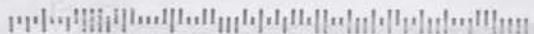


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BUNKER MENTALITY

HAZARDS ARE CONSUMING TOO MUCH OF YOUR CREW'S TIME. HOW THE INDUSTRY IS HANDLING THE SANDY EXPECTATIONS AND DEVISING VIABLE SOLUTIONS.



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THE DIRTY DOZEN

PUTTING IT ALL TOGETHER

Putting together this month's cover story reminded me of an inside joke at GCI that we could do an entire issue on bunkers – sand, liners, maintenance, player expectations, labor allocation ... you name it – and it would quickly become a fan favorite. For that matter, would you, the reader, object to issues devoted solely to managing *Poa annua*, or greens maintenance, or career development, or even Travels With Terry? Heck, we could even devote entire months on water consumption and construction – oh, wait ... we already do that (July and October, respectively).

My point is, our editorial philosophy is for GCI to be the superintendent's solutions provider. It's the litmus test we place every article, feature and column up against: Where's the value in it for the reader, and what can they take away that improves performance?

This is why we seek out partnerships with industry suppliers who share our philosophy and who are not only making valuable investments into turf maintenance, but are providing golf course superintendents with innovative solutions that save time, money and resources.



Mike Zawacki
Editor

Most importantly, the interactions we have with you fuel many of our decisions. Throughout the year, we make a point of being where you are, and to experience firsthand the issues with you. Editorial inspiration may stem from casual conversations at an industry show, during a cocktail reception at a supplier event, while engaged in a course visit, or following an association meeting. And a few "Eureka!" moments have even sprung up during a university field day. In our conversations with superintendents, we're constantly rotating questions like: "Tell me about your course?" "What's your greatest challenge?" and even "What do you want to read about?"

Afterwards, this insight is brought back to the GCI editorial offices and thrown into our collective mental hoppers for processing. It's there we begin to connect the dots. We start to weave the threads of story direction and narrow our focuses. Reader value and expectations are accessed and formed into the final product.

With that said, one of the greatest problems we have as an edit team is an overabundance of great content that can't be shared in print. So in between issues, we supplement a lot of our edit content with exclusives in the issue's digital edition and bi-weekly Fast & Firm newsletters, GCI's unique web-only content, and engaging podcasts on Superintendent Radio Network.

It's important to share our perspective on issue and story development with you so you know where we're coming from with regard to story and topic selection every month, with each social media post, and within the structure of an newsletter. We want to provide readers with solutions that have real value, and not more clutter for their inboxes.

So, don't hesitate to let us know how we're doing, what stories you enjoy or hate, and even what topics we should devote a whole issue to in the future. **GCI**

“Most importantly, the interactions we have with you fuel many of our decisions. Throughout the year, we make a point of being where you are, and to experience the issues firsthand with you.”

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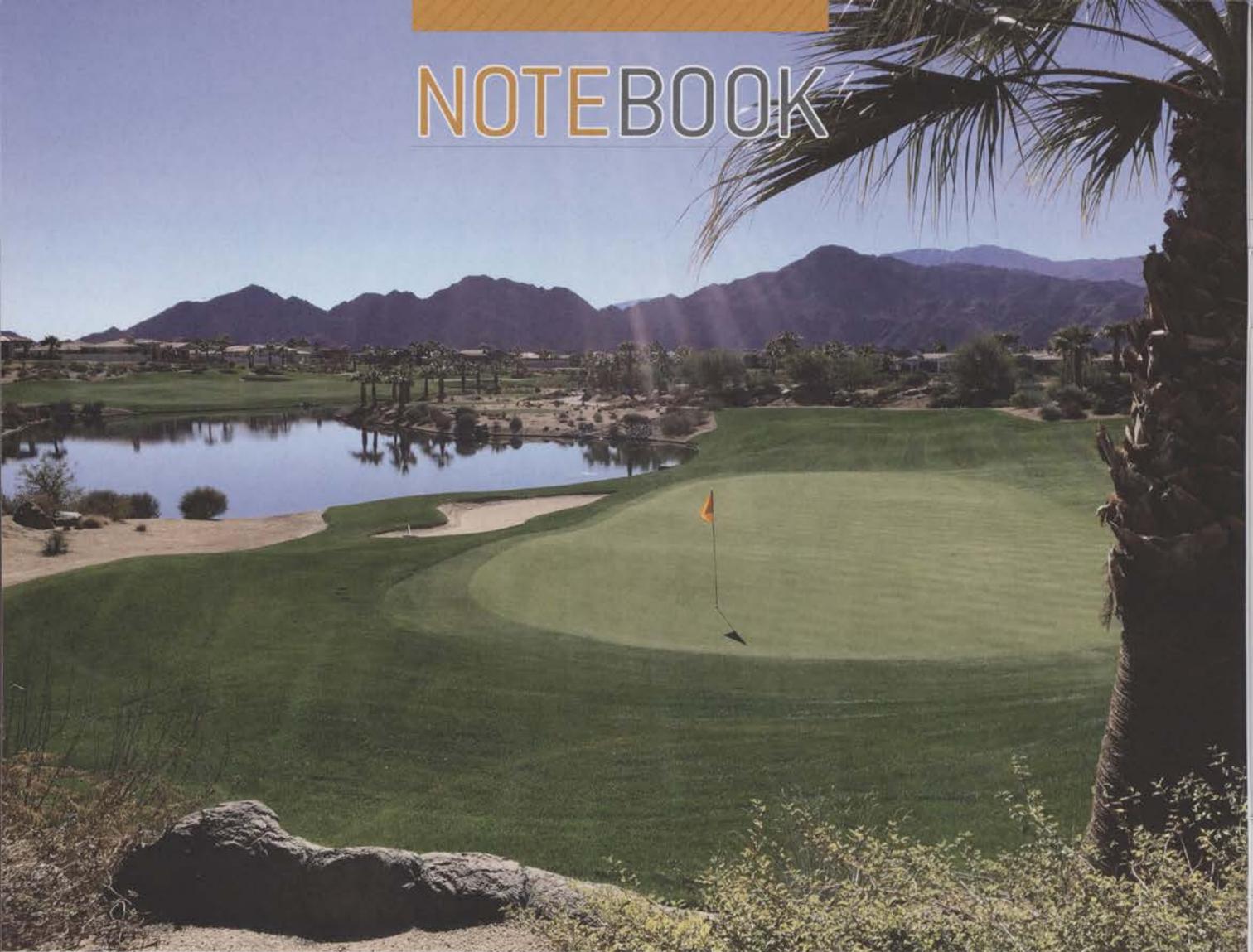
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Where the sun – **AND GOLF** **INDUSTRY** – shines

How big is the business in Southern California's Coachella Valley? GCI's Guy Cipriano explains why it's big enough to have its own summit.

A 50-SQUARE MILE arid patch between a few coastal and desert metropolises seems like an odd spot for an industry dependent on water, greenery and disposable income to be flourishing.

But unlike other golf-dense regions, Southern California's Coachella Valley dodged the consequences of the Great Recession and finds itself in a desirable position as outsiders continue migrating to cities such as Palm Springs, La Quinta, Indian Wells, Palm Desert and Rancho Mirage. Leaders from all segments of the industry emphasized the region's golf economic prowess during the second Coachella Valley Golf Industry Summit Jan. 16 at PGA West.

In a clubhouse dining room with elongated windows overlooking the 18th hole of the partially overseeded Palmer Private Course, PGA of

America President Paul Levy, CEO and general manager of nearby Toscana Country Club, delivered a keynote address with an upbeat tenor. "I have a very bullish view on the industry of golf," Levy says. "I have a bullish view on our people who run the clubs and a group like this."

It's hard not to be golf giddy when operating a facility in the Coachella Valley. For starters, the region receives more than 350 days of annual sunshine, a tremendous selling point when competing with other regions for snowbirds looking to purchase second homes with soothing views.

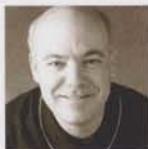
The sun-driven numbers are staggering. The region boasts 123 golf courses that had a \$1.1 billion economic impact in 2014, according to the "Economic Impact of the Coachella Valley Golf Industry" report released in August 2015. This means a region with .8 percent of the total U.S. golf supply is responsible for 1.6 percent of the \$70 billion industry. "There are very few parts of the world where you have this concentration of daily fee, resort and preeminent private clubs," says Turf Star CEO and principal Joe Guerra, whose company served as the summit's presenting sponsor. "You have a composite of the entire industry here."

A young, motivated person entering the golf industry would be wise to take his or her talents to the Coachella Valley. The industry is responsible for more than 14,000 jobs in the region. Maintenance departments at elite facili-

13¹/₂ acres of fun

The Coachella Valley isn't the only arid region in the industry spotlight

this winter. Mountain Shadows Resort in Scottsdale, Ariz., will unveil its Forrest Richardson-



Richardson-

designed short course this month. The course features just 13 1/2 maintained acres of turfgrass and holes range from 60 to 200 yards.

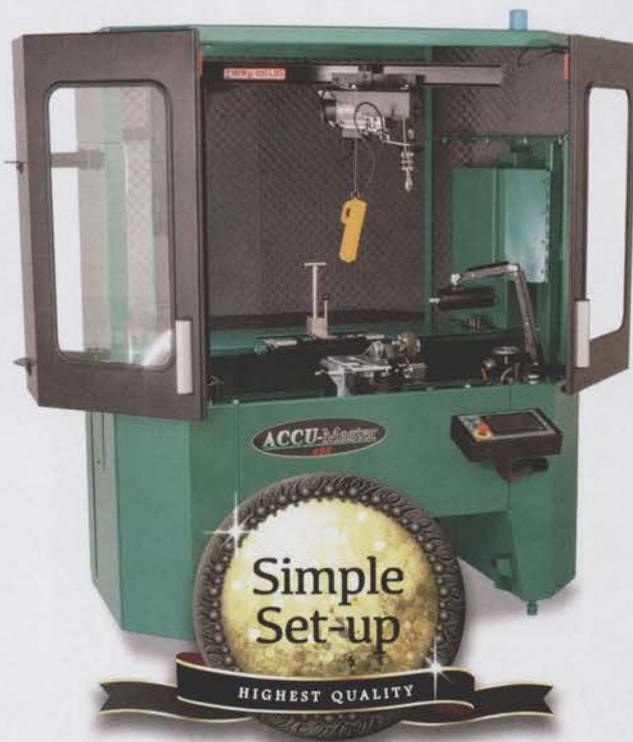
Richardson joined us for a "Tartan Talks" podcast to discuss the philosophies being implemented at Mountain Shadows and the role par-3 courses can play in today's golf market. Enter bit.ly/2jeMAyX into your web browser to hear the episode.

ties are essentially mid-sized businesses, with crew sizes exceeding 50 workers and budgets surpassing \$2 million. Multiple golf management and real estate development companies are entrenched in the Coachella Valley. The volume of jobs in a condensed area makes upward mobility without uprooting possible.

"When there's more than one club involved in a company like ours, the career opportunities are boundless," Troon vice president of operations Bill O'Brien says. "Having been an operator for



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NOTEBOOK

most of my career – the better part of 25 years – many of us are excited about the opportunity to advance and in a market like this there are those opportunities.”

Course closures are also rare. While building started slowing in the early 2000s, only two Coachella Valley courses have closed in the last five years. The closings are a product of land value and repurposing, according to real estate broker and golf course appraiser Z. Gordon Davidson.

O'Brien, Davidson and La Quinta Country Club COO/general manager Bruce Zahn exchanged business snapshots and ideas in a summit panel led by the GCSAA's Jeff Jensen. The Southern California Golf Association's Craig Kessler led the summit-ending water session which included Desert Princess Country Club superintendent Jonas Conlan, Shadow Mountain Golf Club superintendent Luke Hall and Ironwood Country Club COO/general manager Josh Tanner as panelists.

As other parts of California celebrate the end of a prolonged drought, Kessler says the Coachella Valley is different because “the desert is always in a drought.” A strong relationship between the golf industry and Coachella Valley Water Board, low water rates, a plentiful aquifer and longstanding rights to Colorado River water through the All-American canal helped a region that receives less than 5 inches of annual rainfall blossom into a golf mecca.

But the summit and a two-day tour of area courses proved changes in water



Kessler



Guerra

management practices are occurring. About 20 percent of the Coachella Valley's courses, according to Kessler, are engaged in serious turf reduction despite a rebate program that is meager compared to cash-for-turf exchanges other parts of Southern California offered in 2014 and '15. “This really required a cultural shift,” says Kessler, the chair of the Coachella Valley Golf & Water Task Force. “There is nothing harder in life individually or as organizations than cultural shifts.”

Slowly changing course aesthetics aren't producing any alarming shifts in consumer habits. The most important vital sign points to the Coachella Valley remaining one of the industry's healthiest pound-for-pound regions. “As long as there continues to be winter, we will always have an attraction and people will want to come here,” Zahn says. **GCI**



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BREAKING THE GRASS CEILING



Tim Moraghan, principal, ASPIRE Golf (tmoraghan@aspire-golf.com). Follow Tim's blog, Golf Course Confidential at www.aspire-golf.com/buzz.html or on Twitter @TimMoraghan

You're a good superintendent, however, you're not getting raises and promotions commensurate with your education, dedication, sophistication and presentation.

In short, you've hit the "grass ceiling." Despite your best efforts you've run into a layer of thatch that keeps you and your career from growing.

The principal cause of the grass ceiling is discrimination: club members and management think of us as sod-busters, clodhoppers, farmers, grass growers, dirty fingernails ... I've heard them all. They think all we do is fertilize, water and mow, and that anyone with a shovel and seed can keep the turf green and the course playable. They think our asking to be fairly compensated and move up the ladder is an attempt to rise above our station.

But those of us in the industry know how important our jobs are and that we do much more than most members and others realize. Many of you have become the "chief operating officer" of your facility, yet without the title, recognition or compensation that goes with this role. Along with managing turf, you deal with infrastructure, highway management, roads (plowing up north), major property projects, tennis, marinas, pools fitness, security, environment and community relations. And that's just before lunch.

So how to change this perception and stick up for our efforts?

First, tap into the competencies of successful people, members or custom-

ers at your club. Understand their skills and mindsets, which are often closely tied to a business culture and strategic vision. Watch, listen and learn from those more successful than yourself and begin preparing a personal model for yourself, as well as a business model for your club.

Remember, the key is to convince everyone at the club that the proper care and maintenance of the golf course is a business and only one part of what you do.

Second, if you're going to fight, be well armed. Always have your numbers and facts well documented. Show how what you do is done well, done efficiently and at good value. Start here:

- Show how you save the club money
- Justify your value compared to other clubs and other superintendents
- Explain your environmental efforts and why they are important
- Show how you complement other key personnel at the club
- Show how no one else has the expertise to manage the club's key asset, the golf course, which is critical to member perception and enjoyment
- If at a municipal club, compare your efforts and responsibilities to others in local administration
- Explain what you've done and what you do for personal and professional growth, attending seminars, taking classes, volunteering in the community as well as within our industry, and so on
- Explain how the job is one of an op-

erations manager, responsible for more than just the course

- Stress your impact on member safety and enjoyment
- Show how what you do has direct impact on real estate values
- One prominent super told me recently, "I'm more of a city manager with responsibilities ranging from golf turf to the lighting in the fitness club parking area and member safety." Does that describe you?

Third, before demanding more responsibility and money, make sure you understand the following:

- What are the values of the club you work for? Do you reflect them?
- What professional behaviors does your club value? Do you exhibit them?
- What type of professional should you become? Not just for your club but for yourself.

Understand your purpose and place within your club's organizational structure and, if necessary, set goals that align your career path with the club's values. Then set a personal path to improvement and follow it.

Fourth, deal with the incorrect perceptions. As I noted above, the average golfer – and even many board members – don't recognize what we do is key to their business success. But simply explaining it to them with numbers, surveys and a healthy bottom line is not enough. We must manage our responsibilities like a business. We must make sure everyone understands we protect and preserve the biggest and most valuable asset of the club. And as it improves, the entire club and its bottom line will improve.

Fifth, to take it to the next level, keep proving yourself.

- Tell club officials or your immediate supervisor your desire to achieve a higher level of performance
- Ask for and listen to input from club officials regarding those areas you need to work on
- Be dedicated to your improvement, expanding on what you've learned

(MORAGHAN continues on page 48)

STANDING UP TO STRESS

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BUNKER MENTALITY

HAZARDS ARE CONSUMING TOO MUCH OF YOUR CREW'S TIME. HOW THE INDUSTRY IS HANDLING THE SANDY EXPECTATIONS AND DEVISING VIABLE SOLUTIONS.

By **Guy Cipriano**

Ask golfers how they want bunkers to play. OK. Don't ask them. They are sure to approach you about them anyway.

Plucked directly behind green speeds on the list of subjects broached by golfers, are bunker conditions.

Too wet. Too dry. Too inconsistent. Too ugly. Too clean. Too tough. Too many rocks. Too little sand. Too much sand.

Features of a golf course designed to contribute to imperfect results are, well, hazards to maintenance operations. From superintendents to architects, there is no easy or uniform solution, yet viable options are being implemented.

"It's gotten way out of control," says Dan Grogan, the superintendent at The Sagamore Club in Noblesville, Ind. "I think everybody knows it, but how do we change it? It's not like we can just tell everybody to set back their expectations."

Grogan knows the business and expectations well. His father, Mark, is the superintendent at Anderson (Ind.) Country Club. His uncle, Paul, is a retired superintendent who hosted the PGA Tour's John Deere Classic at TPC Deere Run. Grogan's first exposure to escalating bunker expectations arrived when he noticed bunkers being hand watered to satisfy the demands of PGA Tour players while volunteering one on of his uncle's tournament crews.

Now more than a decade into his own turf career, Grogan is overseeing a multi-year renovation to enhance the 90 bunkers at The Sagamore Club, where he worked on the construction crew as an intern from 2002-03. The renovation involves the in-house installation of an aggregate bunker liner. Wide, short and long shots had trickled – or splashed – into the flash-faced greenside bunkers, magnifying playability differences. Bunkers and the thickness of the 70 acres of fescue separating the course from surrounding homes incite the strongest reactions in annual surveys distributed to members.

“We were faced with a decision,” Grogan says. “You’re not going to have 100 percent consistency, but what can we do to at least give members the best opportunity to have the same shot over and over again out of those greenside bunkers?”

Achieving bunker consistency – or at least some semblance of it – comes at a major cost. The cost of bunker work has “flat-out doubled” in the last 20 years, says Ian Andrew of Ian Andrew Golf Design, and the hazards are now responsible for at least 25 percent of all golf course maintenance at many courses.

Nick Kearns sees multiple sides of bunker maintenance conundrum in his role as director of green and grounds at The Oaks Club in Osprey, Fla. The club’s Heron Course reopened in the fall of 2015 following a major renovation that enhanced numerous parts of the golf course including bunkers. The renovation transformed bunkers into a defining course feature. Faces are steep and edges are intricate. Appealing native grasses surround numer-



Bunkers are a significant feature at numerous courses, including Cordillera Ranch Golf Club, a Jack Nicklaus Signature design in the Texas Hill Country outside San Antonio.

ous bunkers.

Playability drives bunker maintenance on the renovated course, Kearns says. Faces are maintained as firm as possible, thus promoting play in flat areas. Three workers are responsible for hand raking bunker bottoms daily. Only rugged-looking portions of faces are smoothed. Completing all 18 holes takes between two and two-and-a-half hours. If faces received full rakes, Kearns says the task would require at least two more workers and each worker would spend an additional 30 minutes on bunkers.

The Oaks is a 36-hole facility, and its Eagle Course provides stark contrasts. The grass-faced bunkers require 86,000 square feet of sand. Smaller bunkers are hand raked, but

two mechanical rakes, including one featuring what Kearns describes as “aggressive” teeth, are rotated to perform the bulk of the maintenance. The bunkers have yet to be modernized, meaning playability issues because of contamination arise.

“The funny thing is you don’t really hear about a bunker issue until somebody is in it and plays out of it,” Kearns says. “Nobody is going to sit there or stand there and judge a bunker if they haven’t played out of it. They are only really going to judge it if they have been in it and have played a golf shot out of it.”

LINE IT UP?

One other major difference between the Heron and Eagle bunkers exists – an aggregate liner was installed as part of

the renovations. Liners are frequently included in renovation plans in regions that encounter severe weather tests such as southwest Florida. Kearns curiously inspected bunkers when touring the Heron Course after Hurricane Hermine dumped 12 inches of rain onto the property last year. “We had a few little slivers here or there,” Kearns says. “But if we didn’t have the bunker liners in those bunkers, I could only imagine what they would have looked like.”

The Sagamore Club renovated 21 bunkers with an aggregate liner and new sand in 2015, and Grogan says four workers spent four hours returning bunkers to a playable condition following significant storms in 2016. The pre-renovation labor devoted to bunker cleanup included eight

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MEANWHILE AT PINEHURST

Want more proof Pinehurst No. 2 isn't like most golf courses?

Earlier this winter a group of Sandhills Community College turf students visited the resort to witness a bunker project in action. A truck brought new sand to the course and the crew raked a pile of dirty, existing sand to the side. The clean sand

was distributed on the bottom of the bunker; the dirty sand was placed on the top layer.

The sand juxtaposition was part of a project to expedite drainage on holes where play starts following weather events. Camouflaging new sand helps keep a naturalistic look throughout the course. "Dirty"

maintenance represents one of the philosophical changes Pinehurst No. 2 employees encountered following the restoration of the Donald Ross-designed course.

"No matter where you work, you would never blend dirty sand with clean sand to make it look older and make it look not what used to be our idea of pretty or

right," superintendent John Jeffreys says. "It took a little while, but our guys are great. They take ownership, they take pride and you show them the old pictures and you show them how it should look and explain why bright white sand surrounded by native doesn't look good. They buy in."



Pinehurst No. 2's bunkers are maintained to keep a naturalistic look.

workers spending five hours each. Grasses and weeds are also no longer growing in faces and bottoms. The labor saved in bunkers is being redistributed, allowing Grogan's crew

to execute additional mowings or detail work such as edging cart paths, sprinkler heads and yardage plaques.

Damaged bunkers following frequent floods in the Texas

Hill Country outside San Antonio recently resulted in Cordillera Ranch Golf Club completing a bunker renovation that included the installation of new sand and an aggregate

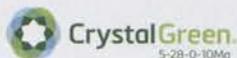
liner. Daily labor devoted to bunkers hasn't been altered since the renovation as four to six workers hand rake the more than 100,000 square feet of bunker surface twice per week;

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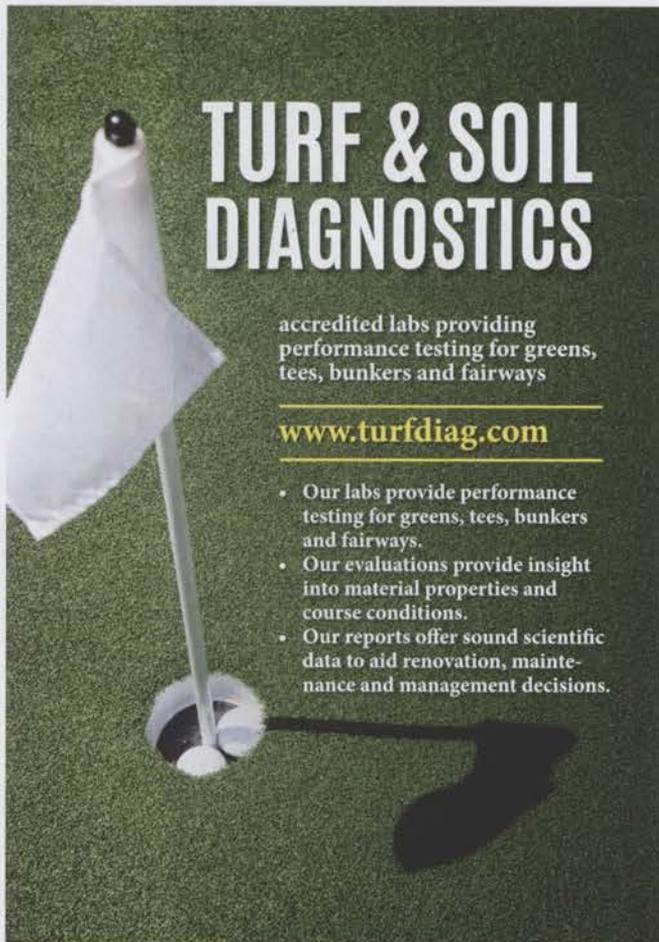


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touchups are performed on four additional days. "We were hand raking them every day when I first got here," director of agronomy Mark Semm says. "That was a little much. That was a lot of labor hours."

The biggest post-renovation change at Cordillera Ranch is noticeable following punishing spring rains – the maintenance department phone doesn't ring as often. "Prior to the renovation, it seemed constant that we were getting phone calls about liners showing or pea gravel that had washed up," Semm says. "We scheduled a guy or two quite frequently to kind of look at that stuff and essentially remove it or we would

chase it after the comment. We obviously don't have to do that anymore."

Superintendents, in most cases, are proponents of aggregate liners because of the labor and frustration saved by preventing or diminishing washouts and contamination. But aggregate liners are a debated subject among golf course architects and builders.

Todd Quinto of Lohmann Golf Designs says when he entered the business in the 1990s installing liners of any kind, including fabric ones, wasn't a common practice. Mentalities involving liners started shifting when the new aggregate technology reached the market

during the final stages of the Great Recession. More than two-thirds of the inquiries Illinois-based Lohmann Golf Designs receives stem from bunkers, according to Quinto.

Aggregate liners are a "big, but reasonable investment," and they are allowing architects to expand their bunker palettes while helping facilities save on post-storm cleanup costs, Quinto says. "You can really change the conditioning in your bunkers," he adds. "With that being the No. 1 complaint from golfers and No. 1 take-home message that a lot of people leave with, being able to have great conditioning in your bunkers now, I think is a bonus if you have the

money to put into it."

Money is a major reason why Andrew, who specializes in restoring the work of classic architects, strays from recommending aggregate liners.

"Something has to give here," he says. "Winged Foot can afford their bunkers, but not everybody can afford Winged Foot's bunkers. But it's funny how every membership wants Winged Foot's bunkers. I can give you Winged Foot's bunkers, but you have to detail them to the point where they can actually stay together. And then there's work to keep them together. That's a lot of work and money to keep them stable. It can be done, but just

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Everything the Pinehurst No. 2 crew knew about bunker appearance and expectations disappeared in the spirit of restoring Donald Ross's architectural intent. Fitting the architecture and landscape trumped consistency following Bill Coore and Ben Crenshaw's restoration. Superintendent John Jeffreys says the bunkers "should be somewhat fair," but

he also stresses they aren't going overboard to produce uniform aesthetics and conditions.

Customer surveys influence some of Pinehurst's agronomic decisions, and negative comments regarding bunkers are rare, Jeffreys says. The No. 2 course crew spent 6,803 hours (20 percent of all labor hours) working on bunkers in 2015. The Pinehurst team is working to reduce the volume of labor spent on features eliciting little reaction. "As we dialed it back and spent more effort on greens and tees and other things, we saw that bunkers weren't as highly criticized as we thought they would be," Jeffreys says. "We backed down the labor,

which is our biggest expense on bunkers."

Pinehurst's agronomic leaders emphasize working smarter when in bunkers. Shortly after the No. 2 course reopened in March 2011, a high-ranking Pinehurst official started noticing balls were rolling through bunkers and resting on downslopes. Later that year, Royal Melbourne hosted the biennial Presidents Cup. The famed Australian course's bunkering caught the attention of the Pinehurst and Coore-Crenshaw teams. The "Aussie" method of raking involves using fan raking bottoms and smoothing faces and edges with the backside of the rake.



SUPERINTENDENT
RADIO NETWORK

BUNKER BANTER

We went directly to one of the ASGCA's most candid members to bring bunker chatter to the Superintendent Radio Network.

Ian Andrew of Ian Andrew Golf Design joined us for a bunker-themed "Tartan Talk" episode. Andrew introduces his definition of a hazard, reveals how architects place bunkers and discusses the differences between Golden Age and 21st century expectations. Enter bit.ly/2kkkLd into your web browser to hear Andrew's thoughts.

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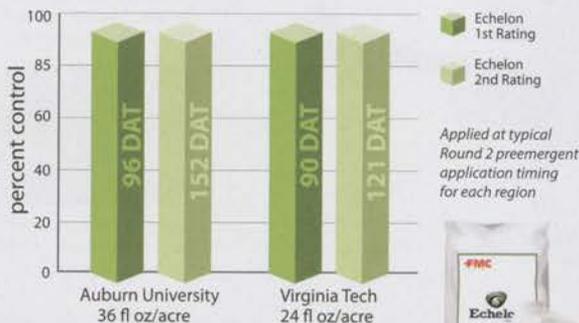


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The method, which reduces plugs and promotes play from bottoms, has stuck on multiple courses at Pinehurst and facilities elsewhere are implementing similar styles.

Grogan adopted the method after being promoted to the head superintendent position and he has continued the bottom-first approach in the renovated bunkers. Superintendent Ross Miller considers bunkers an integral part of the Country Club of Detroit, yet he maintains them using the KISS, "Keep it simple, stupid," principle. The "Aussie" method meshes with the approach.

"It's a hazard, but we keep it very clean and presentable,"



Frequent washouts and a desire to improve playability are leading to a variety of bunker construction projects.

Miller says. "Before there used to be five people here every day to rake bunkers out and it would take them close to five hours. Now it takes us two guys and they are done in 3½ hours."

Semm has dabbled with multiple rakes since arriving at Cordillera Ranch, and weather

conditions dictate the tines and grooves his crew uses. "We have three different tines with four different styles of teeth," he says. "Instead of going out and saying, 'Hey we are going to rake all the bunkers the same way,' we try – that's a big word – to dial them in. If this

bunker is a little more wet or this bunker is a little more dry, to kind of correlate with how aggressive we rake that sand."

Even with sensible ideas from other continents and improvements in liners, sand and equipment, superintendents are bracing for another year of bunker-induced queries. Bunker advances fall on the long list of unintended consequences created by improvement.

"As the superintendent, I know the amount of time and labor and energy that goes into bunkers," Semm says. "From a player's side, I get it and what their expectations are. It's a wrestling match when that topic comes up." GCI

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SHOT VALUES



Jeffrey D. Brauer is a veteran golf course architect responsible for more than 50 new courses and more than 100 renovations. A member and past president of the American Society of Golf Course Architects, he is president of Jeffrey D. Brauer/GolfScapes in Arlington, Texas. Reach him at jeff@jeffreydbrauer.com.

Golfers often speak of “Good Shot Values,” but I have never heard a good, concise definition of this presumably important – and widely misunderstood – term. For example, the 1998 Cornish and Graves book “Golf Course Design” asked a few architects to define the term. The responses were maddingly vague, at best. Some samples:

“A reflection of what the hole demands of the golfer, and the relative reward or punishment it metes out for good and bad shots.” – Killian and Nugent

“The architect should get the most out of the land, while letting play take care of itself. Each hole must be designed to balance risk and reward.” – Tom Doak

“The value of a required shot as related to its difficulty or allowable margin of error.” – Mike Hurdzan

I worked for Killian and Nugent, and never got any more depth than that. Tom Doak has made a nice career over putting the land first, but I wonder if he really “let’s play take care of itself.” And, in his own 1996 book, “Golf Course Architecture,” Hurdzan expounds more on “shot value,” first noting it means a variety of required shots, lengths and targets, and defining the “allowable margin of error” as sizing greens by using

USGA slope system research to allow 66 percent of average golfers to hit the green.

He vaguely suggests hazards can be designed so the punishment “matches the crime,” suggesting bunker depth be matched to expected recovery clubs, with fairway sand bunkers requiring mid to long irons to reach the green should be shallower than greenside bunkers where you can use a wedge. The possibility of clean escape is an inherently good shot value.

Even *Golf Digest*, which uses shot values as a double weighted component of its golf course rankings system defines it only as: “How well do the holes pose a variety of risks and rewards and equally test length, accuracy and finesse?” *Golfweek* has somewhat different criteria, emphasizing variety but notably leaving out resistance to scoring.

First, any course feature designed to “resist scoring” usually cost poor golfers several shots more than it might cost top players. Second, the Golden Age masters wrote they were trying to encourage, suggest or reward a variety of different types of golf shots over 18 holes for fun and challenge. They had little interest in punishing bad shots harshly. The “punishment” mentality was common around 1900 and later from 1950 onward, dating to the Robert Trent Jones remodel of Oakland Hills. The *Golf Digest* “Toughest 100 list”

inadvertently influenced the tough is better mentality, and later, aesthetics (read: more sand bunkers) kept it going.

The difference between placing hazards to encourage different shots versus placing them to punish bad ones is a tough concept for many golfers and greens committees to grasp. Even when you believe in some punishment, we soon realize that for competitive matches, the architect only needs to differentiate golfers by one shot per round in medal play, and by as little as one hole in match play.

The masters knew that arranging hazards to suggest golfers hit a particular shot type – such as a low fade with a mid-iron to a tucked pin position has similar shot values whether the guarding bunker is two or 20 feet deep. The “one shot difference” theory suggests moderate depth bunkers allowing recovery with a good shot and staying in the bunker with a mediocre one.

“Balancing” risk and reward suggests par 4 holes with a maximum reward of birdie or one stroke to par, should typically limit punishment to bogey. On par 5 holes, where you might pick up two strokes, perhaps two-stroke hazards are appropriate.

I have never found previous definitions particularly useful as design tools, as I need to decide specifically how to arrange features to create good shot values, as they’re my primary goal. Thus, undaunted by those who believe shot values are too hard to define, and those who prefer to leave the definition vague, using the pornography test (I know good shot values when I see them...). I have cobbled together any definition of shot values from the thoughts above, and the amazingly consistent comments I have heard over 30 years from better players (in tidbit form) as to what they like, and expect to see.

But, as the psychologists are famous for saying, we are out of time this month...GCI



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ANTHRACNOSE

From chemical rotation to PGRs, turf experts explain the best methods for controlling anthracnose this year.

By **Patrick Williams**

After escaping the hot, humid summer of 2016, some superintendents might be thinking about one of its most irritating consequences, anthracnose, and what steps they can take to rid themselves of this troublesome disease.

Anthracnose pressure is largely determined by temper-

ature, says Dr. Bruce Clarke, extension specialist of turf-grass pathology in Rutgers University's Department of Plant Biology and Pathology. "The vast majority of the anthracnose we see would be during the heat of the summer," he says. "So, basically, we would see this on the courses if we get a really hot year."

Temperatures remained high through the fall months, says Joseph W. Rimelspach, program specialist in Ohio State's Department of Plant Pathology. He recalls some superintendents even referring to September as "the new August."

Although anthracnose pressure is highest in the summer months, superintendents

Anthrachose pressure is the highest in summer months, but it's not uncommon to begin seeing the disease in the spring. September also has become a month ripe for potential outbreaks.



OSE

could see it popping up this spring, Rimelspach says. "Last year, due to July, August, September and October being hot and humid, that weakened plants and you could have gotten some damage or infection in those periods," Rimelspach says. "So, if you weren't aggressive in diagnosis and/or prevention, you could have had major, too, so that would have led to infection you would have to be alert to next spring because you would

want to clean it up."

Spring anthracnose cases are possible, Clarke says, citing the potential for failure to completely suppress the disease, and mentioning that cold weather isolates can appear on certain courses.

At Rutgers, Clarke and his colleagues have found that by maintaining specific cultural practices, superintendents can scout for weak areas and make early curative fungicide applications. By doing so, they can extend their application

intervals and reduce their reliance on fungicides.

Here are seven keys to controlling anthracnose:

1. PROPERLY DIAGNOSE THE DISEASE

Late in the growing season in 2016, greens were not recovering as superintendents had hoped, Rimelspach says. "If they're weak like that, since this pathogen comes in on weakened turf, they just want to be very vigilant on watching those greens and making sure

they have a good diagnosis on them, an accurate diagnosis," he says.

Anthrachose basal rot affects *Poa annua* more often than creeping bentgrass because it attacks the crown of the plant, Rimelspach says. Bentgrass stolons are less susceptible to severe outbreaks of anthracnose, but the risk increases under stressful conditions, such as scalping.

The means through which anthracnose can visually present itself are variable,

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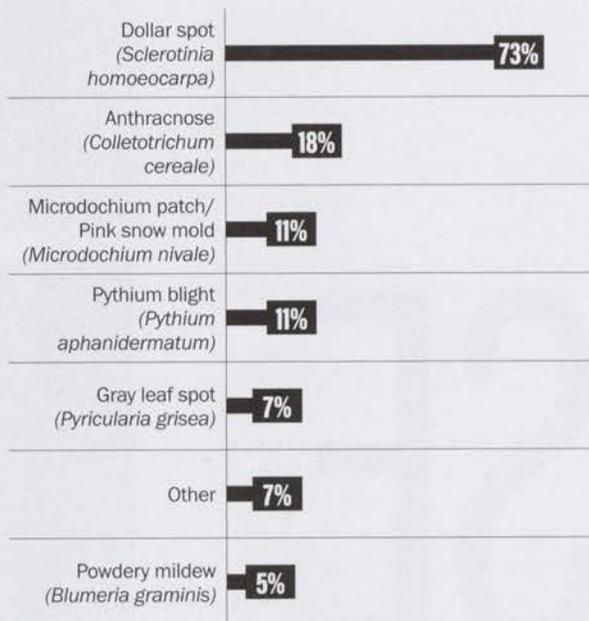
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PESTS & DISEASE

Rotation is the key

GCI, in partnership with AMVAC Chemical Corp., recently surveyed golf course superintendents, via the online research survey portal SurveyMonkey, about their experiences with fungicide resistance issue. While anthracnose and dollar spot were the most troublesome pathogens, superintendents indicated chemistry rotation was the key to preventing resistance issues.

Which of the following pathogens have you been experiencing resistance issues?

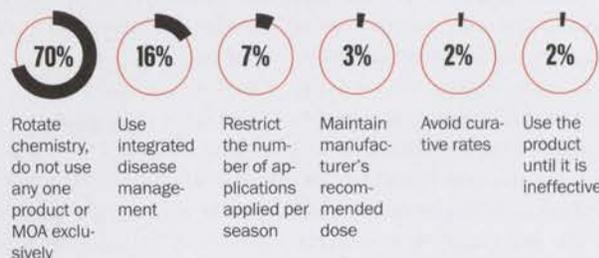


Editor's Note: "Other" responses included: take all patch, fairy ring, and brown patch.

Did you change your fungicide program after you noticed resistance issues?



Which of the following best describes your fungicide use philosophy?



Source: GCI/AMVAC research

Rimelspach says. "You could just have small, dime-sized yellowing plants, maybe some orange color when it's more advanced," he says. "Or it could be just a general area of *Poa annua* declining, or a patch." If superintendents see any of these symptoms on their turf, they should check the crown to make sure it's alive.

2. MAINTAIN ADEQUATE NITROGEN FERTILITY LEVELS

Anthrachnose control is best achieved in an agronomic program in which nitrogen levels are where they should be, Clarke says. "Probably two-thirds of the variability in our studies was accounted for in terms of nitrogen rate and frequency, that type of thing," he says.

In the summer, superintendents or their crew should spoon-feed about 2.4 to 3.6 pounds of nitrogen per thousand square feet, Clarke says. Additionally, in the spring, they can build up nitrogen levels through soluble applications of 0.4 to 0.8 pounds per thousand square feet.

Citing the research from Rutgers, Syngenta technical manager Dr. Mike Agnew says maintaining the right fertility levels is a major component in fighting anthracnose. "Too little nitrogen exacerbated the disease, too much nitrogen exacerbated the disease," he says. "So there's a fine line right in the middle where you want to keep your nutrients. You don't want to overfertilize, you don't want to under fertilize."

3. MOW HIGHER, WHILE ROLLING AND DOUBLE-CUTTING TO KEEP UP GREEN SPEEDS

Clarke and his colleague's research on anthracnose has found that it is brought on by low soil moisture, low fertility and low mowing heights. Discovering this, and dispelling previous notions that the disease is wound-related, has allowed superintendents to take advantage of mechanical practices such as raising mowing heights, rolling and double-cutting, he says.

Grass should be mowed no lower than 0.125 inches, although superintendents and their crews with flex units can probably use a slightly lower setting, according to Rutgers' Department of Plant Biol-

ogy and Pathology. Mowing as high as 0.140 inches will further reduce disease pressure, according to the university's research.

Raising mowing heights increases

photosynthesis and increases the overall health of turf during stress periods, says Dr. Rob Golembiewski, green solutions specialist at Bayer. Rolling then allows superintendents to keep higher heights

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of cut while simultaneously reducing stress. "For some superintendents, I would go as far as to say they can even alternate their mowing and rolling to eliminate that mowing stress every day," he says. "Rolling across the surface is a lot less stressful than mowing on a daily basis."

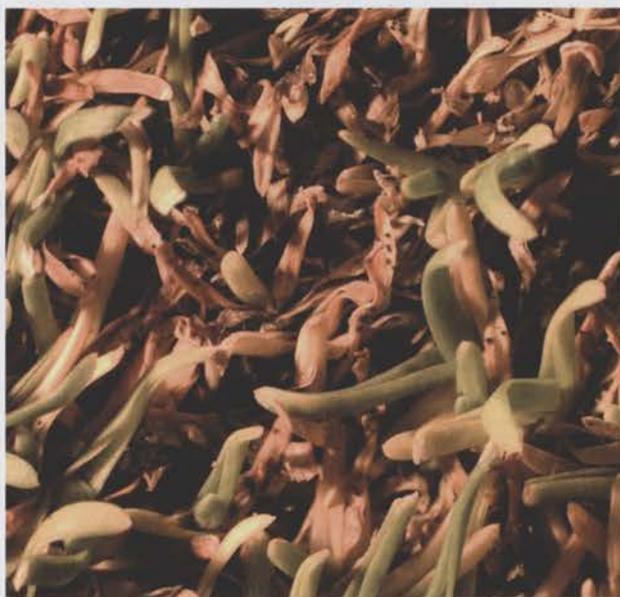
4. TOPDRESS TO IMPROVE OVERALL PLANT HEALTH

Topdressing is another practice that improves turf health, filling the canopy and allowing for thicker, denser, healthier and more vigorous crowns, Clarke says. "It gives you better contact with the rooting media, and in many cases, the plants are more erect and more photosynthetically active," he says. "It just makes for a better, healthier plant. So it's not really an effect on the fungus so much it's an effect on the plant."

Superintendents who aerify in the spring and backfill the holes should continue to topdress through the growing season to maintain a full canopy of sand, Clarke says. In years when it's particularly hot and grass is growing slowly, they won't have to apply as much sand. In years when it's cooler and grass is growing more, they should apply more sand.

5. CONSIDER APPLYING PLANT GROWTH REGULATORS TO REDUCE DISEASE SEVERITY

When studying the effects of plant growth regulators on anthracnose, researchers at Rutgers found that PGRs do not enhance the disease, and furthermore, even will slightly reduce the severity of the disease in certain instances, Clarke says.



Anthracnose presents itself through various means, including small yellowing plants or some orange color when it's more advanced.

Both seedhead suppressants such as mefluidide and ethephon, and vegetative suppressants such as trinexapac-ethyl can be used as tools against anthracnose, Clarke says.

6. USE MULTIPLE FUNGICIDES TO FIGHT ANTHRACNOSE

A multitude of chemistries

work against anthracnose, Agnew says. Syngenta carries products that contain chlorothalonil, fludioxonil, penthiopyrad, azoxystrobin, difenoconazole and propiconazole.

Other effective chemistries include tebuconazole, thiophanate-methyl,

pyraclostrobin, fluoxastrobin, triadimefon, myclobutanil, fenarimol, triticonazole, metconazole, polyoxin D, penthiopyrad and fosetyl-Aluminum, according to Ohio State's Department of Plant Pathology.

7. ROTATE BETWEEN CHEMISTRIES TO PREVENT DISEASE RESISTANCE

Rotating between different chemistries is integral to avoiding disease resistance, Clarke says. "That's a serious problem with anthracnose, especially with certain chemistries, like the strobis or the benzimidazoles or, to a lesser extent, the DMI fungicides," he says.

When applying fungicides, superintendents can make preventative or curative applications, Clarke says. "If you're going to go preventatively, that's fine," he says. "If you're going to go early curative, you have to be scouting, and you have to be very vigilant. You need to get this fungicide down as soon as you see any disease flare-up."

Whether superintendents are applying fungicides preventatively or curatively will determine the intervals at which they should apply, Agnew says. "If you're treating on a curative basis, you're probably spraying it every seven days at the highest rates," he says. "But you can actually control this disease very well with fungicides on a 14-day interval with moderate rates if you do it on a preventive basis and you use good cultural practices." **GCI**

Patrick Williams is a frequent GCI contributor.

13

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CHAMPIONSHIP EXPERIENCE



Henry DeLozier is a principal in the Global Golf Advisors consultancy. DeLozier joined Global Golf Advisors in 2008 after nine years as the vice president of golf for 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.

To the untrained ear, the quiet whispers of winter prevail at the Quail Hollow Golf Club in Charlotte, N.C. But behind the scenes, where superintendent Keith Wood and team are preparing for the 2017 PGA Championship, there are the unmistakable sounds that come in the days leading up to a major golf championship. Soon the season's solitude will be replaced by soul-shaking roars rolling like thunder through the Carolina pines, and Wood knows, there's not a moment to spare.

Here is a preview of what is afoot as Quail Hollow readies for the 99th PGA Championship, with a few lessons sprinkled in for those who may never see a major at their course.

THE PROCESS OF PREPARATION

"There are three keys that I watch: agronomics, playability and personnel," says Wood, who began work on the championship when he came to Quail Hollow in May 2015. "Agronomically, it's all about plant health and making sure the turf has enough fuel to make it through a very busy lead up to tournament week without too much stress."

Wood is hosting his 10th professional tournament, and past experience tells him he needs to harden the turf so it can stand up to heat and severe mowing heights, but without appearing stressed. "Playability is

all about grain control on tightly cut Bermudagrass fairways, greens and approaches. Also, conditioning the Bermudagrass rough to play very difficult without being out of control at an insane height of cut," Wood adds.

He must also make sure his team is ready for any contingency – especially those doled out by Mother Nature. Even more of an unknown are the volunteers, for whom his staff will share leadership duties prior to and during the week of the championship. "The prep that goes into recruiting volunteers is something we take very seriously," he says. "Then the training that is done by our full-time staff during tournament week really sinks in and the entire team comes together."

LEARNING FROM OTHERS

Building the infrastructure to accommodate a championship event is a phase of preparation that largely goes unnoticed. General manager Tom DeLozier and his team have been learning from other professional venues and events since 2009, working as part of the team at the Masters, U.S. Open and Open Championship.

Of course, Quail Hollow is no newbie to PGA events, having hosted the highly regarded Wells Fargo Championship for a number of years. But there's nothing quite like a major championship, DeLozier says.

"The PGA of America is an exceptional organization that has a

tremendous championship team who are experts in hosting major events," he says. "They have been critically involved in everything we have done since the beginning. The core championship team has relocated to Charlotte and been on our property since the fall of 2015."

Patrick Finlen knows the long hours and anxiety that are now the norm at Quail Hollow. Finlen was the director of golf course operations (who rose to the GM job) when The Olympic Club near San Francisco hosted the 2012 U.S. Open Championship.

"The best preparation would be to work at a course hosting a major," Finlen says. "If you can't do that, I would attend as many majors as you can as a spectator and as a volunteer. That gives you a view from two very important perspectives. Outside the ropes you get to see the course as thousands of fans will. Inside the ropes you get to understand what it takes to prepare a course the week before and during a championship. Each superintendent and course prepares in similar and dissimilar ways. The more you can experience that, the better prepared you will be."

ENJOY THE EXPERIENCE

Those who have lived through a major championship know the week will fly by and soon enough the crowds and their roars will be gone. "The absolute best lesson I learned was to be patient and enjoy the experience," Finlen says.

But what if the biggest event happening at your facility this year is the club championship? As Wood, Finlen and others will tell you, many of the same lessons apply:

- Preparation never starts too early
- Train your people for the unexpected
- Take advantage of the knowledge of others, and never be too proud to learn
- Take time to stop and smell the roses or, in this case, the Bermudagrass. **GCI**

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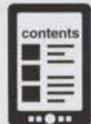
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NEVER TOO LATE

Inadequate fall nutrition doesn't mean a season of substandard grass. Learn ways to shift the odds in your favor this spring and start the season with stronger, healthier turf.

By **Rick Woelfel**

Preparation is the key to healthy, resilient turf, and that process ideally begins in the fall.

The first step in preparing for the spring is soil testing, says Dr. Chuck Darrah, a 35-year turf industry veteran and the owner and president of CLC Labs in Westerville Ohio, near Columbus. He is also a consulting agronomist and a champion for the cause of soil testing.

“(Superintendents) need to soil test to be sure they have adequate nutrient levels and the correct pH,” he says. “And in the North, if they didn’t soil test in the fall, they should soil test in early spring.”

If a superintendent is working in a warm climate and maintaining a warm-season grass, such as Bermuda, soil testing can reveal sodium buildup that may have occurred during the winter dry season, Darrah says.

“The other benefit of doing an early season soil test for the southern courses is to check sodium levels that may have built up during the winter dry season (which is typically dry season),” he says. “That’s when we see the most sodium buildup, when there’s a drier than normal dry season, which means there’s been a higher irrigation input. If the irrigation water has sodium in it, it’s really good to add that sodium test to your soil test so that you can get on top of it early in the spring.”

Dr. Alex Ellram advocates striking the right pH balance in the soil going into the winter, but adds a caveat.

“You definitely want to go into the winter with decent



Blue Ridge Trail (Pa.) Golf Club superintendent Duane Schell: “You can set your people up for success and empower them to be successful or for failure. It’s the same thing with your plant.”

fertility levels,” says Ellram, a professor of animal and plant sciences at SUNY Cobleskill and a former golf course superintendent. “(But) be careful not to overfertilize with nitrogen because that does promote pink snow mold. So you don’t want to put a lot of soluble stuff on toward the end of the growing season. You don’t want to force a lot of extra growth.”

Doing the right things in the fall pays off handsomely later on.

“You want to provide good nutrition to the plant so that the plant and soil and build carbohydrate reserves in the fall,” says Jack Higgins, an account manager for EarthWorks in Easton, Pa. “The plant will build carbohydrates in the spring as well, but you basically don’t want to start behind the eight ball. If you can start with a full tank of gas, meaning you have plenty of carbohydrates in reserve

HELPING HANDS

Every year superintendents gain access to new additions to the turf nutrition market. Here a few that can assist with spring green up.

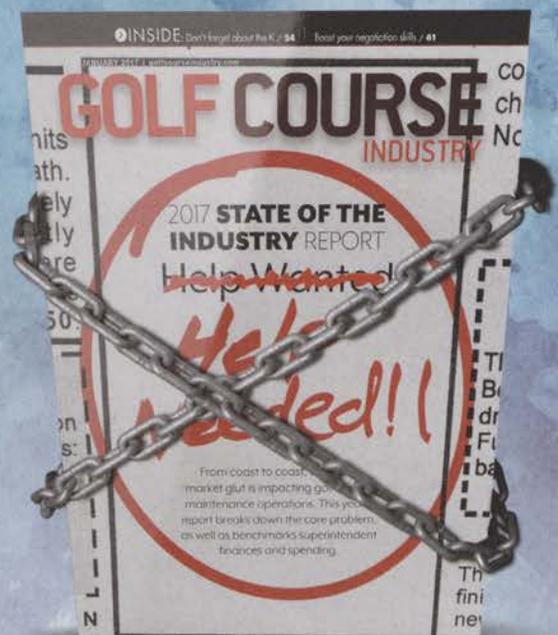
EarthWorks markets a granular fertilizer, EarthWorks 8-2-2, which features ammonium sulfate, says Jack Higgins, an account manager for EarthWorks in Easton, Pa. This helps acidify and warm up the soil. “The key to the function of the fertilizer is it will activate soil biology even at low temperatures,” he says.

In some parts of the country, superintendents coming out of the winter may encounter a stretch of mild weather only to be followed by cold temperatures. Higgins says his company’s carbon-based fertilizers are effective in those conditions.

“They work with the soil,” he says. “If you have a weather event (the product) will basically push the pause button on how that fertilizer is reaching in the soil. It won’t leach away, you won’t waste the product. You won’t be forcing it uptake nutrients when it really shouldn’t be.”

Anuvia introduced the organic fertilizer GreenTRX to the market last spring, after the grow-in season had concluded in much of the country. John Fowler, the company’s vice president of turf sales, says the product allows superintendents to jump-start their turf this spring.

“About 60 percent of our product is available almost immediately,” Fowler says. “That gives you that quick response. And then the slow-release portion is only effective if microbial activity is [present]. At that time of year microbes are typically not very active. So, it’s a great time of year to put it out because you get that quick response from the ammoniacal portion of our material; the slow release part comes along and carries you farther into the spring. That way you could maybe put out some of the other materials that you might be using as part of your program.”



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AGRONOMICS

to break dormancy, then the plant won't use all its carbohydrates."

Your programs start in the fall, says Duane Schell, superintendent/general manager at Blue Ridge Trail Golf Club, a 27-hole daily-fee facility in Mountaintop, Pa., in the Poconos. Schell has worked in the golf in-

dustry since his early teens and has been a member of the GCSAA for more than two decades. His club hosts nearly 40,000 rounds each year despite the fact it's closed during the winter.

"It's setting your plants up for success," he says. "Just like the people that you're managing. You can set your

BEST PRACTICES

Early-season application practices vary based on local conditions. Dr. Chuck Darrah of CLC Labs in Westerville, Ohio, offers these recommendations.

- "For potassium from potassium sulfate as an early spring starter rate, apply 0.5 to 1.5 lbs of product/1,000 sq.ft. For other potassium products, follow the label recommendations."
- "If I knew my greens tended to be low in magnesium coming out of the winter, substitute sulfate of potash-magnesia [0-0-20-10Mg], for the potassium sulfate [0-0-50]. Low magnesium is often the case with silica sand greens and in the high calcium, low magnesium type of calcareous sand greens."
- "If I knew my greens tended to be low in calcium, which is typical of silica sand greens, a good spring starter rate would be 6 to 12 pounds per 1,000 sq.ft. of gypsum. If I knew my greens tended to be low in calcium and magnesium and had a lower than desirable pH coming out of the winter, use 6 to 12 pounds per 1,000 sq.ft. of dolomitic, ground limestone. Dolomitic limestone contains calcium and magnesium on an approximate 2:1 [Ca:Mg] ratio."
- "For other calcium products, follow the label recommendations. However, assuming you are trying to get calcium to the roots, I don't recommend foliar calcium products for the spring starter application. Foliar translocation of calcium from shoots to roots is poor and roots have a special need for calcium for elongation. Therefore, a granular, high calcium product, such as gypsum or ground limestone, is preferred for the spring starter application."
- "pH is a soil chemical characteristic many superintendents obsess about. However, what many superintendents don't know is that in several parts of the country, many bentgrass and Bermudagrass greens are constructed from limestone sands. These rootzones will typically have a pH in the range of 7.5 to near 8.0 and the pH is practically impossible to change. Nutrient management on limestone sand greens is more difficult than on greens with a more desirable pH of 5.8 to 6.5. On greens constructed with silica sands, maintaining a pH in this range, maximizes the availability of nutrients in the rootzone. And, typically the issue is raising the pH to this level as they become more acidic over time."

people up for success and empower them to be successful or for failure. It's the same thing with your plant."

Setting up the plant for success may mean applying the right nutrients in the proper amounts and intervals. Darrah believes in fortifying the turf with potassium in the spring to combat the effects of leaching during the winter months, effects that can be exacerbated in winter weather.

"If there is a higher amount of rainfall or snowfall the potassium levels from the fall can be severely leached by the time we reach the spring," he says. "Because potassium is a leachable nutrient, it should

be applied two or three weeks before the anticipated green-up of the turf."

Ellram, though, is not a big advocate for potassium. Instead, he believes potassium is being "overprescribed" by some turf professionals. However, Ellram is a proponent of other nutrients, specifically phosphorus and nitrogen.

"You've got to have adequate phosphorous," he says, "which really is deficient in most of the soils in our area but that's one of the most important macro ingredients for root growth and most of your root growth is going to be going on in fall, and then early spring.

"And without enough nitrogen, you're not going to have enough carbohydrates either. So, obviously, nitrogen is important but you don't want to overfertilize," he adds.

It's important to maintain appropriate levels of calcium and magnesium, as well, says Darrah. "I think most superintendents are very tuned in to the potassium levels," he says. "But in certain parts of the country, they're not that tuned in to calcium and magnesium levels. So, in order to get the turf off to a good start and get good root growth in the spring, they also need to pay attention to calcium and magnesium levels. Potassium,

calcium, and magnesium are all leachable nutrients."

It's important to time the initial spring application properly to get maximum benefit and perhaps make up for any oversights the previous fall

"Real spring preparation happens in the fall," Higgins says. "But you can get to the same spot if you can get your fertility out right when you're starting to see a little bit of green tissue. Not any growth to speak of, but the slightest amount of green tissue, green color in the plant." GCI

Rick Woelfel is a Philadelphia-based writer and frequent GCI contributor.

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WHATEVER



Brian Vinchesi, the 2015 Irrigation Association Industry Achievement Award winner, is President of Irrigation Consulting, Inc., a golf course irrigation design and consulting firm with offices in Pepperell, Massachusetts and Huntersville, North Carolina that designs golf course irrigation systems throughout the world. He can be reached at bvinchesi@irrigationconsulting.com or 978-433-8972 or followed on twitter @bvinchesi.

If you are installing an irrigation system which includes a new mainline installation, you are going to be digging up a large part of your golf course. That's a given. Much of the cost of the mainline installation work will be excavating the trench, backfilling and compacting the fill and lastly loaming and seeding the trench or hopefully replacing the sod over the trench line that had been previously stripped.

Granted, there is the cost for the wire and pipe in the trench, but the significant costs are in the excavating and restoration. As such, if you want to save some money at the time you're installing new mainline, you need to consider anything else (whatever) you may want to include in that trench while it is open. It will be way less expensive to install the "whatever" now while the trench is open then it will be to excavate and restore a separate trench for the "whatever" later.

So what might a "whatever" be? Unfortunately, in today's technology age "whatever" is pretty much a moving target. What may make sense as not being needed today, may be something you wished you had thought of in the future. Let your imagination be limitless.

Certainly, there are the obvious items that have been considered for years. These include water lines for drinking fountains out on the golf course as well as their electricity if they are going to be mechanical units. Power for green fans is also

something else that is commonly installed today. Consider power to the practice range so the golf pro can set up a video camera or power the ball washer. I have seen golf courses install power to each green so they can run lights to aerate at night to prevent interference with play during the day.

“So what might a 'whatever' be? Unfortunately, in today's technology age 'whatever' is pretty much a moving target. What may make sense as not being needed today, may be something you wished you had thought of in the future.”

The wire or pipe for these other uses can all go in the same trench as the irrigation mainline allowed by code. But you need to make sure that there is separation between conflicting uses such as data wires and power wires. High voltage, 480 volts for example, cannot be in the same trench as a communication cable.

Some of the more uncommon things to consider adding are sewer lines for restrooms and their water supplies and electrical power.

Data communication between the halfway house and clubhouse so it can be part of the food and beverage automatic billing system is also an idea for some courses.

What about "whatevers" you have not thought of yet? How about infrastructure to supply a Wi-Fi or fiber optic network throughout the golf course? It may not be used now, but who knows what it could be used for in the future. So what can a Wi-Fi or fiber optic network allow you to do? Security cameras could be easily installed, gate automation, golf cart tracking and if you want maintenance equipment tracking.

And more than likely unmanned mowers in the future. By having these items already installed, it allows you to be open to new technologies at a much lower entry cost than if a Wi-Fi or fiber optic network needed to be added separately to utilize these new technologies. Have no idea? If nothing else, just put in some empty conduit with the mainlines for direct routes between facilities.

Recently, I was asked to run a fiber optic line throughout a golf course with the irrigation mainline to connect the maintenance facility, clubhouse, pro shop, staff housing, tennis house, halfway house and beach house. It will allow the golf course to easily communicate with every facility on the property from any of the other locations.

Anytime you excavate any part of your golf course it is a big undertaking. It disrupts play, costs money and takes your staff away from other duties or at minimum requires you to supervise an outside contractor.

However, it also creates opportunity. Be proactive and think about what you might want to put in that hole or trench or "whatever" while it is open to save the club money and you aggravation down the road. **GCI**

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THE DIRTY DOZEN

By Patrick Williams

While not always the first thing on superintendents' minds, managing water features is essential. Done right, these 12 deeds will clean up water bodies on golf courses.

Ponds, lakes and streams aren't often a priority for golf course superintendents who want to create a memorable experience for their members and golfers. But in response to environmental impact studies, government regulations and golfer preferences – both practical and aesthetic – knowing how to properly manage water features is invaluable, even if you're going to hire someone else to do it.

"The essence of it is slow the aging process," says Eugene C. Braig IV, program director of aquatic ecosystems at Ohio State University. "So prevent the accumulation of sediment and other materials on the bottom, and limit the availability and input of nutrients to the site." These are 12 things superintendents can do to keep their water features in check:

1 LIMIT PHOSPHORUS APPLICATIONS

An early preventative method that reduces harmful phosphorus from entering water bodies is limiting applications of phosphorus to turf in the first place, Braig says. "In

freshwater, when we're talking about nutrients, the limiting nutrient is almost always going to be phosphorus," he says. "So that's kind of the low-hanging fruit."

Limiting phosphorus to water bodies eliminates the food that fuels

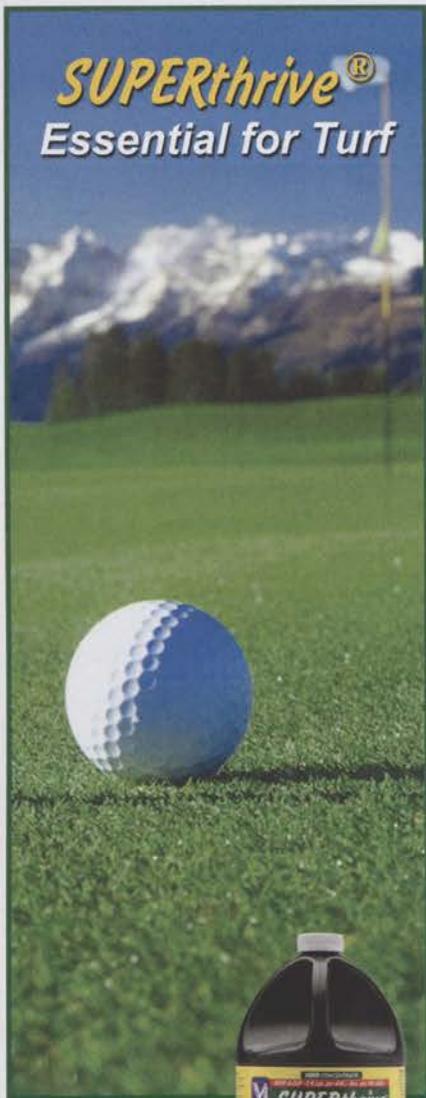
the growth of invasive and exotic plant species and algal blooms, says David Ellison, aquatic biologist and regional director for SOLitude Lake Management. And on a golf course that uses a pond or lake for irrigation, a reduction

in phosphorus decreases the chances an irrigation pump becomes clogged with algae, vegetative debris or aquatic weeds.

2 GROW BUFFER STRIPS ALONG THE EDGES OF WATER BODIES

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WATER & IRRIGATION

short-cut turf and water features provide numerous benefits to the water, as well as to worker and player experience, says Joe Gallagher, president of Ecological Solutions Inc. Buffers prevent phosphorus and other nutrients, as well as golf balls and sediment, from entering the water. They also restrict geese's access to the area.

Golfers are often reluctant to embrace buffer strips because they don't like their appearance or because they slow down play, says USGA Green Section agronomist James E. Skorulski. When vegetation is overgrown, players lose golf balls. Extra vegetation at any height works better than turf cut at short heights, though.

"The deeper, native strip of vegetation would be more effective, and I generally promote that and recommend that," Skorulski says. "But hey, I'll take four to six inches, anything, besides having short-cut turf leading into the edge of the pond."

3 RUN PROFILES OF WATER FEATURES

To address high phosphorus levels in stratified waters, superintendents should measure their water's temperature and concentration of dissolved oxygen, or hire a contractor to do so, Braig says. "I think profiling a pond would let you know a lot about how to better manage the water quality of the pond," he says.

4 DEEPEN SHALLOW WATER BODIES

Deep water bodies receive less sunlight throughout than shallower ones, reducing the potential for harmful algae and plants to grow aggressively, Skorulski says.

"If (superintendents) have a shallow pond – and usually those tend to be more eutrophic (rich in nutrients, plant populations and reduced oxygen levels) with more sediments. They can dredge if that's possible, deepen the column to a minimum of six but preferably eight feet deep," he says.

Shallow areas in ponds can serve a practical purpose. Some suburban golf courses have safety shelves in their water features to prevent children from falling in, Braig says. "If you've got one of those shallow shelves, you can grow emergent vegetation like cattails right across the entirety of that safety shelf," he says.

5 INSTALL DIFFUSER AERATORS TO PROVIDE OXYGEN THROUGHOUT THE WATER COLUMN

In deep water bodies, superintendents should install diffuser aeration, Braig says. "You blow some bubbles down there, and as those bubbles are floating to the surface, they're pushing water with them so they force the water column to mix," he says. "That means stratification can never set up. So you have the potential to dissolve oxygen that's produced by photosynthesis from the plants that grow in the pond all throughout the water column. In doing so, you keep oxygen close to the bottom, which makes phosphorus less able to dissolve."

In shallow bodies of water, fountains can introduce oxygen to the surface, but they aren't effective in mixing the water column, Braig says. When addressing issues in deep water bodies, aeration diffusers are the least expensive option, and more efficiently mix the water column.

6 ENSURE WATER FEATURES CONTAIN A VARIETY OF ORGANISMS

To keep a healthy system, there must be a balance of lifeforms, Gallagher says. "You want to make sure you have aquatic organisms – fish, frogs, those sorts of things," he says. "If you don't have those things in your system, there must be something wrong with it because they should have it in a natural system."

7 KEEP VEGETATION COVERAGE LOW TO AVOID FISH KILLS

If there are fish in a pond, vegetation coverage in the pond should be kept below about 30 percent, Braig says. When there is a large number of plants in a water body, those plants take up oxygen that fish need to survive. If the pond is used as a fishery, vegetation coverage should generally be kept below 20 percent.

8 MAINTAIN DIVERSE AND NATIVE PLANTS

When managing plants to benefit water quality, Braig says to make sure the plants are diverse and native. "If you have a complete coverage of only one type of plant that's only active in one time of the

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WATER & IRRIGATION

year, you lose that benefit when those plants die for the season," he says. Any plants that are not native are likely to be aggressively invasive. Plant diversity allows for a stable ecosystem, reducing the possibility that one species could grow excessively, Ellison says.

9 CAREFULLY READ AND ADHERE TO INFORMATION ON PRODUCT LABELS

Aquatic herbicides and algae-cides often differ in rate and frequency recommendations and use restrictions, Ellison says. "Products used in aquatic plant treatments are highly regulated to protect animals, but can create issues when improperly ap-

plied," he says. "SOLitude highly recommends using an experienced and licensed aquatic applicator for any lake or pond applications." When water features are used for irrigation, there are often additional restrictions or best management practices for algae-cides and herbicides.

10 APPLY AQUATIC HERBICIDES EARLY IN THE SEASON.

Controlling aquatic plants early in the growing season is more effective than waiting months to do it, Braig says. However, aquatic herbicides can't be applied pre-emergently because their effects don't last for

A golf course pond with submersed aeration.



long. "Apply early in the season, but you're not applying it until you actually have something to affect," he says.

11 APPLY ALUMINUM SULFATE TO CONTROL PHOSPHORUS LEVELS

Aluminum sulfate starves algae by removing their availability to phosphorus, Braig says. "If you want to use aluminum sulfate to remove nutrients from availability, just be mindful of the nature of your watershed," he says. "If the inputs from outside, for example from phosphorus, applied to turf are overwhelming, you might not get much

benefit from a treatment like that, but you might."

12 DON'T ELIMINATE ALL ALGAE AND WEEDS

Taking steps to control all the aquatic weeds in a water body will probably create more problems with algae, and cleaning up all of the algae will likely increase plant pressure, Skorulski says. "It's kind of a mixed system," he says. "You don't want a completely pristine body of water. It doesn't hurt to have some algae in there, or to have some aquatic plant material." 6C1

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WINTER THOUGHTS



Paul F. Grayson is the Equipment Manager for the Crown Golf Club in Traverse City, Mich., a position he's held for the past decade. Previously, he spent 8½ years as the equipment manager at Grand Traverse Resort & Spa. Prior to that, he worked as a licensed ships engine officer sailing the Great Lakes and the oceans of the world.

The weather was good for outdoor projects about a month longer than usual as we ended 2016, so I was needed in the shop even though the golf course was closed to sharpen tools and repair the machines being used when they broke down. The big projects were filling the sand traps to the top with sand and a pond landscaping art project. The ponds are getting a nautical look, stubs of the two power poles that were cut down (100 feet each), are being lined up on the water's edge to look as if they are driven in waterfront pilings. It looks pretty cool. Some old mooring line draped here and there with a seagull or two would finish off the theme nicely. Also, some fence that fell down needed to be replaced before the ground froze. The fence was scheduled for next season but with this extra month of warm weather it got done this year.

Replacing fence posts required dusting off the three-point, tractor-mounted posthole digger and getting it ready for the landscaping crew to use. Because it had been stored assembled, the PTO shaft was seized. Once seized, PTO shafts are scrap. A quick trip to the dealership and I had a new shiny one. When I got it running, the posthole digger made drilling holes in heavy clay easy. The decorative fences are up, everyone is happy. When done drilling, the PTO shaft found a home



Winter is a good time for projects that are difficult to complete during the peak golf season.

in cold storage on the wall, disassembled, coated with anti-seize, waiting for the next time it will be needed.

Putting the shop to bed for the winter meant taking all the reels off and lining them for transport. They are going back to the dealers for regrinding and bearing replacement. The bearings in the rollers and reels seem to last about one-and-a-half seasons without any attention so replacing them each year assures they will operate flawlessly the entire season. This past season I had to do some emergency bearing replacements and when I checked with the dealer it was because they had not actually replaced ALL the bearings. While they had charged us for replacing all of them,

they admitted to only replacing "the ones that needed it." They refunded the bearing charges on the reels I had to rebuild midseason.

I cleaned off the workbenches and painted their tops with the same paint that is used to paint the floor. Picked everything up off the floor to clear the way for the people who use the shop in the winter and paint the floor when the reels are gone. I switched the lift from mower lifting feet to on-road vehicle lifting pads. In the winter people use the shop to repair their cars

and trucks. It is a clean, dry, warm place to work on such things and the shop tool set is extensive.

My thoughts keep coming back to the idea of designing and building a turf utility vehicle with a variable frequency AC electric motor in each wheel (4WD), and a large engine-generator to power it. It should also be modular construction, easy to main-

tain, a design each golf course could build from plans with locally available materials.

I have several generators. I'm thinking of using one of them for the prototype. Once I work the bugs out of the design, I could get a larger one or better yet a marine grade generator that is meant to run while being bounced around. The Kubota engine in most of the mowers is actually a marine generator engine – I found that out when I needed to buy a B-end plate and the dealer I had to get it from was a marina in Florida. For just a fleeting moment, when buying that part, I felt like I was in the same league as his other millionaire customers. **GC**



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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.



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.

CROSS-COUNTRY SKIING TRACKER

Classic-type cross-country skiing is very popular for the members at the Edina (Minn.) Country Club, where Brandon Schindele is the superintendent. This 2015 Kubota RTV-X1100 Turf Vehicle (\$19,000) has a heated/AC cab and front winch. The wheels and tires were replaced with Camoplast Tracks (\$4,500). The YTS Groomer, with two Classic Track Setters & Compactor Roller (\$9,200) groom side-by-side trails throughout the course. The Kubota was further modified by adding front and rear 42-inch wide LED Light Bars on the roof facing front and back (\$130 each), one Kenwood Radio for the cab (\$85) and one set of cab speakers (\$20), all available from www.amazon.com. Equipment managers Tim Roddy and Andy Smith performed the installation of the radio, speaker and LED light bars in one day, which included installing controls for the groomer track setter and groomer teeth by means of a five-wire trailer cord (\$50) bought at Napa Auto Parts. The roller attachment is used to firm up the snow on the cross-country trails. The Kubota is also used during winter course inspections and by the equipment managers during the growing season.



GREENS MOWER HOMEMADE TRAILER

This 2012 Baroness LM56 Greens Mower is being transported in a trailer made in-house with angle iron and flat steel welded together. The dual ramps are made of flat steel heated and bent on each side for stability that are bolted to industrial hinges. The ramps are held in place with safety chains during transport. The upper wooden storage bin is used for grass clippings and then the grass catcher is transported in the open space below. The wheels and axle were recycled and all materials were already in inventory. It took about 1½ days to build. The trailer is pulled with a 1995 Yamaha golf cart, which has a rear-mounted plastic four-sided tube for holding the long-handled hand tools in place. Hajime Asahi, is the course manager/superintendent/head greenkeeper at the Taiheiyō Club, Inc., Kohnan Course, in Japan.





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(continued from page 10)

from others with what you've learned about yourself

- Monitor your efforts and successes at improvement, but don't get hung up on meeting a time limit or be ready to suffer discouragement

Sixth, understand why the grass ceiling exists. Despite the hours of work, education and working our way up the ladder, and even if we reach a comfortable financial level, some people are going to freak out when the "farmer" is making as much money or holding as much responsibility as they are. Our salaries could be getting too close to that of the general manager, the pro, even some of the members. That's when, despite our scientific expertise, we become a threat.

To overcome these negative perceptions and earn the recognition and rewards, make others see your competence, leadership abilities, technical knowledge and the other competencies typical of successful businesspeople. To do this, you must build a reputation fitting of someone in a top management position.

On the conference circuit last fall I noticed more of you in coats and ties. I attended and conducted more professional-development seminars focused on financial, career and business planning. I heard and had more conversations about economics, not just agronomics. All of those are good signs that superintendents are taking themselves and their profession seriously, which is critical if we want to be taken seriously by others, particularly those who employ us.

I'm also seeing more supers assume the role of COO, another step toward showing others we care about more than just turf.

To get ahead and reach a level of leadership, you need to champion and market yourself. This means actively managing every step of your career, and may mean working harder than ever before. We all can't become the upper-level employee our club/company is looking for, but we can develop the talents and skills the club/company prizes. Create a personal-growth plan with the help of a mentor, association and industry network. Commit to it and commit to building and showcasing yourself and your skills. **GCI**

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Believe it or not, I do not live and die based on how many “likes” I get for Tweets or posts on Facebook. That said, I do love that warm fuzzy instant feedback and occasionally it is a good barometer that you’re on to something.

That happened a few weeks back in a discussion about the prospects for assistant superintendents on Gary Grigg’s awesome “Golf Course Maintenance” Facebook page. Brian Benedict from Seawane G&CC asked a good question that ignited a zillion responses:

“Anyone concerned about the lack of assistants and kids in the turf schools? Seems like more and more the jobs are plentiful and the applicants are non-existent.”

At some point, I saw the post and replied: “Huge problem and it’s likely to get worse until we get assistant salaries in line with reality.”

That got a few dozen “likes,” thus giving me a nice little ego boost and indicating that maybe I was a little bit right. Thus, a column is born!

So let’s start this conversation for real...

Turf school enrollments are less than half of what they were back in the peak in the early 2000s and many of the smaller schools have eliminated the degree entirely. The market downturn started in 2001 and we went from high demand and lots of growth to

closing more than 1,000 courses, stagnant budgets and little if any salary growth for supers or assistants. Now, as the business gets healthier, demand for talent has far outstripped supply.

Golf is no longer the only game in town for young turfheads. On top of smaller enrollments overall, many students see sports field management or even lawn care as better options than golf.

Salaries for assistants have not increased commensurately with salaries for superintendents. We’re still stuck in this AIT salary model based on the outdated notion of “apprenticeship” – the young turf grad commits to a few years of indentured servitude and 80-hour work weeks in exchange for a quick opportunity to get a head super job. That simply never happens anymore. And remember that many of these traditional four-year turf students will graduate with a crapload of student debt. Most assistants don’t get decent superintendent jobs (paying \$50,000 or more) for 7-10 years these days. Why?

Superintendents are staying put in their current jobs. There’s little mobility and many supers are holding on to their current positions for dear life.

So, we have fewer young people interested in spending a pile of money to get a degree in a field where they will almost certainly starve and work their butts off in the heat and cold for 10 years before maybe getting a decent job. They can be totally passionate

about turf and that still doesn’t work if they have families to feed.

So, what do we do?

I’ll now refer you back to my pithy Facebook response because it’s the only legitimate answer. We have to improve compensation for this position.

I’m not sure I trust any of the salary averages from the various associations that produce such things, so let’s just take a typical hypothetical situation. A super at a mid-scale private club earns \$85,000 a year. Chances are good under the traditional apprenticeship formula that his assistant makes \$35,000, or about 40 percent of the boss’s salary.

We need to start looking at the value of a good assistant to an effective agronomy team and make the case that assistants should earn 50 to 60 percent of what the super earns. When the super at that mid-scale club makes \$85,000, the assistant deserves to make \$45,000 to \$50,000 as a general rule.

How do you make that change? Well, first, look at the profitability of your facility. If you’re doing relatively well, your owners can probably afford it if you make the case. Second, if you have to choose between reducing your crew headcount by one or even reducing crew hours in return for recruiting and retaining an excellent assistant, that’s a no-brainer.

The fact is assistant salaries are going to go up because of demand at the top. We’re already seeing Top 500 clubs reassessing pay scales for the second-in-command and other key positions. The discussions about assistant compensation that began with the possibility of the Department of Labor’s planned changes to the overtime law have now turned into a realization that we simply have to pay better if we want quality people.

As Paul Latshaw wrote in this space a couple of months ago, “It’s the superintendent’s responsibility to fight for good salaries for assistants.” As you consider what’s important to your future success, remember those words and begin to make your case for the future. **GCI**



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