogging the intake structure that Whitford uses to fill its irrigation ponds. In other locations, including the signature 4th green, worsening stream erosion threatened key course assets.

Through the years, course managers had implemented small bank-stabilization projects, but the stream seemed to eventually migrate around these measures and continued to erode. After years of escalating costs, reduced revenues from course closures, and failed stream stabilization projects, Whitford decided to take a radically different approach. Ron Rottman, the club's general manager, says the club had reached a breaking point. "The creek was eroding into the 4th green. The left side of the 4th green was going into the creek. The creek was at ground level on 6. Something needed to be done. If you keep putting Band-Aids on something you never fix the problem. It made sense to fix the problem once instead of fixing it 10 times."

The new approach involved a comprehensive redesign of the entire channel system, about 4,000 feet in total, rather than the piecemeal approach that had typified previous attempts. After several years of design development by another firm, Whitford retained AKRF, an environmental design firm specializing in natural channel design. AKRF worked with Whitford throughout the design, regulatory approval and construction process.

LEVERAGING ENVIRONMENTAL BENEFIT. During the design process, Whitford managers also uncovered the potential to secure state funding to partially offset project costs. Since the project would take an environmentally friendly approach to fixing the stream, it was eligible for funding through a grant program administered by the Pennsylvania Department of Environmental Protection (PADEP) called Growing Greener. Whitford applied for the Growing Greener grant and was awarded $400,000 to support project implementation. According to Chotty Sprenkle, watershed specialist with the Chester County Conservation District (CCCD), the organization that sponsored and administered the Growing Greener Grant, the reduction in bank erosion, which contributes harmful nutrients to local streams, combined with the club's willingness to install tree and shrub plantings along the creek banks, made the project an attractive investment.

FLUVIO-WHAT? Prior to design work, the project design team first sought to understand the behavior of the stream as an entire system, by applying the principles of fluvial geomorphology, a branch of science that focuses on the behavior of river systems. By looking at historical aerial photographs, designers discovered Colebrook Run once flowed through agricultural lands and appeared to have been straightened along the margin between two fields. Since most streams naturally meander, many of the erosion problems experienced by the club were probably due to the natural processes of a straight stream returning to a meandering form over time. Additionally, the turf grasses lining the stream edge offered little erosion resistance to slow the rate of erosion.

In some areas, undersized bridge or culvert crossings contributed to the erosion problems by accelerating stream flow through the bridge opening. During high flows, the bridges also slowed upstream flows, causing sediment to pile up.

Project designers also discovered the flooding and erosion problems were closely linked. As banks eroded in the upstream areas of the course, sediment from the eroding banks would be carried by the flow to lower portions of the course. Since the gradient of the stream flatted toward the lower end of the course, much of the eroded bank sediment was deposited in these areas. Over time, sediment buildup reduced the size and depth of the channel, causing the stream to flood with increasing frequency.

DESIGNING FOR MULTIPLE OBJECTIVES. The design strategy evolved from a solid initial understanding of the stream and its behavior over time. The design

Boulder toe stabilization was implemented around the 4th green to prevent additional erosion, while enhancing the aesthetics of the hole.

ALL IMAGES AKRF

team worked with the club to set final design goals for the project, which included reducing erosion and flooding in key areas, improving course aesthetics, maintaining playability and improving in-stream and stream-side habitats.

To address the design goals, the design approach included several interwoven design elements. First, the project team designed continuous bank stabilization measures using stacked boulders within the upper areas of the stream. These features would eliminate bank erosion and thus reduce the potential for additional sedimentation within the lower areas of the course.

Next, the team redesigned the channel system in the lower two thirds of the course. Most critically, the stream bed was lowered by several feet and a floodplain was added at a lower elevation, creating flood storage throughout once flood-prone areas. Within the lower areas of the course, the team designed the new stream channel with natural meanders, pools and riffles, and step/pool structures to mimic the natural pattern exhibited by healthy streams. Where possible, native grasses, shrubs and trees were planted along the banks to improve erosion resistance.

In the far downstream end of the project, the team rerouted

Prior to project implementation, frequent flooding caused frequent course closures, diverted maintenance resources, and damaged key course assets. This image depicts stream side flooding of the 6th green bunker and approach after a rain event in 2005.

about 1,000 feet of the stream through an unused open field. This allowed for the creation of a broad forested floodplain to reduce course flooding and improve in-stream habitat for aquatic life.

The team also redesigned several bridge and culvert crossings, including a vehicular crossing near the club's maintenance facility. This structure was replaced with a bottomless, modular arch culvert to promote fish passage. The new structure also reduced downstream flow velocity, reducing the potential for bank erosion, while matching the course aesthetics using a concrete form liner. Elsewhere, cart and footbridges were replaced to account for the new stream elevation and floodplain.

The team also redesigned the club's irrigation intake structure. The new structure provided an adjustable weir and was located within a designed pool structure. The pool structure was designed to provide sufficient flow to move sediment, thus eliminating the potential for clogging. Finally, the team designed two pocket wetlands to treat and detain runoff from the club's maintenance facility.

NAVIGATING REGULATORY CHALLENGES. The project required numerous local, state and federal approvals. At the local level, the team secured a floodplain consistency letter from

the township. The letter required mapping of the floodplain boundaries before and after the project to demonstrate the project would not increase downstream flooding. The project also required a tree-mitigation plan from the township and a review of the stormwater management design. An approved erosion-and-sediment-control plan was required from CCCD. At the state level, the project required an National Pollution Elimination Discharge (NPDES) program permit for Stormwater Discharges Association with Construction Activities an a Water Obstruction and Encroachment Permit, both issued by PADEP. Finally, the project required a Nationwide permit from the US Army Corps of Engineers.

BUILDING A NEW STREAM. Project construction occurred during fall/winter 2009 and spring 2010 and was carried out by Frontier Golf (Jones Mills, Pa.). The project was implemented during cold weather months to minimize conflict with course operations.

During construction, Frontier also worked with Whitford to develop a plan to reuse the excavated sediment generated by lowering the creek to rebuild the course's aging driving range. This reduced project costs by eliminating the need to haul material off site.

PROJECT OUTCOMES. Since the project was installed in 2009, club management and members have been very pleased with the investment. As the plantings have grown in, the project has become an indistinguishable part of the course. "You wouldn't know if the project was installed three years ago or thirty years ago" says head golf pro Mike Ladden. "I can say that not one of our members would question the $1 million investment we made now that the project is completed."

The club has reduced down time due to flooding problems. "If we hadn't done the project, we would probably have lost 14 days of operation due to flooding this year alone" says Ladden. "Now we can do the things that need to be done instead of shoveling silt off of the 6th green."

In addition to reducing flooding and erosion, the redesigned stream channel has also added interest and challenge to several holes, for instance bringing water into play on the approach to the 6th green and enhancing the 4th green with boulder walls. "The project has enhanced the overall feel of the golf course," says general manager Ron Rottman

The project is also an environmental success story CCCD's Sprenkle is eager to tout as an example project. "We're hoping it's a trend, because the golf course community is easy to work with."

KEYS TO SUCCESS AND THE NEXT STEPS. Three years after project implementation, the Whitford staff is focused on protecting its investment through vegetation maintenance and project monitoring. The club is conducting a 5-year monitoring effort designed to evaluate the performance of the project and so far the monitoring results are very favorable. **GCI**

Contributor Shandor Szalay was the AKRF project manager on this project.

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MEMBERS SAY THE DARNEDEST THINGS

As folks engaged in the business of keeping golf courses healthy and looking good, we have control over everything except two factors: the weather and other people.

Weather we understand and are trained to deal with. But people? Every turf-education program should include a few classes in human psychology. How else to deal with the club committees, boards and membership? Most of them, in my experience, are nice and mean well, but they've also been known to check their brains at the clubhouse door.

Knowing that most of the country's clubs are getting ready to open again and we can all use a good laugh, what follows are honest-to-goodness, real-life questions and statements to superintendents. I called a few friends for these and they had no problems responding.

I swear all of these are true. I hope they provide a chuckle and make you realize you are not alone.

NEW YORK STATE OF MIND. I understand replacing club flags with American flags on the Fourth of July. But at one club the superintendent was asked to convert the bridge across a par-three pond into the Brooklyn Bridge, complete with ferries and tug boats in the water. He also was asked to paint one golf cart yellow like a New York City taxicab to shuttle members across the bridge while Frank Sinatra blared from speakers.

ON THE ROCKS. Experiencing the worst drought in West Coast history, one superintendent was preparing for a major event when an ingenious member – who happened to own a shipping company – offered to take a couple of his tug boats up to Alaska and tow back several icebergs that could be melted for the necessary water.

TRUE GRIT. During a particularly rainy spell, one course member asked the superintendent, "Do you think your staff could bring the sand from the bunkers inside at night so it could dry out?"

110 ON THE STIMPMETER. A superintendent in the Midwest told me that while enduring relentless 100-degree days, his club president approached him concerned about membership safety. Seems he had been told that in times of excessively high heat it wasn't unusual for greens to blow up. Yes, actually explode when the earth overheated.

HIGH-SALT DIET. Having lost a saltwater marsh to fresh water, the president of one coastal club asked the superintendent if there was any way to return the feature to its previous state. Told it was impossible, the president came back a few days later with his own suggestion: The super should go to the hardware store, buy large blocks of salt (the kind used for attracting deer), grind them in the big wood chipper, and spread the ground substance to "re-salt" the marsh.

Seems he had been told that in times of excessively high heat it wasn't unusual for greens to blow up. Yes, actually explode when the earth overheated.

YOU CAN'T MAKE THIS STUFF UP. How many of these have you heard?

"What time is the 9 o'clock shotgun tomorrow?"

"My member-guest partner packed in a hurry but forgot to bring any underwear. Could you go to the mall and pick up some for him? He's a size 40."

"We know there's a no-cell-phone policy at the club, but we also know the club provides you one. Can we use it to order lunch and call our offices?"

You are standing in an 8-foot-deep hole filled with water, covered with mud and soaking wet: "Hey Bill, you fixing a leak?"

"I read somewhere there is a statistical relationship between agricultural chemicals and breast cancer. So please don't spray on ladies day. Spray only when the men are playing and on outing days."

"Can you get some of those softer flagpoles so when our balls strike the pin they don't ricochet so far from the hole?"

"I have a great idea for our holiday tournaments and closest-to-the-hole contests. On the greens you should paint a red heart for Valentine's Day, a colored egg for Easter, a shamrock for St. Patrick's Day, and a wreath for the Christmas tournament!"

What's is the most ridiculous request you've heard? Send your best MMMMs – most memorable member misstatements – to my blog, www.aspire-golf.com/buzz.html.

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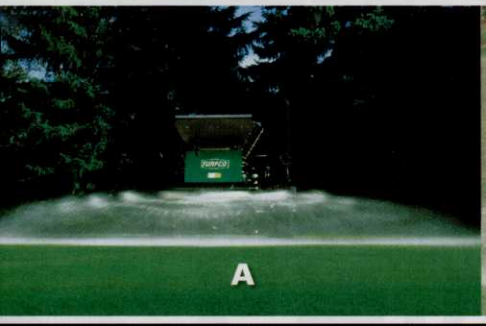

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A GAME CHANGER

The turf industry faces off against the possible emergence of bacterial wilt, a bizarre, complex, indiscriminate killer. By David McPherson

The snow has yet to melt in the Midwestern and the Southeastern United States and superintendents are already losing sleep over what surprises Mother Nature has in store for them come opening day. What diseases are lurking below the surface – just waiting for the right conditions to make the turf bosses' job that much more difficult? For golf clubs with creeping bentgrass greens in certain parts of the country, one of the biggest fears is a pathogen called "bacterial wilt."

"It's a game changer and an indiscriminate killer," says Jeff Kent, superintendent, Quail Hollow Club in Charlotte, N.C., home of The PGA Tour's Wells Fargo Championship each May. "It begins as a minor nuisance but spreads rapidly and builds over time like rolling a snowball down a hill that eventually ends in an avalanche."

Bacterial wilt has caused some confusion in the turf pathology field. Not all academics, who were initially working cooperatively doing research, partly funded by the United States Golf Association (USGA), are on the same page. Currently, the USGA is supporting research on the bacteria question with Joe Vargas at Michigan State University, Nathaniel Mitkowski at the University of Rhode Island, and Bruce Martin at Clemson. In the past, they also funded Lane Tredway – part of the not-yet-convinced camp – at North Carolina State University. Tredway is currently working for Syngenta.

"It is an interesting, complex story," says Stan Zontek, director of the USGA Green Section's Mid-Atlantic region. "Most pathologists in our industry have discounted bacteria as being much of a turf problem. I don't think we quite know whether it is a primary pathogen, but I can tell you this does have the industry concerned with ample justification. That's why the USGA is supporting research on a fairly wide scale."

As Zontek alludes to, most are in agreement, but some dispute that what superintendents such as Kent at Quail Hollow have

NATHANIEL MIKOWSKI, UNIVERSITY OF RHODE ISLAND

For golf clubs with creeping bentgrass greens in certain parts of the country, one of the biggest fears is a pathogen called "bacterial wilt."

found on their greens is really a bacterium. Whatever you call it, superintendents who have witnessed bacterial wilt destroy their greens don't care. They just want pathologists and the USGA to work collaboratively to find a cure.

Jim Rooney, director of golf courses and grounds at Saucon Valley Country Club, Bethlehem, Pa., first saw bacterial wilt on his *Poa* greens back in 2005. After regrassing the 60 holes at this historic private club with A1A4 creeping bentgrass, he saw some of the bacteria return to his renovated greens in 2010. He sent plugs to Tredway (who was at NC State at the time), to the University of Rhode Island, to Rutgers and to the University of Connecticut.

Rooney – a 25-year turf veteran – has never seen a disease this devastating. He's upset by the controversy among the pathologists over this issue.

"To have academics arguing is wasting everyone's time," Rooney says. "What am I supposed to tell my membership? It's not fair for the superintendent."

Tredway is still not convinced that what Kent and others are seeing on their bentgrass greens is bacterial wilt. To him, it's just

> "In the absence of proof as to what causes it, I continue to call it etiolation."
>
> *— Lane Tredway, Syngenta*

etiolation – a technical term to describe yellowing and elongation of the turf, which is a common symptom seen on creeping bentgrass putting greens.

"In most locations, the symptoms come and go with changes in the weather conditions and it is not a significant problem," Tredway explains. "In the absence of proof as to what causes it, I continue to call it etiolation."

On the other side of this disease debate is Nathaniel Mitkowski, who has been studying bacterial wilt for several years. Looking through last year's records he saw it most concentrated in Ohio, Illinois, Pennsylvania, south New Jersey, South Carolina, North Carolina and then back in through West Virginia. It's also been identified in Texas and Kentucky.

"If you have excellent growing conditions for bentgrass you most likely won't see it, but when you get a very hot, stressful year, the pathogen becomes very aggressive and that's when you start to see decline," explains Mitkowski, associate professor of plant pathology at the University of Rhode Island.

This summer, Mitkowski, along with colleagues at the University of South Carolina, are set to do extensive field trials at golf courses throughout his region on what he dubs "a bizarre disease."

Bacterial wilt first cropped up widespread on putting greens around 2006-07 at Quail Hollow and it came back over the following few years, causing severe etiolation of leaf blades on the course's bentgrass greens. Tredway was involved in the initial research into this disease at Quail Hollow.

According to academics, what basically happens with this disease is the plant becomes clogged with bacteria; then, when you mow it, or roll it, you spread it around unknowingly. If the plant becomes too stressed from being dry and hot, you try and cool that plant, and evapotranspiration and photosynthesis and everything else that is taking place in the plant doesn't allow the plant to function. Since it can't transport nutrients upward or downward, it clogs up, withers back, turns yellow and wilts.

Kent decided to send a plug out-of-state to try to figure out what it was. One researcher he sent it to was Joe Vargas at Michigan State; Vargas identified the bacterium as Acidovorax, according to Mitkowski and despite no conclusive evidence discovered by Tredway's team, and published a paper of his findings.

"What Joe [Vargas] was able to do was pull the bacteria out of the plants, put it on clean plants, and get disease in a greenhouse environment," says Mitkowski. "To many, it was pretty clear it was a pathogen."

The summer of 2010 was the hottest year on record in many

"Most pathologists in our industry have discounted bacteria as being much of a turf problem. I don't think we quite know whether it is a primary pathogen, but I can tell you this does have the industry concerned with ample justification."

— Stan Zontek, USGA Green Section's Mid-Atlantic region

parts of the country. Quail Hollow lost some grass because it was so aggressive and other courses started to feel the wrath of this silent killer. Mitkowski had reports of bacterial wilt from Maine to Georgia, so he considered it a significant problem in the turf market.

Sam Green at Eagle Point Golf Club in North Carolina is another superintendent who believes in this bacterium. "This will be the single limiting factor to growing bentgrass in parts of the southeast," he says.

Green has dealt with bacterial wilt on and off for the past couple of years on his 12-year old bentgrass greens. Fortunately, he has not had total turf devastation as the bacterial wilt tends to be isolated to segregated areas. He speculates that the disease is caused by a variety of modern superintendent maintenance practices to get grass to grow to golfer's high expectations.

"The way we have to treat our greens to achieve expected green speed and firmness and our fungicide rotations all play a role," says Green. "I believe growth regulators and the way we are using fertilizers also have something to do with it. In a nutshell, we are growing the grass lower than we should, then we are foliar feeding it to get it to recover, and then, so we don't lose any speed we are putting a growth regulator on top of that to slow it down.

"Then on top of that we are using these newer fungicides for some of these different diseases that have come on in the last number of years," he continues. "We are throwing four things at the turf, so I don't think it is any one product that anyone is using that is causing it ... I believe it is a combination of everything we are doing."

Last year, Green was part of a trial that used Daconil Action (a Syngenta product) in two of his putting greens that historically had etiolation and in which Dr. Tredway had verified Acidovorax in the plugs.

"We eliminated the yellowing and the problems on those greens last year versus historically having some trouble," Green says. "We need to have open discussions about this issue. I've heard arguments that it's product-related, some say it's a primary pathogen, others say it's a secondary pathogen. At the end of the day, it doesn't matter what it is, I want to know why it's happening and how to fix it."

There is still a lot of research remaining to pinpoint the root causes of bacterial wilt and find the best fix for this perennial problem. Working with the University of South Carolina with USGA funding, Mitkowski sees this summer as a crucial time in the field where he hopes to discover good data that will help find a cure to this serious turf problem that doesn't appear to follow the rules.

Plant pathologists are trained in universities, not trained on golf courses, he says.

"Training at universities is typically, if you see something in the field, you have to replicate it in the lab, and if you can't, that's not the cause ... that is really the foundation of disease diagnosis," Mitkowski says. "Right now what we've got is a pathogen that doesn't seem to follow the rules.

"That's a concern," he adds. "But, I'm not going to throw the baby out with the bathwater and say, 'just because we couldn't get it in the greenhouse, it couldn't possibly be bacterial wilt. We don't get etiolation in the greenhouse, but we get the same decline and the same loss of grass that you see in the field."

What many do not understand, he says, is just because they take a plug out of their green and they send it off to a lab and see some bacteria streaming from the plant, that doesn't necessarily mean they have bacterial wilt. So, whether it's a pathogen or not, what are some of the solutions discovered to date to battle bacterial wilt? Daconil Action that Green tried at his course is one fungicide that doesn't actually kill the bacteria, but it turns on the plant's defenses.

"We've seen very good control of the bacteria with this product when it is applied preventatively on a regular basis," Mitkowski says. "It's not going to give you 100 percent complete control, but it will definitely give you enough control that you can probably manage it if you get it early enough and you can go through the summer without too many problems.

"In terms of other solutions, there are antibiotics that are not labeled yet for turf, but experimentally they work very well," he adds. "People are now looking at registration of some of these products for turf because those will control the disease."

Green says changing his general maintenance practices – such as backing off on topdressing and keeping soils at the optimal wetness by using handheld moisture sensors – have also helped keep bacterial wilt from spreading.

Based on what superintendents and pathologists have seen, it will take a true cooperative effort to win the battle against this indiscriminate killer. The summer of 2012 is going to be a busy one for turf pathologists studying this disease.

"I'll be driving from golf course to golf course where they have the disease, examine the results, try different products, and see what works," Mitkowski concludes. "This is going to be the first time we go out and try to control this disease in the field and hopefully, by the end of the summer, we will have some good data." **GCI**

Bacteria or not, the culprit tends to be isolated to segregated areas.

EAGLE POINT GC

David McPherson is a Toronto-based freelance writer and a frequent GCI contributor.

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Henry DeLozier, a principal in the Global Golf Advisors consultancy. DeLozier joined Global Golf Advisors in 2008 after nine years as the vice president of golf of Pulte Homes. He is a past president of the National Golf Course Owners Association's board of directors and serves on the PGA of America's Employers Advisory Council.

CRISIS WAITS FOR NO ONE

What do Herman Cain, Penn State University, Netflix, Bank of America, Carnival Cruise Lines and the Susan G. Komen Foundation have in common?

They've all been in the news recently for reasons they would not have chosen.

What's more, they all probably wish they had been better prepared for the communications crisis that dropped abruptly into their laps. But, if we know anything about crises capable of wrecking a brand, a business or an individual, we know they enter unannounced and seldom follow a script.

You think nothing like that could happen to you, a golf course superintendent, owner or operator? So floods, fires, tornadoes, lightning and hurricanes all stop at your property line? You're immune to chemical and gasoline spills, acts of violence and moral transgressions by employees? And your computer systems are so absolutely fail-safe no one could infiltrate a program and steal members' and guests' personal credit card information?

Maybe you won't attract national media attention, but a golf course is no more unlikely a spot for a crisis than many other places. So as politicians, banks and major universities have discovered, you need a plan.

PREPLANNING. And as anyone who has experienced a crisis of any magnitude knows, if you wait for the crisis to arrive, it's too late to plan. There are three key steps in preemptive crisis planning:

Identify all of the potential crisis situations. Start with the ones with the greatest potential, including on-site deaths or injuries, fire and property damage. But don't forget arson, terrorism, domestic conflict, environmental disasters and computer-related hacking.

Determine how you will respond to each circumstance. Which agencies, officials and professionals should be contacted? In which order? Who will make the contacts? Who will serve as back-up if the primary contact is unavailable or – worse yet – a part of the crisis? Who speaks for the club?

Develop a communications checklist. Keep the list of actions and the order in which they should happen immediately available to those designated to act in these situations. Maintain accurate contact information in a consistent place for immediate action.

ESSENTIAL TOOLS. Responding to the demands of a 24-hour news cycle, which includes the media, your members and customers connected via social networks, requires five essential tools:

Backgrounder file. Be prepared to distribute background information concerning the club via electronic and hard-copy formats. Among the items that will be required and/or requested by media outlets and others are a map of the club, photographs of the club, descriptions of the mission and vision of the club and a brief description of the club and its history. Do not issue names of members, contact information and secure information about the club, such as finances and internal issues. Being prepared to respond immediately to requests shows media covering the story that the club is professionally managed and accountable.

Maybe you won't attract national media attention, but a golf course is no more unlikely a spot for a crisis than many other places.

Scripted remarks. In a crisis situation, precision is critical. Even the most experienced spokespeople can misspeak, so key message points should be crafted long before the crisis hits. Scripting also helps the club spokespeople say what should be said, not what comes to mind in the heat of the moment.

Locations for interviews and broadcast communications. Most clubs are private property and are, therefore, protected from trespass. But a crisis is not the time to bar the media from your property; doing so only heightens the sense that something is being hidden. Plan ahead and consider backdrops that neutralize the story. For example, if the club is being accused of a chemical spill that polluted a local stream, don't hold the news conference in the maintenance facility in front of pesticide containers. If circumstances have damaged or destroyed the primary locations, have back-up locations selected nearby that align with the club's brand standards.

While in times of crisis a plan is essential, the process that a facility goes through to arrive at the plan – carefully considering every possibility and every response – is equally valuable.

As General Dwight D. Eisenhower once said, "In preparing for battle, I have always found that plans are useless, but planning is indispensable." GCI

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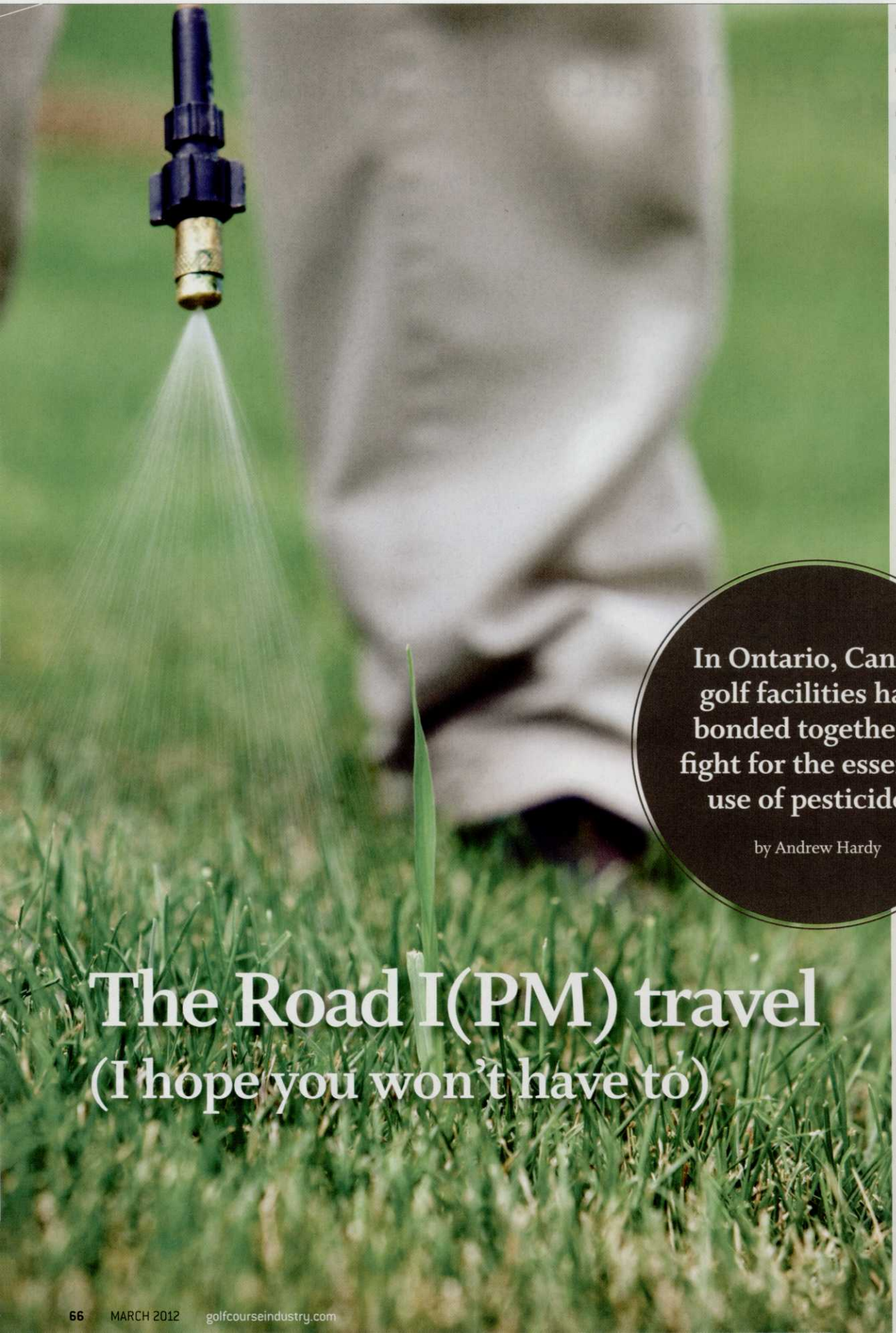


In Ontario, Canada golf facilities have bonded together to fight for the essential use of pesticides.

by Andrew Hardy

The Road I(PM) travel
(I hope you won't have to)

ISTOCK

Over the years in the turf industry, there has been many a political war waged at all levels. Private club superintendents have fought to have a much-needed renovation done, semi-private clubs have battled one another for the almighty golfer's dollar and public golf courses can be forced to fight for survival from season to season. In the province of Ontario, Canada, all levels and calibers of golf facility have bonded together to fight for the essential use of pesticides. The reason for the formation of the Ontario Allied Golf Association (OAGA) was the impending scrutiny that all provinces in Canada are going to face going forward.

I focus on Ontario due to the fact my club, Pheasant Run Golf Club is located there. The conflict being waged is more of an annoyance than a true battle. But the fact is that the Ontario government implemented the Earth Day Act on April 22, 2009. Essentially this law was a ban on the cosmetic use of pesticides. Ontario Premier Dalton McGuinty felt "pesticides to control weeds and insects was purely a cosmetic use and that we were putting our families at undue risk."

"The program is taking many superintendents off the golf course and putting them behind a desk."

So how was golf going to cope with maintaining a high-maintenance turf stand without pesticides? Fortunately, the Ontario Golf Superintendents Association (OGSA), National Golf Course Owners Association (NGCOA), Golf Association of Ontario (GAO), Ontario Professional Golfers Association (OPGA) and Croplife Canada formed the OAGA. The mission of OAGA was to have the golf industry be exempt from the pesticide ban. The formation of OAGA was a big deal because of the fact that these groups had always worked so hard to gain an independent profile.

With all of the points made thus far, where does Integrated Pest Management (IPM) as it exists in Ontario become so high profile? The IPM program had been a fully voluntary program since 2004. All the stakeholders (golf, landscape, forestry, public works) that were using pesticides were able to come up with their own version of an IPM program. The IPM program for golf was a very user-friendly setup which included the writing and passing (75 percent score) of an IPM exam, the registration of your golf facility with the IPM council, submitting annual desk audit review, successfully passing of and on-site audit performed by an independent third-party auditor and maintaining eight continuing education credits (eight CEC's) per year.

The program as it existed until the end of 2009 was user-friendly, easy to understand and because it was voluntary not really a panic document to finish. Cue the Earth Day Act of 2009. The pesticide ban was less friendly to the landscape industry than it was to the golf industry. Home owners were completely shut down for pesticide use while golf was granted an exemption based on the IPM program. But the catch was that the IPM program the 53 fully accredited golf clubs had gotten used to was to be revamped and drastically changed. So my thought when electing to enter the voluntary program was that Pheasant Run would have a leg up on the other clubs that hadn't entered the program. Becoming a fully accredited Level-2 golf course in 2008 did not offer any advantage. The fact is the clubs that were "ahead of the curve" were lumped in with everyone else. Though the process to becoming a Level 2 facility remained the same as before, the program as I learned it was going to change.

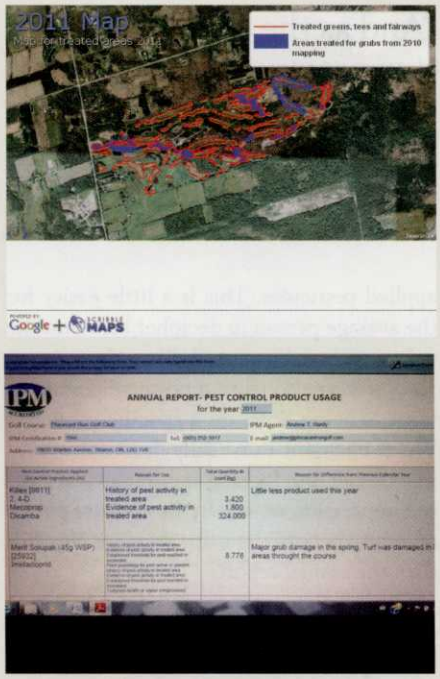
Changes to the documentation and the amount of paperwork with the new IPM desk audit were significant. My 2008 desk audit was about 20 pages in length, while my 2009 desk audit was more than 300 pages. Yet the two documents did basically tell the same story. The biggest difference was the Annual Report, which was a part of the new IPM desk audit. The report was a cumulative account of the actual active ingredient in kilograms for each product used within the given golf season. And this report is to be uploaded on the IPM Council of Canada website and placed in a high-traffic area in the clubhouse of your course. To the average golfer or member these numbers really don't mean much. In fact to a fellow superintendent they probably don't mean much other than a possible comparison. Also to be added to the IPM website is the map that is created that shows where on our properties we have applied pesticides. This is a little easier for the average person to decipher based on the colors and outlines used. Though easier to read, it may also paint a negative picture of what is being done on a specific property. We at Pheasant Run really don't spray very much at all. But looking at our map you'd get the impression we do. In the court of public opinion I believe the maps do more negative than the annual report.


Hardy

"And as the chips fall for two provinces, it isn't going to be long before others will have an IPM program to work with."

The last element to meet the conditions of the golf exemption is the holding of a public meeting. The public meeting is to be advertised in a newspaper and all inhabitants living within 100 meters of the golf course are to be personally invited to the public meeting. For a facility like mine this meeting does not really strike fear as we have six neighbors. There are a number of golf courses in Metropolitan Toronto (population about 4 million) that have as many as 350-500 dwellings within the prescribed 100 meter zone not to mention the potential for "environmental activists." With fire codes of clubhouses and potential member participation some of these clubs may have to rent outside of the club to accommodate the numbers. And there are at least two clubs I know of that will do up to two or three separate meetings in one night to meet the guideline. The OGSA in conjunction with Croplife Canada have produced an informational video that highlights the positive benefits of golf to be presented the night of your public meeting. The OGSA has also developed a guideline for running a successful meeting with the hopes that member clubs will follow these for symmetry within our industry. Essentially, the meeting is the reading of the annual report and fielding potential questions.

SO WHAT DOES ALL OF THIS MEAN FOR GOLF IN ONTARIO? For the time being the exemption is in place until 2013. At that point Ontario's Ministry of the Environment (MOE) will review the program and move forward from there. There is somewhere in the neighborhood of 1,300 golf facilities in Ontario. It seems a little farfetched at this point to think



Mapping and public notices are part of Ontario's IPM program.

that all are going to fall in line with the legislation (less than 40 percent participation, so far). And there is one small club that I am aware of that, based on the costs of being in the IPM program ($905/season plus the $85 agent fee), have decided to stop using pesticides. They made their membership aware of what was coming and they essentially live with the issues that arise.

The golf industry in Ontario has lived through the first phases of the exemption. For some of my colleagues in other Canadian provinces – such as British Columbia, which has always been a very political province – I fear the government is going to throw the book at golf. The presence of the NAGA in British Columbia will hopefully allow cooler heads to prevail. And as the chips fall for two provinces, it isn't going to be long before others will have an IPM program to work with.

I have always based my maintenance on an IPM program with the environment and strong stewardship at the fore. So falling in line with this new IPM program has been easy and difficult all in the same breath. The easy part is the spraying aspect, as we don't spray a lot and do use other means of fighting disease as well. The more difficult aspects are the reports and work to complete annual reports and paperwork now take me in excess of 70 hours to complete. The in-season scouting reports can take up to two hours to complete with all the follow-up and cross-referencing with spray applications. The program is taking many superintendents off the golf course and putting them behind a desk. But the Ontario government, no matter who is in power, is never going to eliminate this pesticide ban. So we grin and bear it and trudge through the paperwork and meet the stringent guidelines set upon us because it could have been worse. In fact, it could have been much worse. **GCI**

Andrew Hardy, CGIA and Diploma Turfgrass Management, is superintendent at Pheasant Run Golf Club, Sharon, Ont., Canada.

ANDREW HARDY

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WIN-WIN *with* Environmental Stewardship

By
Dan Mausolf and Paul L. Scott

Environmental stewardship is a win-win practice for the golf industry and the environment. It helps the bottom line, reflects positively on the golf industry, and offers the public the chance to experience nature. At the University of Michigan's Radrick Farms Golf Course, environmental stewardship has been rewarding on so many levels. At its most basic definition, environmental stewardship is the responsible management of our natural resources. For us, it is much more. It represents an ethical value that defines our operational culture. Environmental stewardship helps us accomplish our mission of offering an exceptional golf experience at an exceptional value.

From the inception of Radrick Farms, environmental considerations have been a priority. Frederick Matthaei, Sr., an alumnus and former regent, donated the property to the university in the 1960's. However, Matthaei was already implementing environmental stewardship practices in the 1930's when he purchased the property and converted it from a gravel mine into a farm. He practiced the innovative science of arboriculture while growing at least one of every tree indigenous to the state. University of Michigan President Harlan Hatcher suggested building a faculty golf course with then little-known golf course architect Pete Dye. Agreeing with the plan, Matthaei stipulated that the construction left as many trees undisturbed as possible. Radrick Farms is now an 18-hole championship layout set on 275 acres of beautiful, rolling terrain.

The staff of Radrick Farms continues to embrace Mr. Matthaei's pioneering environmental stewardship vision. As part of our comprehensive approach to environmental stewardship, we have partnered with the Audubon Cooperative Sanctuary Program, the Michigan Turfgrass Environmental Stewardship Program, Groundwater Guardian Green Site program, and the Washtenaw County Community Partners for Clean Streams program. Through participation in these programs, Radrick Farms has garnered recognition from professionals within the golf industry, policy makers and citizens. These efforts help prove that a golf course can have a positive impact on the environment as well as participate in the university's goal of "going green, staying blue"

Some of these programs require the reporting of environmental data. Through careful planning and fiscal responsibility, we have been able to invest in technology that improves course conditions while gathering that data. Moisture meters, infrared thermometers, compaction meters, weather station data, and soil, water and tissue sampling give us the information necessary to make intelligent decisions. The accuracy of this data allows us to use best practices for chemical applications, water use and cultural regimens. Given the fluctuation of the economy and governmental regulations, superintendents need to be efficient with all of the resources they have at their disposal. Environmental stewardship programs can be a catalyst for identifying wasteful practices, making proper adjustments, and tracking the efforts that often result in better playing conditions while saving time and money. These programs are a win-win for golf and the environment.

These programs also involve educational efforts that have resulted in unexpected benefits. To accurately and effectively promote environmental stewardship, the superintendent and the clubhouse manager have collaborated in many ways. The two parts of the operation must work together to promote and to educate the public about our program partners and their certification requirements. These efforts promote team work and appreciation between the two parts of the operation.

For example, our environmental stewardship guide was created to achieve full Audubon Cooperative Sanctuary certification. To create this guide, extensive collaboration was necessary. Photos were contributed from both ends of the operation. Computer and turf science knowledge was shared. The drafting and proofing process resulted in mutual respect and pride.

The golf industry is at the forefront of implementing and promoting environmental sustainability and stewardship in the burgeoning "green industry."Much research and unwavering dedication are required to reach the best solutions for any particular property. What may seem to be a daunting task is a rewarding experience that results in better course conditioning, sound financial decisions, satisfied customers, and ultimately a better place to live and work. Definitely a win-win. **GCI**

Dan Mausolf, superintendent and Paul L. Scott, clubhouse manager, are from Radrick Farms Golf Course, University of Michigan, Ann Arbor, Mich.

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Timing, temperature are the keys to winning this wa of attrition against *Poa*.

The inva

By David McPherson

Think of *Poa annua* as that annoying uncle who comes to visit unexpectedly once per year: you know he's coming. You can prepare for his arrival with distractions to hopefully minimize his stay. He's familiar, yet he's still hard to figure out.

Fighting *Poa annua* (commonly referred to as annual bluegrass) on putting greens – where it's perennially an unwanted guest – is a battle many superintendents face each spring. *Poa* adapts faster in cool-season climates. Once this turf variety invades a club's greens, it is difficult to get rid of. For the best success, superintendents can attack this unwanted intruder in the early spring before it germinates by spraying its seedheads with Plant Growth Regulators (PGRs). This inhibits, and limits, *Poa's* production before it reaches the surface and spreads.

Sean McCue can relate to this perennial pest. The superintendent at the Country Club at Castle Pines in Colorado for the past 16 years says trying to prevent *Poa annua* from further encroaching into his putting surfaces is one of his biggest maintenance challenges. Castle Pines' greens are made up of a 25-year-old Penncross bentgrass variety, which at 70 percent, is the dominate strain of turf; *Poa* makes up the remaining 30 percent.

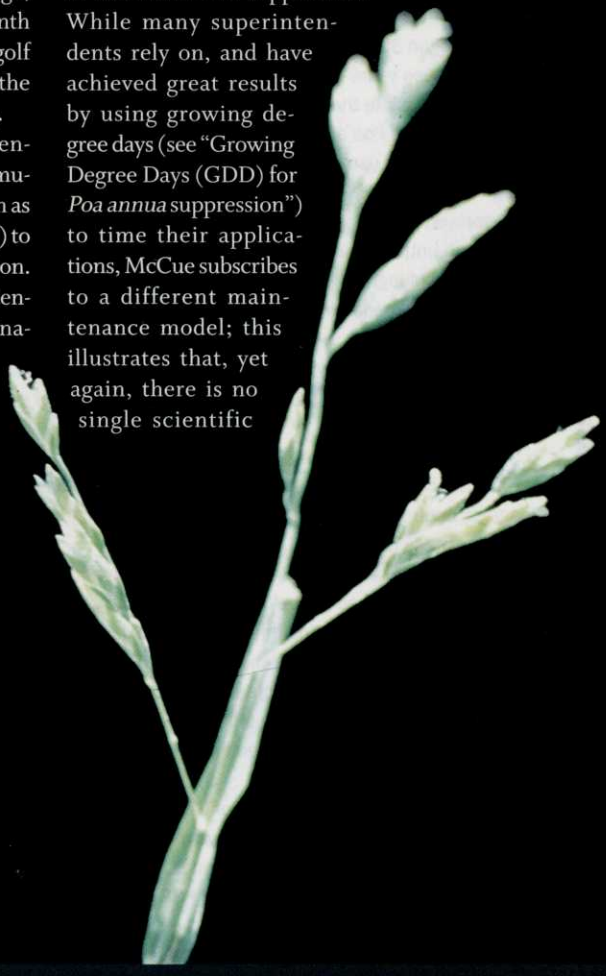
Castle Pines' members, who are privileged to play this Jack Nicklaus design near Denver, are very active. According to McCue, they play, on average, 26,000 rounds in an eight-month season. And, like all private golf club members, they expect the highest level of conditioning.

Over the years, superintendents have used different formulations of Embark (now known as Embark Turf and Ornamental) to inhibit *Poa* seedhead production. More recently, many superintendents have used the combination of Primo MAXX and Proxy with good results. For McCue, a combination of PGRs is the best way to keep *Poa* at bay and to improve the overall playability of greens. Throughout his career, the superintendent has relied on a variety of products.

"These products have ranged from pre- and post-emergent herbicides and an extensive use of PGRs such as TGR, Primo, Embark, Cutless and Proxy, all with varying degrees of success," McCue says.

Regardless of the product he uses, McCue says proper timing of the applications is the key to successful *Poa* suppression. While many superintendents rely on, and have achieved great results by using growing degree days (see "Growing Degree Days (GDD) for *Poa annua* suppression") to time their applications, McCue subscribes to a different maintenance model; this illustrates that, yet again, there is no single scientific

sion



STEVE DEWEY, UTAH STATE UNIVERSITY, BUGWOOD.ORG

Growing Degree Days (GDD) for *Poa annua* suppression

Aaron Hathaway worked as an assistant with Ron Calhoun at Michigan State University for more than a dozen years. For four of those years (2003-2006), Hathaway was involved in a project to calculate the best temperatures to apply particular PGRs to suppress *Poa annua* on putting greens. Calhoun came up with the idea to use GDD for seedhead suppression PGR timing.

"I sprayed Embark and Primo/Proxy twice per week from early March until the major seedhead flush was finished in June on an annual bluegrass fairway," Hathaway explains. "We then fit the best GDD model to each of the best timings for each of the four years. This way, a best timing for seedhead suppression and fastest injury recovery was not based on a calendar date, but was based on the weather in any given area during any given year."

Today, while Hathaway no longer works directly with Calhoun, he continues to do extensive research on annual bluegrass control in creeping bentgrass fairways and greens with PGRs at Michigan State University.

"We know PGRs such as Primo/Proxy, Trimmit, and Cutless are metabolized by the turf plants more quickly when temperatures increase during the summer," he comments. "Therefore, we recommend increasing rates or lowering rates as temperatures increase or decrease, respectively. We would like to be able to track GDDs in relationship with our PGR applications, whether they are used for green speed regulation or *Poa* suppression.

"We could then use the science of GDDs to improve the efficacy of our PGR treatments and save money by regulating the rates at which we apply them," he adds. "This becomes especially necessary as we recommend PGR programs throughout the growing season in which we are applying PGRs every 14 days. Already, many superintendents are applying Primo/Proxy on a very regular basis."

solution in the battle against unwanted turf species.

"Phenological indicators work best for me," McCue explains. "Our weather patterns in Colorado in the spring are unpredictable and unstable with huge temperature swings from day to day. That's why I find growing degree days extremely inaccurate. If I were to follow this philosophy, I would miss my application window by a month or more. For me, the key is Forsythia bloom. I have found the timing of this has always been right on the money for our applications."

A little further east, Eddie Roach, superintendent at the Jimmie Austin University of Oklahoma Golf Club, finds GDD a useful tool. At this semi-private course, he uses GDD to determine when to apply PGRs to suppress *Poa's* seedhead development on his Penncross greens. In the past, while he's used Primo, his preferred inputs are Trimmit and Legacy.

"The PGR program we use is pretty good," he says. "*Poa* still pops up, but we also control it well by using general maintenance practices such as aggressive verticutting and top dressing, and core aeration to promote a good growing environment for the bentgrass."

Embark Turf and Ornamental is one of the most common PGRs to combat *Poa annua* on putting greens. Gary Custis, certified professional agronomist and manager of field research and technical services at PBI Gordon, explains that the product prevents the seedhead from forming – stopping it right in the crown area of the plant. Like all PGRs, getting the timing right is critical. Most superintendents will do two applications, depending on the seed head development. "Once you miss it, you've missed it," he says.

No matter what PGR combination you use, or when you spray them, when it comes to battling *Poa* on greens, superintendents must prepare for a never-ending fight. Even the academics admit that what makes keeping *Poa* at bay so challenging is its aggressiveness. And, once it presents itself, it is much harder to get rid of.

"It's one that, in all likelihood, will not be won," says McCue. "You will need to do all that you can from an economical and physical standpoint to keep the *Poa* under control. This can be accomplished by sound agronomic practices that do not favor tipping the scale in the direction of the *Poa*. These include proper fertility, irrigation practices, timing of aerification, mowing heights and the use of PGRs and herbicides as an overall management strategy.

"The superintendent's best friend against *Poa annua* invasion is to follow the Turf 101 principle of MTDT – Maintain Thick Dense Turf. This gives you the best chance of winning the war," he says. **GCI**

David McPherson is a Toronto-based freelance writer and frequent GCI contributor.

Web resources

For more information on Michigan State University's research, see gddtracker.net.

http://turf.unl.edu/ResearchReports/GreensPoacontrolInov2011.pdf

The USGA is partially funding a three-year research study at the University of Nebraska that is currently being done cooperatively with Purdue University and Michigan State University; the study is trying to find new and effective ways to control annual bluegrass on putting greens. This is a three-year study that will concludes after the spring observation in 2013.

Travels With Terry

Globetrotting consulting agronomist Terry Buchen visits many golf courses annually with his digital camera in hand. He shares helpful ideas relating to maintenance equipment from the golf course superintendents he visits – as well as a few ideas of his own – with timely photos and captions that explore the changing world of golf course management.

UNIQUE DYE MARKING SYSTEM

The multi-talented team of Bill Larson, CGCS, Ryan Browning and Erik Tolzmann, assistant superintendents, and Mike Romundstad, golf course mechanic, at the Town & Country Club in Saint Paul, Minn., have devised a very efficient and unique dye marking system for their 1992 SmithCo 100-gallon green and tee sprayer booms. A 5-gallon soda fountain dispensing tank – obtained free from the clubhouse – has 3 ounces of Becker Underwood Turf Mark Dye added that is mixed together during transport. A CO2 tank, filled at Praxaire for less than $10, is filled with 160 pounds providing 3-5 psi pressure to the two small ball valves located on either side of the steering wheel that control the dye to each respective spray boom. A ¼-inch diameter flexible plastic hose runs from the ball valves to the end of each boom and then ¼-inch flexible rubber fuel line hoses are used for the Tee-Jet flat spray nozzles hanging on the boom ends. The nozzles are turned sideways so a very narrow spray line can be turned on and off creating a dashed line or a solid spray line. Material cost was about $75 and it took about three hours to install.

Terry Buchen, CGCS, MG, is president of Golf Agronomy International. He's a 41-year, life member of the GCSAA. He can be reached at 757-561-7777 or terrybuchen@earthlink.net.

WATER WAGON

The Lyman Orchards Golf Club in Middlefield, Conn., is a 45-hole facility covering 850 acres with elevation changes of 350 feet. This great idea is used to fill a dozen 10-gallon water coolers distributed throughout all of the courses. A 120-gallon potable drinking water tank, with tie-down straps to hold the tank onto the trailer, was purchased from a local golf course supply house. It was mounted to an old utility trailer that was modified with 2-inch square metal tubing "beefed-up" with metal rebar for the hitch and support under the tank, metal unpainted fenders acquired from Great Plains, an electric Flojet "on-demand" 5-gpm RV water pump, on/off switch, alligator clips to hook up the pump to the tow vehicle's battery, sanitized potable water hose with gate valve and metal nozzle. The rangers clean the water coolers each night and fill them with ice each morning. The course set-up crew member tows the water wagon and fills the water coolers as they go staying ahead of play. This idea saves three labor hours per day compared with bringing the coolers into the shop, cleaning them and taking them back out. The water wagon tank is cleaned daily with a mild bleach solution and stored in a dedicated clean area. The pump and water tank cost about $125 and it took two hours to build. Mark Pelkey, superintendent, Senad Begovic, equipment tech, designed and built it. Matt Fauerbach is the director of agronomy, northeast region, for Billy Casper Golf. **GCI**

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THE USUAL SUSPECTS

A variety of new herbicides are taking broadleaf weed control to the next level.

By Jason Stahl

A variety of new herbicides offering broadleaf weed control have hit the market recently, most geared at providing more control with less usage.

The trend for golf turf seems to be with "combo" products that consist of a combination of three well-known products for broader control of a greater variety of weeds. PBI/Gordon Corp. claims they started the trend with the three-way Trimac product, of which there are many copies now, says PBI/Gordon product sales specialist Jim Goodrich.

"There are still two-way combos out there, and I think the reason is because it cuts down the cost a little to superintendents, but they're leaving out a third kind of weed they could target," says Goodrich.

Goodrich characterizes the three-way market as highly competitive, even more so now after a company typically known for its fungicides and insecticides introduced another three-way product to the market last year. PBI/Gordon recently released Katana, T-Zone and Q4 Plus.

Katana, with the active ingredient flazasulfuron, is a warm-season sulfonylurea herbicide that offers postemergence control of kyllinga, sedges and broadleaf weeds, as well as many grassy weeds. Goodrich says it falls in the same category as Monument, Revolver or SedgeHammer and also acts as an inhibitor.

"After application, the plant will stop functioning as it stops producing enzymes and then slowly dies," he says. "What makes it unique is it works more quickly in cooler temperatures, especially soil temperatures in which a lot of products don't respond."

The soil temperature Goodrich refers to is below 65 degrees, but he says Katana, unlike other products, even exhibits good control when the soil temperature gets as low as 50 degrees.

T-Zone offers broadleaf weed control in cool-season turfgrasses. It contains four active ingredients, including triclopyr which Goodrich says is a proven ingredient for hard-to-control weeds such as wild violet, ground ivy, clover and black medic. One ingredient, sulfentrazone, offers suppression of yellow nutsedge.

Q4 Plus, a four-way product like T-Zone, is actually a re-release of Q4, says Goodrich. The difference is that PBI/Gordon increased the quinclorac load, which Goodrich says is the active ingredient in competing products such as Drive and Accelerate. In Q4, the amount of quinclorac was at ½ lb. per acre, but in Q4

IME SCENE DO NOT CROSS CR

Plus, it's at ¾ lb. per acre.

"It also contains sulfentrazone, so you'll get broadleaf weeds as well as grassy weeds all in one shot," Goodrich says. "And unlike T-Zone, you'll get control, not just suppression, of yellow nutsedge."

Goodrich claims that Katana has gotten great reviews from superintendents, specifically regarding *Poa annua* control.

"Compared to other products, the use rate is much lower, which means you have less environmental impact but you still get excellent control," he says. "Normally, guys will go out to control *Poa* on warm-season turf, then have to come back with a separate broadleaf herbicide, But with this product, they can get it all in one shot."

Goodrich says that being environmentally sensitive is always a goal of PBI/Gordon, but the other benefit of less usage when it comes to Katana is that superintendents save roughly $20 per acre per application.

T-Zone has also been getting raves, says Goodrich. A specialty herbicide that targets hard-to-control weeds, it's effective on weeds such as wild violet, which is difficult to kill because there are multiple layers of it. Typically, one would spray over the top and only hit the top layer and not achieve the entire killback desired. But T-Zone has been achieving better results, according to Goodrich.

"Still, you might have to come back with a second application depending on the infestation level of the wild violet," he says.

FMC Professional Solutions has launched two herbicides and changed the label on a third within the last few months.

The new Blindside, which offers postemergence control of a variety of broadleaf weeds, is a combination of two core active ingredients found in other products FMC offers: sulfentrazone and metsulfuron.

"These ingredients have unique properties, so we're adding them to other chemistries," says Adam Manwarren, FMC turf and ornamental product manager. "We don't just make a premix for the sake of making a premix. We try to do it if there are synergies we can outline and capitalize on.

Blindside, for use on warm-season turfgrass including St. Augustinegrass and also approved for Kentucky bluegrass and tall fescue, controls weeds such as dollarweed, doveweed, buttonweed, ground ivy, wild violet, sedges and clover.

"Metsulfuron by itself would do okay on some of those weeds but would take two to three weeks to have an effect," says Manwarren. "But put metsulfuron and sulfentrazone together and we see something within a couple days. That makes the club members happy when they see something happen sooner."

Manwarren says not only is Blindside fast acting, it will continually reduce the weed population the following year, allowing superintendents to go down the sustainability path. He used the example of applying Blindside to a 1,000-square-foot area of solid doveweed. The next year, he says supers might only see 80 percent (a rough guess, he explains, for the sake of the example) of the area covered in doveweed.

"The idea is if you treat an area and don't have as much weed pressure the following year, you'll be applying fewer pounds of active ingredient the following year," says Manwarren. "Some people think it's because the active ingredient is hanging around in the soil, but actually it's that Blindside is controlling the reproductive structure of the plant."

Another thing superintendents like about Blindside, Manwarren says, is it's formulated as water-dispersible granules, so it's easy and convenient to measure. Supers also like its speed and control of doveweed, he says.

"They're raving about its control of doveweed, because that weed is very fast-growing and hard to control and there are not a whole lot of other products that are working well on it," says Manwarren.

FMC's SquareOne offers broadleaf weed and crabgrass control for newly seeded turf and consists of a combination of carfentrazone and quinclorac. The idea is to get rid of competing weeds so that the new turfgrass can get off to a healthy start.

"You can use it one day before seeding or seven days after emergence," says Manwarren. "With most herbicides, you have to wait four mowings or 30 days after emergence to treat, or at least one week before seeding. SquareOne really narrows that window of application."

Finally, FMC changed the label on Dismiss South, a combination of sulfentrazone and imazethapyr, to include control of dallasgrass.

"We had marketed it for control of purple nutsedge, but we discovered it had significant

These two photos illustrate how Blindside controls buttonweed at 6.5 oz./acre. Photos were taken at the University of Tennessee 28 days after treatment.

Blindside on ground ivy at 6.5 oz./acre on the left, 8.0 oz./acre in the middle and a control at right. This was also taken at the University of Tennessee.

activity on dallasgrass," he says.

With all the combo products out there, which are essentially doing the same thing – eliminating the use of two or three products versus just one – superintendents have to sort out if the particular product is adding value for them.

"And that value would be increased weed spectrum, longer residual, easier mixing, speed and fewer pounds of active ingredient," Manwarren says.

Syngenta's new products are Tenacity, which offers preemergence and postemergence control of both broadleaf and grassy weeds in cool season turfgrass and bentgrass, and Monument, which offers postemergence activity on warm season turf.

"Tenacity can be applied at the time of seeding if you're renovating tees or areas of fairways," says Dean Mosdell, turf and ornamental western technical manager. "You can put it down and seed right into it or put it down after seeding for control of weeds that would compete with the new seeding."

Those weeds would include crabgrass, goosegrass, sedges, chickweed and winter annuals such as dandelion and clover. Mosdell is expecting Tenacity to be registered in California next year, although the product has been available to the rest of the country for the last two years.

Monument, a sulfonylurea herbicide, only works on warm season turf and, according to Mosdell, has an entirely different mode of action, weed spectrum and turfgrass sensitivity than Tenacity. It controls sedges, green kyllinga, oxalis and various other grass and broadleaf species in Bermudagrass and zoysiagrass.

While some turf experts have called attention to the proliferation of combo products, Mosdell says he's seeing more and more individual products that target specific weeds like dallisgrass and goosegrass.

"These weeds are difficult to control, and maybe the two- or three-way combos left a couple weeds like these out of their control spectrum," says Mosdell.

Mosdell has also seen the effect of reduced budgets, which has led to reduced use of herbicides but also fertilizer, which he speculates might influence competition from weeds and lack of growth of turfgrass.

"From an herbicide perspective, [supers] might not be broadcasting as much anymore but spot treating areas that have gotten a little more weedy," he says.

Mosdell says superintendents have told him that Monument has been the best product they've used for sedge and broadleaf weed control. With Tenacity, there has been surprise at how safe it has been to use when seeding ryegrass and Kentucky bluegrass, he says.

"When you start renovating an area, there's no competition and the weed seeds can out-compete the desirable plantings, especially considering how slow Kentucky bluegrass is," he says.

Also, Mosdell says Tenacity makes a solid tank-mixing partner. "Because of the synergistic response we see with some herbicides, [Tenacity] will pick up additional weeds, increasing its activity. Plus, [the mixing] takes away some of its whitening response – something built into it to show that it is actually working and infiltrating the susceptible species' leaves, shoots and roots."

One of Valent USA Corp.'s latest developments includes the recent registration of SureGuard for broadleaf and annual bluegrass control for dormant Bermudagrass. Its active ingredient is flumioxazin, and it has both preemergence and postemergence control of broadleaf weeds. Its real strength, says Jason Fausey, regional field development manager, is its long-lasting preemergence control on broadleaf weeds.

"But it is also rather unique in its long-lasting postemergence control of winter annual broadleaf weeds such as chickweed, henbit, black medic and shepherd's purse," says Fausey. And that control is fast-acting, he says, within seven days, even under cool temperatures.

Fausey says this product fills a hole in the market left by other limited-use products that have been taken off the market.

"This product goes in the opposite direction of 3-in-1 products," says Fausey. "For the most part, it would control most weeds at the time you apply it. I think it's great in the summer when you use a 3-in-1 product just from the spectrum of control you get. But [SureGuard] has a single active ingredient and does a nice job of targeting specific weeds at a specific time of year."

Fausey has seen a declining number of courses due to what he says is the cost of overseeding with ryegrass in the winter months. But he believes that's where SureGuard can help.

"You can apply it in a dormant Bermudagrass area and maintain it weed-free and not worry about overseeding to maintain a nice, attractive look," he says. **GCI**

Jason Stahl is a Cleveland-based freelance writer and a frequent GCI contributor.

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THE GIS REPORT CARD

I'm at 35,000 feet and the nose of the 737 is pointed directly at Cleveland and Vegas is to our aft. Another GIS is in the books for the GCI team. It's time to take stock and grade the industry's big event.

Golf championship. *Upside:* It was held in one of the prettiest places on Earth, at least 100 friends of mine were playing, met even more great folks and both the golf and schmoozing were excellent. Toro and GCSAA continue to exceed expectations on this thing. Also, the fact that I no longer give a crap how I play was a major plus. *Downside:* Expensive and a couple of extra days away from work. **Grade: A** (for those who can swing it).

Venue. *Upside:* I think there was a sense of excitement about Las Vegas as a "different" destination. It probably did draw better than New Orleans would have and, as I understand it, it was certainly a better financial deal for the hosts. Decent facility and show set up. *Downside:* Post-Recession Vegas is kind of a shabby shadow of its old self. The "Giant Rundown Headquarters Hotel Formerly Known as the Las Vegas Hilton" was lousy but close to the center. Though I personally loved it, thousands of "normal" folks had to put up with the ever-present toxic cloud of cigarette smoke that permeated every space. Personally, I don't drink or gamble so Vegas is largely just noise, weirdness and inconvenience for me (except for the people-watching, which is absolutely world-class). **Grade: C+.**

Conference. I'll let attendees judge the overall value of the education because I was too busy meeting and Tweeting to go to anything. That said, it's always excellent and I didn't hear any negatives. **Grade: N/A.**

Events. *Upside:* Feherty. *Downside:* The compressed schedule of the week now makes it impossible for most people to fully savor anything. And, because GIS-unsanctioned events are *verboten* during the show and other official sessions, every company, chapter and association runs conflicting events Tuesday and Wednesday evening. If you're one of the "popular kids" you basically have to bounce from thing to thing and never really land for long. That said, the shorter schedule is a damned-if-you-do, damned-if-you-don't thing for organizers. If it was still three days, I'd be bitching about it being too long. **Grade: B.**

Show. *Upside:* Traffic reports were good from larger and well-established companies, particularly those who had given attendees a reason to come (promotions, invitations, etc.). *Downside:* Last year, attendees were business-focused and determined to justify the trip by working the show hard. This year, my impression was that supers hit key supplier booths and fulfilled their obligations but didn't necessarily explore around the fringes. Some smaller vendors were bummed out. Note: my grade would be higher if it were not for the huge (and *always* preventable) lines at registration Wednesday morning. Unacceptable snafu. **Grade: B-.**

Camaraderie/Networking/Fun. *Upside:* The finest people in the world sharing ideas, friendship and a passionate commitment to the profession. *Downside:* The aforementioned time crunch makes it hard to have enough quality time with people I like and respect. **Grade: A+.**

Overall. I had promised myself that I would not use the now-hackneyed term "new normal" in this column but that's exactly what the Vegas show was. The reality is fewer supers and employers feel they can justify the money, time and risk (i.e., "Why the hell is Bubba Joe off partying in Vegas while the club is struggling?"). Also, there's no lack of good education or product information regionally and there's this crazy new thing called the Inter-Web that fulfills many old-skool trade show benefits for free.

Thus, GIS-Vegas was a leaner, smarter show that quite simply is what it is. And kudos, by the way, to Rhett Evans and the board for being absolutely up-front and transparent about that.

> God help me… but I adore this stupid thing.

"Par" for the show back in the fat-and-happy days used to be 22,000-25,000 bodies. Now it's maybe 15,000. And no one has given me a compelling reason to think that number will grow in the future. Exhibitors will still invest in booths, but they'll have to work harder for the time and attention of fewer customers. The hosts will continue to provide education, but they need to be unique, invaluable sessions. Supers and assistants who want to be citizens of the profession will still go, but not every year. I'll always go. God help me… but I adore this stupid thing. **Final Overall Grade: B-ish.**

Well, I'm out of words and the plane's about to land. Time to return to Earth and to begin looking forward to the promise of a new golf season. I hope the seeds of optimism planted in Vegas grow into a prosperous year for all of us. **GCI**

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