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## the water issue

Our annual look at how you're managing the industry's most precious resource.

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Precision water management / **P 20**

Overcoming too much water / **P 52**

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## #TORO100

Not long ago I addressed all of John Deere's North American golf/turf dealers about the state of the industry, market trends and what customers (i.e., you guys) are thinking. As always, I made up a bunch of stats, spoke loudly and pounded my fist on the table to demonstrate the importance of what I was saying... and they seemed to buy it.

During the Q&A, one dealer asked me for my opinions about Deere's competitors. I said Jacobsen is aggressively working to regain its position in the market and doing a lot of things well. And Toro? Well, I said, Toro is just a beast. They're focused as hell and they almost never make mistakes.

The Toro Company is, quite simply, the most respected supplier in our industry, according to our study a few years back. But that study merely proved the obvious.

For 100 years, Toro has been single-minded in one pursuit: creating better tools to maintain golf courses. And, over a century in which golf maintenance has evolved exponentially, no company has done more to support technology, training and professional development for superintendents.

Corporate anniversaries are generally more interesting to the company than customers, but this one is noteworthy because Toro's story is really the story of the evolution of the golf business. They started by providing better versions of the simplest equipment during simpler times early in the 20th century. As demand for better conditions grew, Toro grew more sophisticated. As irrigation became standard, they expanded to create solutions. As technology became more complex, they provided training and put more people into the field to work with customers, observe needs and bring ideas back to the engineers in Minneapolis. And, as golf globalized,

they became a worldwide brand serving the needs of turf managers everywhere on the planet. Today, as facilities must reinvent their business models, Toro is focused on a pitch-perfect message: Turfonomics.

It's fitting a big part of Big Red's centennial celebration has been to ask customers to tell their Toro Story. My Toro Story has to involve the legendary Dr. Jim Watson.

Doc Watson – one of the many World War II vets who shaped our business – was part agronomist, part engineer, part salesman, part market cheerleader and part corporate executive (he hated the executive part). But, when you put those all together, they equaled “Mr. Toro.” He was the face of the company in the business for nearly half a century. He was tough-minded but always had a quirky smile on his face and a devilish twinkle in his eye. His job – as far as I saw it – was to be a conduit between the

needs of customers and the brains of the people who created solutions back in Minnesota. He was, above all things, a Turfhead (before that term existed) who fought for fundamental agronomy and constantly looked for ways to make courses better.

In short, Doc personified Toro: determined, customer-focused, steadfastly sticking to a long-term plan and always looking for a better solution.

It's a happy accident that Toro's birthday falls in the same month when we focus our entire issue on water and what it means to golf. Precision turf management and the irrigation technology it demands will be critical to the future of the game. It's reassuring to have a company like Toro quietly leading the way to solve those problems before water becomes a crisis in our business. That's not pandering... it's just a fact.

So, enjoy the big birthday bash Toro... and then get back to work! As always, we're relying on you. GCI



**Pat Jones**  
Editorial director and publisher

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## Brendan Hoban named recipient of Stanley Zontek Memorial Scholarship

By Guy Cipriano

The recipient of the 2014 Stanley Zontek Memorial Scholarship presented by GCI doesn't sit still often.

University of Georgia senior Brendan Hoban maintains a 3.13 GPA in turfgrass management while competing for the Bulldogs' NCAA Division I cross country and track and field teams. Hoban is working as an intern at East Lake Golf Club in Atlanta this summer. Before beginning shifts in the stifling Georgia heat, he trains for the upcoming cross country season, sometimes running as many as 10 miles.

"It's about finding a rhythm," he says.

Hoban has been finding a rhythm on golf courses since a young age. His father, Mark, is the superintendent at Rivermont Country Club in Johns Creek, Ga. Hoban started working



Hoban

alongside his father at age 7 and received his first formal job on the Rivermont maintenance staff in 2007. He also has worked at Peachtree Golf Club and Atlanta Athletic Club, all before turning 22 years old.

"It's a passion," he says. "I love everything about it.

I love talking to my dad about it. I love the research side of it. That's kind of where I'm at."

The Zontek Scholarship, an unrestricted \$2,500 grant, supports a turf student with a passion for the game. Selection criteria include academic performance, advisor/superintendent recommendations and an essay about why the student is passionate about a career as a superintendent.

The award honors Stanley J. Zontek, the former director of the USGA Green Section's Mid-Atlantic Region. Zontek died after suffering a heart attack at

age 63 in 2012. He joined the USGA in 1971 and was the organization's longest-tenured employee at the time of his death. Zontek, whose father was a superintendent, started his career raking bunkers for \$1.10 per hour.

"That's what I find super interesting," Hoban says. "We are following similar paths. His father was a superintendent, like my father is a superintendent. Reading his story, it's kind of like this bonding experience. I feel like the passion he had for the industry is what I feel like I have. I definitely see exactly how he feels. It's a people business."

Collin Harley received the 2013 Zontek award.

**+** For more on Hoban:  
[bit.ly/1qHidRT](http://bit.ly/1qHidRT)

**+** For a Superintendent Radio Network interview with Hoban:  
[bit.ly/1jImDH4](http://bit.ly/1jImDH4)

## Minnesota course using storm run-off water for irrigation

By Jacob Zuckerman

The land of 10,000 lakes has had some trouble living up to its nickname; its lakes are drying up as groundwater is being used faster than it can be restored. While golf courses comprise a small percentage of groundwater use, some courses are doing what they can to address the growing problem.

Enter Oneka Ridge Golf Course in White Bear Lake, Minn. This summer marks the first season of use for the Oneka Ridge Golf Course Water Re-Use Irrigation Project. The project is an environmentally driven collaboration between the Rice Creek Watershed District (RCWD), the city of Hugo, Minn., and the Oneka Ridge Golf Course.

The three parties worked together to build a large pond for the

golf course that catches run-off storm-water from approximately 915 acres of land. Oneka Ridge then uses this water for irrigation purposes on the greens. This not only prevents aquifer depletion, but stops phosphorus taken by the water into nearby White Bear Lake, causing an algae bloom.



## From THE FEED



We asked for candid thoughts on Pinehurst No. 2 immediately after Martin Kaymer's final putt fell into the cup to complete the first half of the course's U.S. Open marathon. We received plenty of them.



**Dave Pitkins Jr.** @DPitkinsJr

@GCI magazine it's awesome but will never catch on. American golf public is addicted to easy bunker and rough play, don't want penal shots



**TSTC Waco GLM** @GLM\_TSTC

@GCI magazine great for this competition. However: green>brown>dead.  
#photosynthesis #sprinklersontonight



**Savannah Quarters CC** @SQCCAgromy

@GCI magazine They did exactly what they set out to do. Not sure it was as well received as they hoped. Don't think it's an industry changer.



**BG** @ItsNotBarry

@GCI Magazine Good for the fight against Augusta syndrome. However, that look is very specific to that course/soil/climate.  
#NotForEveryone



**Scott Wiiki** @p0annua

@GCI magazine I thought it was awesome! Just don't ask @realDonaldTrump



**Steve Dorer** @SteveDorer

@GCI magazine made me want to play golf! Variety is the spice of golf!



**Scott Dickson** @ScoAllD

@GCI magazine the world wasn't ready



**Brett Morris** @brettmorris73

outstanding, shows that brown is not bad in this instance



**Mike Posey** @Hoover\_Agronomy

@GCI magazine They went too far for the public. Set sustainable golf courses back decades!



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## Superintendent turns damaged trees into benches

By Guy Cipriano

Nick Folk found an ideal way to use wood from white pine trees damaged by Imprelis. The wood helped Folk, the superintendent at Rochester Golf and Country Club in Rochester, Minn., make new benches for the 18-hole golf course.

The desire to use the wood for a course-related project sparked the idea. The low price of pine made selling the damaged trees difficult, but Folk found a willing trade partner in a Minnesota sawmill operator. Folk picked 20 logs of perfect quality and the sawmill cut the logs into 3 inch by 12 ½ feet sections with a depth of 18 to 22 inches. The sawmill performed the task in exchange for hardwood logs the course had removed last winter for sunlight/turf quality reasons.

Rochester GCC has 22 benches on its course, and Folk plans to replace all of them. Folk makes the benches himself, using a drawknife to shave off bark. He then cuts tops, legs and support pieces before assembling, sanding and staining the benches. He applies four coats of urethane on the top of the benches and two coats on the legs and underside. When he completed his first bench, Folk posted a picture on his Twitter account of the sturdy-looking unit resting on a tee. "It's a fun project," he says. "That's why I was so excited to get it out because they are pretty unique." Folk had the first bench on the course before the start of one of the club's major summer tournaments in June.

The benches fit Rochester GCC's rustic surroundings. "It's beautiful wood, even though it's pine and not hardwood," Folk says. "We have white pines on the property that are 100 feet. You don't see wood like this. That's the unique part of this and then to re-use it on the course. ... Our members are going to be really excited about that because they were upset that the trees were damaged and that we had to cut them down. To do something like this is really unique, and my committee and board are super excited about it."





BY GUY CIPRIANO

Overhauling your irrigation system is a massive undertaking, but it doesn't have to be an intimidating project. Here's how to simplify it.

# THE

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**R**eplacing an irrigation system might be the biggest – and most important – project in a golf course superintendent's career.

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So let's get the process started correctly.

#### PROBLEMS UNDER GROUND

Brian MacMillan became the superintendent at Port Jefferson Country Club on Long Island in 2010. He inherited a big problem.

The course's irrigation system, which MacMillan estimates was 20 to 25 years old, didn't stop leaking. To control the water, MacMillan relegated one of his two assistant superintendents to leak-related duties. The job lacked glamour and offered few respites. Annual repair bills exceeded \$20,000.

"I understand fixing a head in the afternoon or two or three heads a week," MacMillan says. "That's fine. But having a guy non-stop to just do that. ... We knew we could open him up to do so many more things, really paying attention to turf conditions instead of looking at the irrigation system all the time."

With 63 holes of golf and more than 70 acres of common areas, Timber Pines in Spring Hill, Fla., had what superintendent Robert Wiemer calls a "piecemeal" irrigation system, with components being installed as early as 1982 and as recently as 1995.

The facility's irrigation needs are vast and the amount of water available is fixed, which made obtaining an efficient system utilizing HDPE piping a priority. "We only have a certain amount of time to water – when it's dark until it gets light out again because everybody wants to go out and play golf," Wiemer says.

Poppy Hills Golf Course in Pebble Beach, Calif., sought to upgrade its 16-year-old system to improve efficiency as a means to handle California's water restrictions and rising utility costs.

"With any system, it's about efficiency," says Manny Sousa, the course's superintendent for the past 24 years. "You want to be efficient in water distribution so your turf is always in good health. You don't want it wet. You don't want it dry. There's also power consumption. That's all big dollars. We're also looking at the next big thing. Generally speaking, it's time anywhere from 16 to 20 years. It's not that it can't go any longer, but if you want efficiency, you stay within 16 to 20 years."

Consultant Dave Davis of David D. Davis and Associates has worked on more than 200 golf course irrigation projects. He says it's time to start pushing for a new irrigation system when those outside the maintenance crew begin noticing problems.

"When complaints get to the greens committee and it has to do with playability, that's when it's time to renovate or repair," he says. "Or another sign is when you have a single part of your irrigation system that is the majority of your repair bill for a season or a series of seasons."

#### CONVINCING TIME

Identifying a faulty or inefficient system doesn't guarantee a greens committee or an owner will propel irrigation atop a priority list.

"The members might see the mowers, but they don't see the sprinkler heads, they don't see the pipe, they don't see the broken fittings," irrigation consultant Jim Barrett says. "You don't see irrigation. Part of the decision-making process for the decision-makers or membership is showing them the defects."

Barrett, founder and president of James Barrett Associates, has worked on 400 golf course irrigation projects and combined with four other experts to publish a 464-page book, "Golf Course Irrigation." A "realistic appreciation" of the project's cost must be determined early in the planning process, he says, and superintendents must perform significant research to prove the need justifies the cost. And, yes, irriga-



# BY THE NUMBERS

## Annual water budget

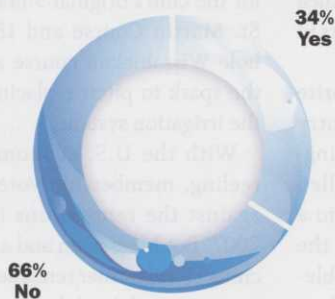


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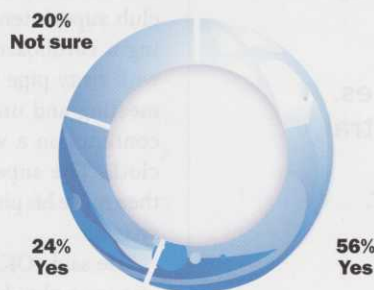
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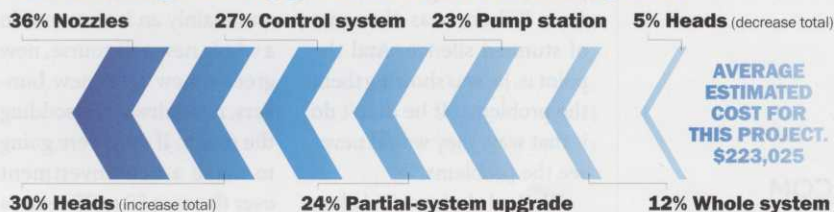
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### Regarding the approval process for a proposed irrigation upgrade, do you have the ability to demonstrate a return on investment (ROI) to your board or ownership?



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the water issue



An irrigation system replacement was included in the major renovation plans for the Philadelphia Cricket Club. The renovations started in the fall of 2011 and were completed this past spring.

tion is costly, with many new systems ranging between \$1 million and \$2.5 million.

Photographs and Power-Point presentations are traditional ways of demonstrating the need for a new system. Sometimes, though, it takes a bold maneuver to convince a facility's decision-makers to support a project.

One of Barrett's favorite stories involves a country club superintendent bringing a cardboard box filled with rusty pipe fittings to a meeting and unloading the contents on a white tablecloth. The superintendent then made his pitch for a new system.

"He said, 'OK, people, if I was your plumber and took these pipes out of your walls, would you believe me when I said, it's time to replace your plumbing?'" Barrett says. "There was this sort of stunned silence. And the point is, he was showing them the problems. If he didn't do it that way, they would never see the problems."

Philadelphia Cricket

Club director of grounds Dan Meersman used more guarded tactics when convincing his board to include an irrigation system replacement in the club's golf course restoration plans. He used physical changes proposed for the club's original 9-hole St. Martin Course and 18-hole Wissahickon course as the spark to pitch replacing the irrigation system.

With the U.S. economy reeling, membership voted against the renovations in 2007. But Meersman and architect Keith Foster remained persistent and the club started its restoration project in the fall of 2011. The final stages of the project were completed this past spring. "We had normal wear and tear in our irrigation system," Meersman says. "But that's not what drove it and sold it for us. It was mainly an investment in a whole new golf course, new greens, new tees, new bunkers, new fairways, resodding the rough. If they were going to make a new investment over the next 50 to 75 years, a



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new irrigation system to match those new features was just a necessary process.”

Poppy Hills completed a \$6.5 million course renovation project this past spring. The project started with discussions about replacing the irrigation system, Sousa says. The discussions, many of them informal, occurred regularly for years, and led to the course’s owners, the Northern California Golf Association, deciding to complete all of the work at once.

“It’s one of those things where it begins with a discussion and somebody says, ‘Our sprinkler heads should be replaced. Our pumps are OK, but they are old and we might get

by, but it doesn’t make sense not to replace them,” Sousa says. “It’s like a train going down a hill. You can’t stop. You try to do one thing, it escalates and they say, ‘Let’s do it right.’”

**CHOICES, CHOICES, CHOICES**

Sousa compares the competition to sell irrigation systems to the development and marketing showdowns in one of America’s iconic industries.

“I have been in the business for almost 40 years,” he says. “I have dealt with lots and lots of irrigation systems. Different types, old types, cheesy types, good types. But in the last 20 years, the ones I felt more worth dealing with were Toro

and Rain Bird because they are typically like the Ford to Chevy. Ford says, ‘No, we have a better car.’ The next year, Chevy says, ‘No, we have a better one.’ Then Ford says, ‘Good luck. Now we have a better one.’ There are always trying to outdo each other and they are trying to do it to make money. For us, what it does is take technology to the next level. For us, it’s a great thing.”

Price and service were the biggest factors in Timber Pines’ decision. Members and the club’s board of directors heard presentations from the two major suppliers competing for the project. The facility selected a two-wire system to eliminate

running copper wires out to the course. The system fit the facility’s budget. “We did a lot of teaching to let our residents and board of directors know why this was the system that fit our needs,” Wiemer says.

Philadelphia Cricket Club considered aesthetics when making its decision. The club wanted to control irrigation on all three of its courses – a third 18-hole course opened in 2002 – from a central location through the Internet, and it didn’t want visible signs of the irrigation system.

“We didn’t really want to see any satellite boxes,” Meersman says. “We have really vast vistas and an old, classic

# Still Dragging Hoses?

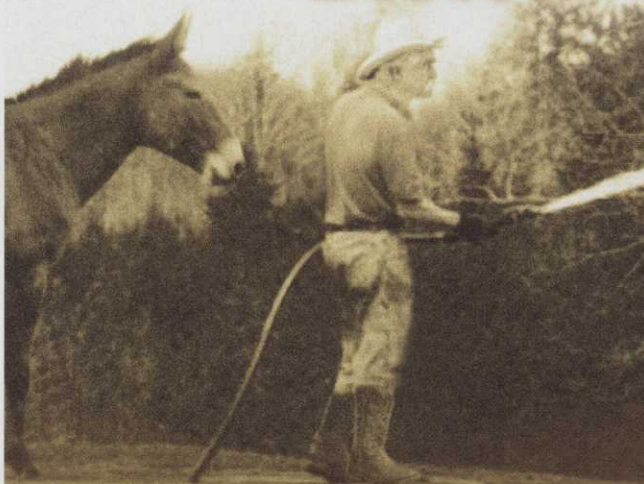
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Time-consuming and expensive repairs led to Port Jefferson Country Club on Long Island replacing its irrigation system. Renovations at the club also included a bunker restoration project. The course reopened this past spring.

course. We didn't want to see any infrastructure on the course from the irrigation system. We wanted to get it under one vendor to make that happen."

The availability of local service must be a priority when picking a system, Davis says. "What we say as somewhat of a parody is that your system fails on the day before the member-guest tournament," he says. "It always fails at the wrong time, no matter what, no matter how good or bad the system is. You need people that are close."

#### OPENING AND CLOSING

Strangers will be on your course for months, which means operating adjustments

must be made.

Port Jefferson, for example, started its project in mid-November of 2013. The weather allowed for regular work until Christmas. Snow then pestered Long Island for the next two months.

The club opened nine holes on April 1. The entire course opened in May. MacMillan calls the disruption to play "minimal." A normal season consists of the club opening nine holes around St. Patrick's Day.

Philadelphia Cricket Club completed its course restoration and irrigation project in phases, with work starting in the fall of 2011. The project was finished this past spring.

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## ALUMNI UPDATE

**T**he diversity of the superintendents and the opportunity to network was fantastic. We all have different budgets, different turf and different sites, but we all deal with the same challenges regarding management.

I particularly appreciated the presentation on bridging the generation gap. I have 65 employees, all the way from teens to guys who are ready to retire. We learned how to bond and create a team when you have a wide diversity of ages and cultures.

We are now focusing on staff appreciation; we've implemented an employee of the month program and learned to offer incentives other than money. Making people feel appreciated at the end of the day has really increased morale.



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the water issue

The club has 45 holes, which makes enduring a major project easier compared to courses with 18 or 27 holes. Members also received reciprocal privileges at 50 Philadelphia-area courses. Meersman considers communication with members, especially when it comes to a club's reciprocal program, key to a successful irrigation or renovation project.

Timber Pines completed its project in phases and limited most of its course closures to nine holes at a time. Because of the scope of its renovation project, Poppy Hills was closed for 13 months. The course reopened this past spring. "Basically, it was 10- to 12-hour days, six days a week when the contractor was here," Sousa says.

One of the myths surrounding irrigation work includes images of large vehicles tearing into pristine turf. Many members will be surprised by the scenes they witness. "The equipment is very small equipment," Barrett says. "There aren't 500 guys all over the golf course."

A solid presentation to members can eliminate concerns regarding the construction process. To ease member apprehension, Barrett recommends using pictures of successful golf course irrigation work. "That part is really important," he says. "Most members expect the world to end for two years." **GCI**

*Guy Cipriano is GCI's assistant editor.*

## GO TEAM, GO

**S**uperintendents spend most of their working lives concocting ways to maintain and enhance what rests above the ground. There's no shame in soliciting help when plotting an irrigation system replacement. In fact, it's encouraged.

"The biggest decision was pretty much finding the right consultant," says Robert Wiemer, the superintendent at Timber Pines in Spring Hill, Fla. "The consultant is somebody you bounce ideas off. They have the experience to deal with the negatives and positives, and what can happen."

Dedicating an assistant or veteran irrigation technician to the irrigation renovation also helps reduce the stress associated with the installing and digging. "It takes a huge load off the superintendent. (He) still has a golf course to maintain, and if he thinks he can be the 24-7 guy in the trench and run his golf course, he is really going to drive himself to drink, lose his hair or get old in a hurry, more so even than the normal stress of being a superintendent," says irrigation consultant Jim Barrett.



Poppy Hills Golf Course in Pebble Beach, Calif., completed a \$6.5 million renovation, which included an irrigation system replacement, this past spring.



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

## WATER, WINTER AND WATCHFULNESS

Those who ignore the past are doomed to repeat it.

**W**hatever form it comes in – liquid, humidity, frozen – too much water is never a good thing. But too little is no picnic, either. It should be news to no one that right now, while certain regions of the country are in dire need of water, others have had way more than their share in the form of rain, snow, hail and otherwise.

But that was last year, or last week. What are you doing about water now to prepare for the future? No matter what part of the country you're in, you can't be waiting until Labor Day, Thanksgiving, or worse yet, Christmas, before you make plans and take action to reduce water's harmful effects next year.

The future will come first to those of you in the Southwest and other regions where water shortages have become disastrous. I'm sure you are doing all you can to find what water you can and prepare your course for severe shortages. But are you also doing enough to convey the severity of the situation to your members and the general public? Are you communicating to one and all what effects a lack of water has on golf courses, and what effects that can have on the local economy? While there is no silver lining to the water crisis we're facing, it is an opportunity for golf course superintendents everywhere to step up, start talking and becoming the leaders you wish and need to be.

Those of you anywhere else in the United States, if you've been in the business less than about 15 years, have probably never seen a winter like 2013-14, and with luck you never will again. But those of us with 20 and more years have lived through numerous cycles and climatic chang-

es. We don't know how to avoid them, but we do know that ignoring climate fluctuation can cost your job.

Again, one of the most important things you can do wherever you live is become a spokesperson for our industry and what it's doing to work within regional water restrictions. Proactive education is everyone's responsibility.

“ Even though you're probably in the throes of tournament season and the time of heaviest play and greatest demands on your course, you should be thinking about next winter.”

### DON'T WAIT. THINK WATER NOW

Even though you're probably in the throes of tournament season and the time of heaviest play and greatest demands on your course, you should be thinking about next winter. What are you doing right now to protect the turf in 2015? Are you watching turf deal with the heat and humidity? If it's hurting now, just think if we have to contend with another polar vortex next January?

What are the three most important concerns on your golf course? Drainage, drainage, drainage. Retained water and ice probably cost you turf last winter. So you should be using the nicer weather now to evaluate low spots (tees, fairways, roughs), areas that drain poorly, and surface run-off (sheet flow), looking for ways to move excess water away more quickly.

Wherever you live, think about water conservation on older, soil greens without sub-surface internal drainage (non-USGA construction). Water stays in the soil under these greens; give serious consideration to

modernizing their construction and drainage.

Look at your areas of shade and your long-range tree-removal plan. (Don't have one? You should!) Are there areas not getting enough sunlight? Patches that don't thaw quickly enough in spring, dry out after rain, or allow for proper sunlight and air movement?

Get rid of unnecessary and harmful trees. Of course, that's easier said than done, and you'll likely face a fight from the members. But you already know that trees are key to the long-term health of your course, and thinning them out will increase sunlight penetration.

Have you considered a turfgrass-conversion plan for greens, teeing grounds and fairways? Again, this is a smart way to protect your agronomic investment – and perhaps your job. In the Northeast and central parts of the country, reduce poa annua and replace it with bentgrass, a more cold-tolerant species especially when wet.

Do you have adequate funds to pursue a sand topdressing program? This cultural practice promotes a drier golf course and, over time, the course will become firmer and play faster. And sand does not retain water.

Are you following current research from the major universities regarding water? North Carolina State University is taking the lead with plant-health research and how it relates to water

usage. Check out this resource at [www.turffiles.ncsu.edu](http://www.turffiles.ncsu.edu).

Do you have the proper equipment to encourage good healthy turf?

Verti-drain for deep tine aerification, compaction relief and drainage. The result will be good, strong turf with less retained water.

How's your plant-health know-how? Strengthening a plant helps protect it against severe weather fluctuations. Are you using fungicides and other treatments to prevent disease and encourage strong, healthy turf? As Dr. Joe Troll of the University of Massachusetts puts it, "Healthy turf is happy turf." Add to that, "and creates happy golfers."

Speaking of golfers, are you paying attention to their traffic patterns: where carts go, entrance and exit patterns on greens, low points? Believe it or not, all of this impacts water retention.

Consider keeping hole locations away

“ Get rid of unnecessary and harmful trees. Of course, that's easier said than done, and you'll likely face a fight from the members.

from sensitive areas such as compacted areas and low spots that are more susceptible to ice and other harm in cold weather.

And it's not too early to be thinking how you'll set up the course in fall and winter for the diehards who will play whenever they can (even when the course should be resting).

And I repeat, you must let your members/golfers know what you are doing and why, how long it will take, when it will occur, and the desired outcomes and advantages. Stress that ignoring vital practices and preventative efforts will hurt them – their golf course, their games, their investment.

I can't say it enough: communicate, communicate, communicate.

**WHAT WE LEARNED. WHAT YOU'LL DO**

In college, I learned the phrase, "Those who ignore the past are doomed to repeat it." The phrase means we have to learn from each year past how to protect our courses and our jobs in the year to come.

Where was your winterkill last year? In shade, weak turf, heavily trafficked areas? Take inventory throughout the remainder of the summer to get a jump on next winter. You work in winter to prepare and protect the course for the following summer; so it's no different.

And if you tried something in the past that didn't work, fix it for the future.

Maybe we'll be lucky and next winter won't be as bad as last winter. But do you really want to take that chance? **GCI**

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Get rid of unnecessary and harmful trees. Of course, that's easier said than done, and you'll likely face a fight from the neighbors.



WHAT WE LEARNED: WHAT YOU'LL DO  
In college, I loved the phrase, "I love who grows the grass and demands to reap it." The phrase means we have to look from each other how to prosper and prosper and not take the grass to court. When you want to reap the grass, you should work out, mostly with the grass. Take things throughout the season. Let of the summer to get a jump on new winter. You work in winter to prosper and prosper the course for the following summer, so it's no different.  
And if you need something in the past that didn't work, let it be the future. Maybe we'll be lucky and next winter, you'll be in bed as last winter. But do you want to be in bed as last winter? Or only want to be in bed as last winter?

both sensitive areas such as compacted areas and low spots that are more susceptible to ice and other damage in cold weather. And it's not only to be thinking how you'll set up the course in fall and winter for the elements who will give the course they can leave when the course should be testing.  
And I expect you must let your maintenance know what you are doing and what how long it will take, when it will occur and the desired outcome and advantages. Give the working staff practices and preventive efforts will last them - the golf course, their games, their investment.  
I can't say it enough, communicate. Communicate, communicate.

range. Check out this resource at [www.matties.com](http://www.matties.com).  
Do you have the proper equipment to encourage good healthy turf?  
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How's your plant health know-how? Implementing a plant health program is against severe weather practices. Are you using fungicides and other treatments to prevent disease and encourage strong healthy turf? As the Joe Foll of the University of Massachusetts put it, "Healthy turf is happy turf." Add to that, "and you are happy golfer."  
Speaking of golfers, are you paying attention to their subtle gestures: where carts go, entrance and exit patterns on greens, low points? Believe it or not, that's this impact water retention.  
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# CHAMPION TURF FARMS

## Need to do more with less?

Integrate precision management strategies to optimize your water usage, cut costs and produce healthier turf.

By John Torsiello

Between the vagaries of Mother Nature, increasing local governmental restrictions placed on water use during drought conditions and the cost of irrigation, superintendents are looking for any way to manage water usage more efficiently. Knowing how to strategically use weather data, soil moisture maps and establishing irrigation management zones can assist in precision management of water usage.

With an annual water budget of \$243,000 for two golf courses, Gary Carls, superintendent at Sunnyvale Golf Course in California, figures if he can save 10 to 15 percent of that figure he will have more dollars to maintain the active playing areas of the course that “more significantly affect our customers and their enjoyment of the game.”

“In our case, water is a huge expense,” Carls says. “If we can reduce the area of the course that is watered throughout the year, we can save a lot of money in the long run and be less dependent on dwindling water supplies and resources.”

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## **Avila Golf and Country Club – Tampa, FL**

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## **Berkeley Hall North Course – Bluffton, SC**

No-Till conversion from Bentgrass

## **Cabarrus Country Club – Concord, NC**

No-Till conversion from Bentgrass

## **Camelback Golf Club Ambiente Course – Scottsdale, AZ**

Greens renovation from Bentgrass

## **Carolina National Golf Club Egret Course – Bolivia, NC**

No-Till conversion from Bentgrass

## **Carolina National Golf Club Heron Course – Bolivia, NC**

No-Till conversion from Bentgrass

## **ColoVista Country Club – Bastrop, TX**

Greens Renovation

## **Country Club of Landfall Nicklaus Course – Wilmington, NC**

No-Till conversion from Bentgrass

## **Country Club of Winterhaven – Winter Haven, FL**

Greens Renovation

## **Country Hills Golf Course – Gibsonville, NC**

No-Till conversion from Bentgrass

## **DeSoto Golf Course – Hot Springs Village, AR**

No-Till conversion from Bentgrass

## **Duke University Golf Club – Durham, NC**

No-Till conversion from Bentgrass

## **Emerald Greens Cypress Course – Tampa, FL**

No-Till conversion from Bermudagrass

## **Escondido Golf Club – Horseshoe Bay, TX**

No-Till conversion from Bentgrass

## **Ford's Colony CC Blue Heron Course – Williamsburg, VA**

No-Till conversion from Bentgrass

## **Frisch Auf Valley Country Club – LaGrange, TX**

Greens Renovation

## **Governors Club – Chapel Hill, NC**

No-Till conversion from Bentgrass

## **Grand Cherokee Golf Course – Langley, OK**

No-Till conversion from Bentgrass

## **Griffin Bell Golf Links – Americus, GA**

Greens Renovation

## **Heritage Ridge Golf Club – Hobe Sound, FL**

Greens Renovation

## **Hindman Park Golf Course – Little Rock, AR**

No-Till conversion from Bermudagrass

## **Horseshoe Bent Country Club – Roswell, GA**

No-Till conversion from Bentgrass

## **Indian Springs CC Windmill Course – Broken Arrow, OK**

No-Till conversion from Bentgrass

## **Jonesboro Country Club – Jonesboro, AR**

No-Till conversion from Bentgrass

## **Kentucky Hills Golf Course – Summer Shade, KY**

No-Till conversion from Bentgrass

## **Kinston Country Club – Kinston, NC**

No-Till conversion from Bentgrass

## **Lely Resort Mustang Course – Naples, FL**

Greens Renovation

## **Magnolia Greens Golf Plantation Azalea Course – Leland, NC**

No-Till conversion from Bentgrass

## **Overlook Golf Club – Atascocita, TX**

Greens Renovation

## **Orange Tree Golf Club – Orlando, FL**

No-Till conversion from Bermudagrass

## **Mesquite Golf Club – Mesquite, TX**

Greens Renovation

## **Pinchurst No. 3 – Pinchurst, NC**

No-Till conversion from Bentgrass

## **Pinchurst No. 8 – Pinchurst, NC**

No-Till conversion from Bentgrass

## **Reynolds Plantation Oconee Course**

No-Till conversion from Bentgrass

## **Reynolds Plantation National Course**

No-Till conversion from Bentgrass

## **Ridgewood Golf Course – Athens, TN**

No-Till conversion from Bentgrass

## **Rio Pinar Country Club – Orlando, FL**

No-Till conversion from Bermudagrass

## **The Savannah Golf Club – Savannah, GA**

Greens Renovation

## **Shamrock Golf Club – Burlington, NC**

Greens renovation from Bentgrass

## **Suffolk Golf Course – Suffolk, VA**

No-Till conversion from Bentgrass

## **Sugar Creek Country Club – Sugar Land, TX**

Greens Renovation

## **The Club at The Strand Savannah Course – Naples, FL**

Greens renovation Floradwarf

## **The Dunes Golf and Beach Club – Myrtle Beach, SC**

No-Till conversion from Bermudagrass

## **The Emerald Golf Club – New Bern, NC**

No-Till conversion from Bentgrass

## **The Golf Club at Bradshaw Farm Blue Course – Woodstock, GA**

No-Till conversion from Bentgrass

## **The Honors Course - Ooltewah, TN**

No-Till conversion from Bentgrass

## **The Senator Course at Shula's Golf Club – Miami Lakes, FL**

Greens Renovation

## **Traditions Golf Club – Bryan, TX**

No-Till conversion from Bermudagrass

## **Turtle Creek Golf Club – Rockledge, FL**

No-Till conversion from Bermudagrass

## **Whispering Woods Golf Club – Whispering Pines, NC**

No-Till conversion from Bentgrass

## **Willow Creek Golf Club – Knoxville, TN**

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“If we can reduce the area of the course that is watered throughout the year, we can save a lot of money in the long run and be less dependent on dwindling water supplies and resources.”

—Gary Carls, Sunnyvale Golf Course

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If the goal is irrigation management, then current weather data is more useful than historical data, says Dale Bremer, associate professor in the department of horticulture, forestry and recreation resources at Kansas State University. The National Weather Service defines climatic norms as the average over a 30-year period. “However,” adds Bremer, “on any given day, week, or even season the weather may deviate from those averages.”

This was illustrated by recent springs, which were dramatically different in many parts of the country. An on-site weather station is probably best for determining irrigation requirements (evapotranspiration or ET) for turfgrass, although it would be acceptable to use estimates of ET from a local off-site weather station or service.

“The caveat with using off-site ET data is that you will need to have an accurate measurement of rainfall on your course, because rainfall is much more variable across short distances than other climatic variables,” Bremer says.

Carls uses more recent weather patterns to gain a better understanding of basic trends. However, in his market, the weather changes so much that he prefers to keep a watch

on what’s coming in the next 10 days versus what happened over a period of years.

The intrinsic value of historic, current or forecast data depends on the specific use or need, but in the case of precision water management accurate forecast information is the most important, says Dr. Van Cline, senior agronomist for Toro.

“Historical data is good for context, but being conscious of what’s going to happen in the next few days is most valuable for making water efficient irrigation decisions,” Cline says. Getting the most out of rainfall by factoring weather forecasts into irrigation planning is critical, he adds.

#### MAP IT OUT

Soil moisture maps are vital in developing a precision water management plan for golf courses, says Brian Vinchesi, a design engineer with Irrigation Consulting Inc.

“If soils or topography are not consistent, then the mapping may be helpful,” Vinchesi says. “If your irrigation system is poor, it would be helpful to demonstrate its inadequacies and possibly help to get a new or improved irrigation system.”

The maps can be time consuming to develop if super-

intendents want them to be accurate and helpful. The work can be hired out or can be done in-house.

“If you hire it out, it is expensive,” Vinchesi says. “If you do it in-house, you would need to purchase or rent equipment for measuring soil moisture and GPS mapping. This work is also very technical so some education on how to use the equipment, manipulate the data and present the data will be needed.” How an individual golf course prepares and utilizes a soil moisture map will depend upon its budget and how deep the superintendent wants to get into the theory versus the results, he adds.

According to Tim Cloninger, superintendent at Shadow Creek Golf Club in Nevada, it’s important for superintendents to understand three key factors when considering using a soil map for management decisions:

- What scale was the data collected – the number of data points for the area;
- What is the accuracy of the positioning equipment used to collect the data – which can range from 1 centimeter to 15 feet, GPS is not always accurate; and
- Is the soil data accurate and are there any soil factors

influencing the data?

A soil moisture map is beneficial if superintendents have a soil texture map to compare it to, Cloninger says. “The soil moisture will be influenced by the soil texture,” he says. “It is important to understand how the map was produced and what influence the soil texture has on the soil moisture readings.”

A soil moisture map helps diagnose and correct problematic areas such as where turf is overly dry or wet, Bremer says. Anything from poor sprinkler patterns or leaky heads and pipes to compacted soils that have less water holding capacity can produce inconsistent or erroneous results.

Soil moisture maps give a superintendent a wealth of information on several fronts related to water management, Cline says. Soil moisture data collected and mapped during a period of significant rainfall when soils are at or near field capacity reflect inherent differences in soil attributes that determine its capacity to hold water, namely soil texture and soil organic matter. When soil moisture data is combined with soil compaction data and topographic data, both of which also affect soil moisture patterns, superintendents get an



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even clearer picture of natural site moisture dynamics. Soil moisture data collected during a dry period of significant irrigation can yield valuable information about irrigation system performance.

In addition, soil moisture distribution relative to the irrigation system layout can be used to calculate soil moisture uniformity as an index of irrigation performance in the same way that distribution uniformity is calculated from catch-can testing, Cline says. Data collected during irrigation also provides insight into irrigation scheduling practices.

"Because of natural variability in soil conditions and

topography, all sprinkler heads on a golf course do not need to apply the same amount of water during a given irrigation cycle and over time," Cline says. "Soil and topographic data, along with the use of properly located in-ground soil moisture sensors, allow golf courses to be zoned and monitored for precision irrigation management – only applying water where it's needed at the right time and in the right amounts." And, soil moisture maps can direct the installation of subsurface drainage to remove excess water.

There are a few options for creating workable soil moisture maps, says Dr. Douglas

Karcher, associate professor in the department of horticulture at the University of Arkansas. They range from contracting out services to map the entire facility to moisture probes with GPS capabilities that can be used by golf course personnel along with subscription services to upload the moisture/GPS data from the equipment to a server and generate moisture maps.

"Maps can also be created in-house with inexpensive software using the moisture data along with either GPS coordinates or X,Y coordinates from a simple grid system," Karcher says.

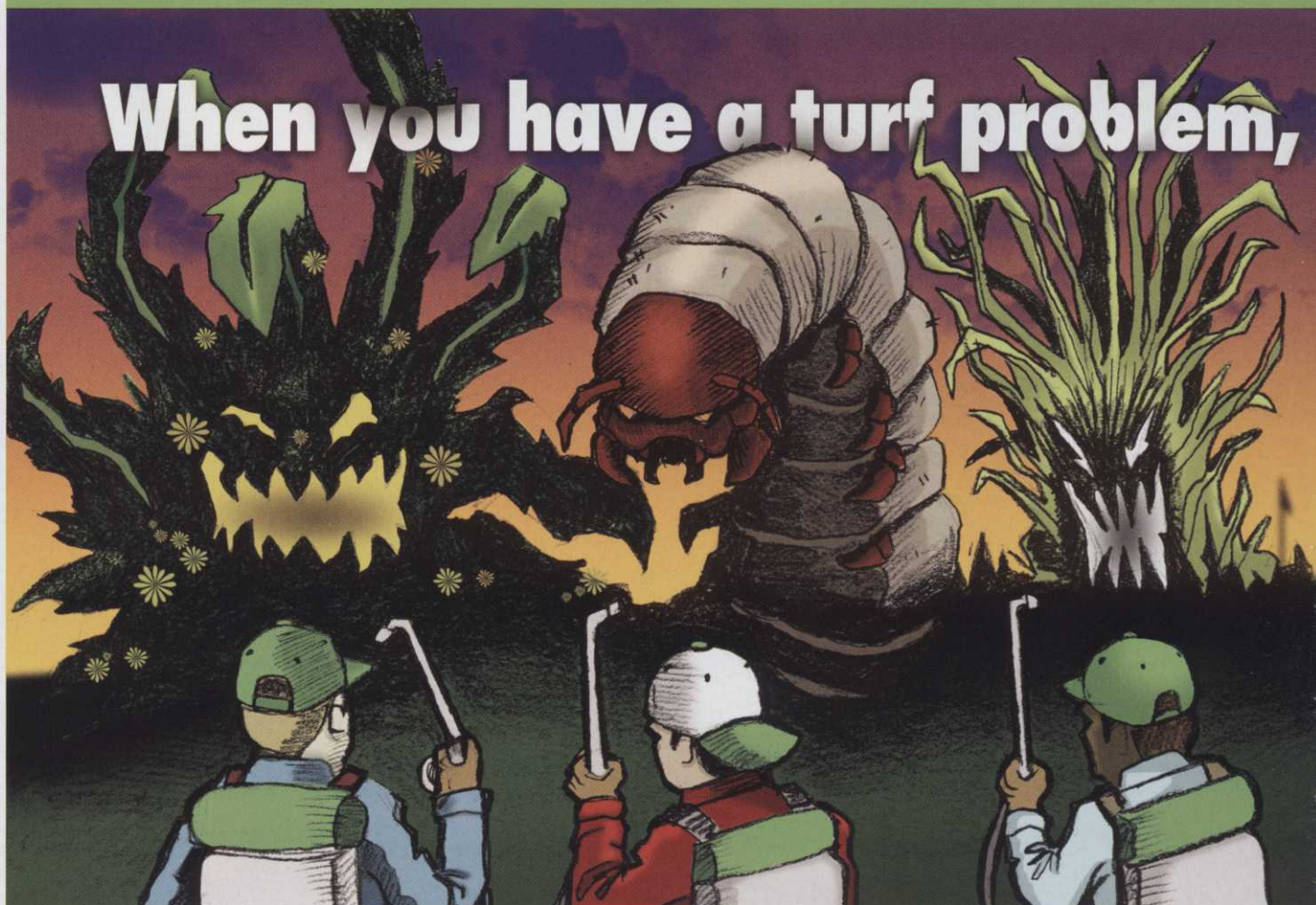
Accurate monitoring of rain-

fall and irrigation inputs, along with knowing the available water holding capacity of the soil, the current effective rooting depth, and the estimated rate of water loss from (daily ET estimates), can all be used to accurately schedule frequencies and run times for irrigated turf.

"Considering all of these factors allow for the most efficient use of irrigation water in the absence of direct soil moisture measurement via a soil probe," Karcher says.

Paul Roche, national sales manager for the golf division at Rain Bird, points to one of the biggest trends in the industry – the installation of in-ground soil sensors to monitor soil

## When you have a turf problem,



moisture, temperature and salinity.

"Many superintendents supplement this data with data collected from portable units, especially on greens," Roche says. "Superintendents then create their own area groupings or site-specific management zones to help group like areas together to aid in the management of the course."

If there are areas with waterlogged conditions or poor drainage, then those would need to be dealt with. If an area tends to be consistently wet, then it may need less irrigation, or the irrigation system may need to be adjusted or tweaked, Bremer says.

"If an area is low or has poor drainage, then you may need to consider cultivation or perhaps adding tiles to improve drainage," Bremer says. "Valves and heads should be regularly inspected in all zones on your course and irrigation audits may help diagnose problems with poor sprinkler patterns and irrigation efficiency."

#### PLANNING AHEAD

More and more golf course superintendents are developing and implementing drought management plans so they are prepared for water restrictions when and if they occur. Many of these plans include the use of circle sprinklers that can quick-

ly be set to a "part circle" arc when management requires it. Central control systems can be set up with specific programs that adjust water requirements in certain areas due to water availability.

As far as coverage and management issues, many superintendents have taken the Irrigation Associations and the Certified Golf Irrigation Auditor program. This program was developed jointly between the Irrigation Association and the Golf Course Superintendents Association of America. It is a detailed program on how to measure water distribution uniformity and includes strategies to identify problems and

make adjustments that will help improve water distribution uniformity.

"There are also many services offered by irrigation consultants and some distributors that can help a superintendent measure uniformity and help formulate strategies to make improvements to the application of water," Roche says.

Improving water distribution uniformity leads to saving water and energy due to the reduction of operating time at the pump station and labor due to a decrease in hand watering. "These are all areas that are a top priority of golf course superintendents," Roche says. "A result is a drier, healthier

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“The soil moisture will be influenced by the soil texture. It is important to understand how the (soil moisture) map was produced and what influence the soil texture has on the soil moisture readings.”

—Tim Cloninger, Shadow Creek Golf Course

and firmer golf course.”

As regulations or drought curtails the amount of available water, Vinchesi says a superintendent should not be dealing with it on the fly. Instead, they should have their approach in place with certain triggers based on water flow, water level or weather so that they will always have some water available.

When they are not having issues, they should implement water-saving technologies such as soil moisture sensors, part/full circle sprinklers and newer nozzles of sprinklers, he adds. Updated controls can also provide water savings by providing more control of existing irrigation sprinklers.

Saving water saves on the cost of the water if you're paying for it, or if you're not paying for it, then the financial savings are realized through lower energy costs. Additionally, managing water will provide for more consistent playing conditions on a day-to-day and season-to-season basis.

Beyond these savings, Cline says efficient water use can also enhance course operations, save resources and improve environmental fitness in a number of other ways. “A significant portion of a course's contribution to CO<sub>2</sub> emissions comes from electricity used for pumping irrigation,” he says. “Reducing water use reduces electricity use which reduces CO<sub>2</sub> emissions.”

Efficient water use through precision irrigation allows the turf manager to keep course conditions drier, Cline says. And drier turf is better conditioned against stresses, and less hospitable for turf diseases that can result in reduced pesticide use. Reduced water use leads to fewer nu-

trient losses through runoff and leaching.

“And in the interest of the popular movement toward ‘firm and fast,’ precision irrigation control enhances course uniformity and playability,” he adds.

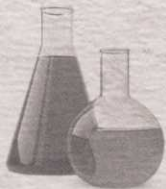
Precision water management can help diagnose problematic areas and indicate where adjustments to an irrigation system are needed.

“This could result in significant savings on water costs as well as minimizing water stress on your turfgrass – stress that can result in poor visual quality and perhaps even costly reestablishment,” Bremer says.

Carls is one of many superintendents involved in the ongoing efforts to use and manage water more efficiently. “We are trying to identify areas of our course where water may not be as critical and we can reduce use without impacting the playability of our course. Over time we are trying to convert these areas to either more natural plant materials or in some cases simply creating mulched areas. This process can take some time to complete because it is not as simple as just turning the water off and letting it all go.” He adds that there may also be an expense involved in the conversion but in the long run, it will pay off. “Less green turf areas also still continues to have a negative perception among many players as well,” he says.

And, in the end, the customer's perception of your product – your golf course – can be just as vital as conserving and using water in an enlightened and educated manner and helping your turf maintenance budget's bottom line. **GCI**

*John Torsiello is a Torrington, Conn.-based writer and frequent GCI contributor.*



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# WEST COAST **IN CRISIS**

Superintendent Radio Network tells the stories of California turf professionals when golf goes dry.

**C**alifornia has been one of the states hardest hit by drought and water restrictions in recent years. Not only has the cost of water skyrocketed, but the availability of water is constrained, or low-quality. And with the additional stress on water usage in a drought comes an even higher level of media attention focusing on golf as sources of water waste in the community.

But California superintendents aren't taking this on alone. We've collected some great stories from experts and superintendents through the Superintendent Radio Network to show how they're dealing with water issues, and what could be coming in the future:

**Pat Gross**, director for the USGA southwest region, talks about how superintendents are coping with water restrictions both on the local and state level. The pressure is on for superintendents to continue to provide green turf while watering responsibly.



**Craig Kessler**, director of governmental affairs for the Southern California Golf Association, discusses the politics and legal issues behind water availability. Legal issues and local complications are tough to unwind, but organizing to meet with major districts has started some responsible changes that work for golf businesses.



**Todd Lyijynen**, superintendent at Diablo Country Club, couldn't wait any longer for effluent water plans to come through his local water district. His course developed a bold plan to build a water treatment plant to make use of wastewater to proactively provide a water source for the course in the future, despite scarcity.



Check out these stories as well as more from the west coast as they deal with water issues all in one place by visiting <http://bit.ly/WCcrisis>. Never miss an episode by subscribing to the Superintendent Radio Network on iTunes.

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**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@jeffreymbrauer.com](mailto:jeff@jeffreymbrauer.com).

## STRAIGHT, NO CHASER

Brauer: Is it time for desert-style irrigation everywhere?

**G**olf has a water problem, from both regulatory and public perception points of view. These photos show how some regulators and many in the public view golf as it is, and as they think it should be.

Initially, the response was denial, then humor – “They want water conservation – I’ll order whiskey straight, rather than waste water.” Now, most “get it” (meaning the challenges of the future regulatory landscape) and the golf industry made great strides toward that water conservation goal in the last decade, while still fighting to keep golf courses from being a great place to hide UPS trucks. We have a pretty good story to tell:

- Architects have taken steps to reduce golf course turf. For example, at La Costa, shown on opposite page, our team was able to reduce turf on the Champions Course by 25 percent by introducing a mix of drought tolerant grasses, wildflowers and bark mulch. Water management and turf reduction plans are now a common request.
- Superintendents have developed and promoted use of “Best Management Practices” irrigation plans.
- Golf courses have accepted some browning in long droughts.
- Irrigation companies have developed moisture sensors and other technology to reduce irrigation.
- Turf growers develop new drought tolerant species.
- The USGA has set up “Golf’s Use of Water Resource Center” to distribute knowledge and research on this subject ([www.usga.org/water](http://www.usga.org/water)).
- The industry has lobbied to make legislators understand the



importance and needs of the golf industry, in an effort to forestall crippling mandates.

However, what we call a “good story” is probably only a “good start” to regulators, and we can expect increasingly restrictive irrigation mandates moving forward, resulting in harder, more painful steps to be taken soon.

Jim Moore, the director of the

USGA Green Section’s Education Program, knows this. His presentations on this subject are among the most interesting – and eye-opening – I have seen in a while. To answer the question “What more can we do to reduce highly irrigated turf?” Moore quotes H. James Harrington, author of “Business Process Improvement.”

“Measurement is the first step that leads to control and eventually to improvement,” Harrington says. “If you can’t measure something, you can’t understand it. If you can’t understand it, you can’t control it. If you can’t control it, you can’t improve it.”

Moore has measured a few courses, employing drones, golfer tracking devices and other technology, in the name of searching out unnecessary irrigation and maintenance. This kind of measurement is invaluable to clubs, golf course architects and irrigation designers in producing either new designs or redesigns, or in preparing turf/irrigation reduction plans for courses. The intuitive and creative art form that is golf course





“What we call a ‘good story’ is probably only a “good start” to regulators, and we can expect increasingly restrictive irrigation mandates moving forward, resulting in harder, more painful steps to be taken soon.”

architecture has always relied on some math and measurements – just how big does that green need to be? – to turn creative ideas into practical golf courses, and this is both a continuation of that and a bold new phase in water reduction.

A typical example is shown here: to irrigate about 5,000 square feet of actual tee surface, about 50,000 square feet – approximately 10 times and one acre more – receives irrigation. This suggests that desert-style tee irrigation, consisting of small pop up heads watering only the tee surfaces,



could save almost 18 acres of turf on a typical “all-turf” course. That is likely a 10 to 15 percent turf reduction.

Under typical Texas irrigation, this course might save 10 to 12 million gallons a year. Your actual reduction might be less, but even half that irrigation reduction may be significant in a water-starved future.

The reason this really resonated with me is that on recent projects I actively designed in reduced-tee watering areas, using small double rows of heads to water a 35- to 40-foot strip

the length of the tee. I was satisfied about my water conservation methods at the time, but now see I could have gone even further – my target goal is Moore’s starting point for further reductions! He feels like an old coach telling me that I’m trying hard to reduce irrigation, but perhaps not giving that legendary 110 percent.

Moore also calculated other substantial maintenance reductions for tee only irrigation that might allow resource allocation to other critical maintenance areas:

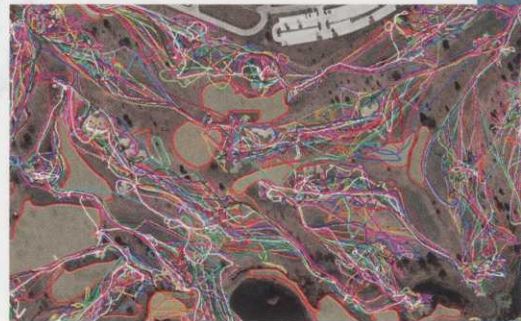
- Approximately 120 gallons of diesel per year to mow complexes.
- Consuming approximately 251 labor hours per year to mow complexes.
- The consumption of these resources can be reduced by approximately 90 percent by changing the irrigation design.
- Approximate conversion cost for irrigation under \$1,000 per tee (additional cost for changing turf or landscape treatments).

In my master plans and turf/water reduction plans, I also consider reducing rough. Here, I use my experience and some limited studies on where shots land to guide design. Moore suggests new technology can exactly determine where to cut back rough irrigation on your course, based on your actual player movement. In a test, they equipped golfers with monitors, which showed many turf areas receiving no or minimal traffic, thereby suggesting the best areas to turn off the water and/or convert to natives of some type, as shown in Moore’s image below.

Even with true measurement of play density, the trade-offs of less

turf and lost balls/slow play haven’t changed, even if the need for water conservation has. Any turf reductions must include a value judgment. Turning off water where no one plays is easy. But what about one player a month? A week? A day? A half-day? An hour?


Any turf reduction plan must also simultaneously consider the best alternative to the existing turf. No-water native grasses are popular, but we have also used decomposed



granite and bark mulch, and even left irrigation sprinklers and existing turf in place if a species that can be watered very infrequently under higher mowing under the “best management practices” water plan.

While your actual day of reckoning for water reduction may be a decade away, the time to start planning is now. Reducing highly maintained turf is a given moving forward. Every course requires a well thought out plan, and the tools are there to accomplish that efficiently. **GCI**





# Water, water everywhere... but here

GCI's Bruce Williams looks at how California superintendents are meeting their water challenges, and what it could mean for turf managers in the rest of the country.

**E**ntrenched in the most severe drought in its history, California Governor Jerry Brown has mandated that water usage for golf courses must be cut 20 percent by the year 2020. When drought restrictions came into play in 2009, the request within the Los Angeles Department of Water and Power (LADWP) was to reduce water in that year by 15 percent. A collaborative task force was formed that consisted of local superintendents, local PGA Section, Southern California Golf Association, golf course operators and the USGA. Together, they hammered out a proactive plan to deal with the question of water availability for golf courses.

The initial restrictions would have allowed for watering two days per week. Additionally, it would restrict irrigation to 10 minutes per head. This was felt



to be onerous and the group offered to reduce not only 15 percent, but 20 percent in that first year if the superintendents would be allowed to manage their water as they saw fit as long as the reduction was met. Within that first year, participating golf course facilities met their goals.

The bottom line is that any market or group of superintendents facing water regulations or drought restrictions need to actively engage their water providers and become an active part of developing a solution for water conservation.

The once common perception of golf courses as water wasters has evolved into a new image of golf courses and turf managers as wise water managers and users. It's gratifying to see what happens when all parties have the same goals and work together to achieve them.

LADWP was the preliminary case study and it still is working quite well. Since then, other agencies and golf course superintendents in San Diego and the Coachella Valley Water District are working together

periodically develops off the Pacific coast of South America influencing weather patterns. However, it would take about three such years to replenish California's water supply to normal levels.

Water is a commodity that, with predicted double-digit rate increases, is almost unaffordable. To survive, golf courses must look at turf reduction, smart irrigation systems, improved grasses that require less water and, most of all, better overall water management.

Water is not just an issue exclusive to the arid regions of the U.S. In fact, many areas are dealing with their own particular water challenges. It is highly likely that this trend will continue and I would strongly suggest that chapters take a strong look at the ground work completed by your colleagues in California, Georgia and Florida.

**OUT OF THE PAST**

Almost two decades ago I ventured from my birthplace in the Midwest out to the great state of California. After spending



A collaborative task force was formed that consisted of local superintendents, the local PGA Section, Southern California Golf Association, golf course operators and the USGA. Together, they hammered out a proactive plan to deal with the question of water availability for golf courses.

tion system was decent, it was not a major concern. So here I go with a couple of decades with plenty of water, at an affordable cost, with a high quality level, not to mention a couple of dozen inches of natural rainfall and lots of snow in the winter.

I arrived in California in March of 1997 realizing it was a climate change from Chi-

- Water is low in quality more often than not

So, at my first few gatherings with peers, the conversations seemed to turn to water. They would go something like this: "So how much sodium in your water? 15,00ppm... that's nothing. I deal with 2,500 ppm on a daily basis. Yeah, and some days I have just enough stored water to irrigate greens and tees if I am flushing and other nights just enough to water a few fairways!"

It didn't take long to figure out that water was the key to keeping grass alive and it would be a balancing act with affordability, availability and quality as long as I was a California superintendent.

**AFFORDABILITY**

In 1997, it cost about \$12,000 per year to irrigate an 18-hole golf course in Chicago. Plentiful rain, double- or triple-row irrigation (no rough), and water that was predominantly pumped from a canal that ran through the golf course, all

*"The bottom line is that any market or group of superintendents facing water regulations or drought restrictions need to actively engage their water providers and become an active part of developing a solution for water conservation."*

toward similar collaborative task forces to develop responsible regulation.

This winter, scientists and meteorologists are calling for an El Niño, a band of warm ocean water temperatures that

47 years of my life in Illinois, Ohio and Michigan, I was intrigued about what California would offer.

All of the golf courses I had worked at until that time had ample water, and if the irriga-

cago, but my new neighbors quickly informed me of a few concerns I might have making that transition:

- Water is not readily available
- Permits are issued if courses have effluent water



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# Crystal ball

From time to time I have been asked to bring out my crystal ball and prognosticate about the future of the industry. In dealing with water issues, here are my key predictions:

- Golf courses will have to use less water
- The water will become more expensive
- The water will be less available
- Restrictions will be placed on water usage that are onerous to the golf course superintendent
- Those who manage their water well will survive and those who do not will be out of business
- Architects, superintendents and golfers must all be aware and be responsible to do the right thing when it comes to water usage on golf courses

contributed to this luxury of a resource that perhaps was taken for granted.

A rough estimate to maintain an 18-hole facility with average water usage in California would be between \$400,000 and \$600,000 depending on your water district.

Yes, those figures reflect potable water usage, but effluent and blended water is not much different in price. Now, if you split the difference between those two water cost figures (\$500,000) and figure that the average round of golf is roughly \$30, you'd need 16,667 rounds just to pay for water, not to mention surviving Southern California's golf market.

## AVAILABILITY

Imagine having a straw in a bottomless glass. If you want more to drink, then you just draw on the straw. That's the best analogy to explain what I experienced, along with about a dozen other golf courses, that were built in flood plain along the East Fork of the North Branch of the Chicago River. Lots of water flowing all the time and our only cost was electricity to pump that water.

At one point, we worked with the North Shore Sanitary District and established turf plots to see if the tertiary treated water would work well on bentgrass/*Poa annua* cut on test plots with USGA greens mix. The testing proved it would as long as we had rainfall and could flush the greens. Sadly, the cost to install a pipeline to deliver this water was around \$1 million. It would have cost each course about \$100,000 to get water to their course, but why would anyone want to spend that kind of money

when your water bill was less than \$12,000? Let's just say hindsight is 20/20.

No permits are issued for California courses unless tertiary water is part of the plan. Many water districts are rationing water. So even if you can afford it, you may only be allowed a certain amount per week or per year.

## QUALITY

Chicago's water came from Lake Michigan. The quality was great in terms of pH, low bicarbonates and low sodium. Outside of rainfall, you couldn't ask for any better water. Canal water was great in quality in the 1970s and as parking lots replaced farm fields there was a gradual reduction in quality and quantity to the point where water had to be purchased at Bob O'Link and other clubs. At times we tested the quality and learned when we could use water from the creek or had to use potable.

I remember reading about salt-impact greens at Medinah. How could that be with the great water they had in Chicago? Well, Chicago also has snow and they treat paved surfaces with salt... lots of it.

Things change over time, therefore superintendents must adapt to change. While availability, affordability and quality have been major water issues in California for some time, they are becoming issues in Chicago, Georgia, Florida, Texas and Arizona, as well.

## MEETING BASIC NEEDS

Over the last 40 years, the golf industry has seen monumental changes in grasses and their maintenance. Golf courses have been built in deserts, mountains, arid regions and just about anywhere you can imagine. Where we may have

formerly seen sand greens we now see grass growing where it was never intended to be. Hats off to the greenkeepers who have learned how to make adaptations and perhaps really "fool Mother Nature."

Without water this would not have been possible. We develop new grasses, new fertilizers, new irrigation systems and new equipment, but it still gets down to using water to provide quality playing conditions.

As an industry, let's develop better water management practices. Let's work with our water agencies to develop concepts to conserve. Let's be true stewards of the environment and be a part of the water conservation solution rather than a part of the problem. **GCI**

*Bruce Williams, CGCS, is GCI's senior contributing editor.*

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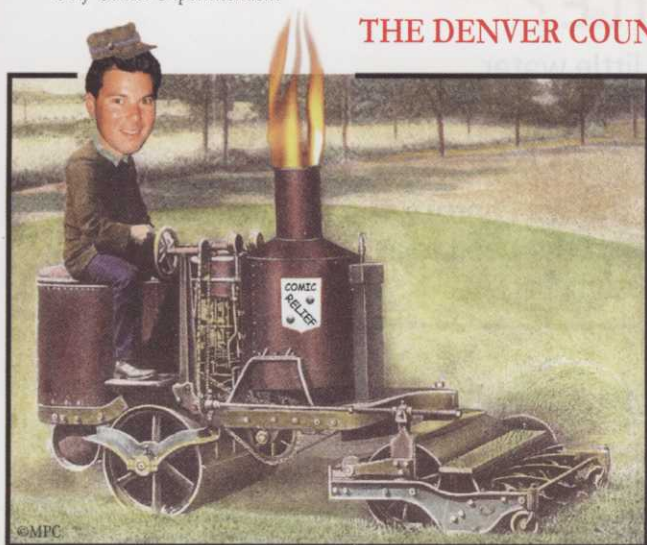


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**Monroe Miller** retired after 36 years as superintendent at Blackhawk CC in Madison, Wis. He is a recipient of the 2004 USGA Green Section Award, the 2009 GCSAA Col. John Morley DSA Award, and is the only superintendent in the Wisconsin Golf Hall of Fame. Reach him at [groots@charter.net](mailto:groots@charter.net).

## TOO MUCH OR TOO LITTLE?

Water problems don't have to mean too little water.

It is a foolish discussion that leads to foolish arguments: What's the most important factor in golf turf management? You'll find advocates for disease control. Others will argue improvements in mowing equipment have made turf machinery the most important. Plant nutrition will have its proponents, as will PGRs, grass varieties or dozens of other factors.

I cast my opinion with those who believe water is the most important factor in healthy and quality turf. For most superintendents, this may imply course irrigation is the bottom line for consistent playing conditions.

My tenure in golf gives me a broad view of how far we have come. When I started my career courses were watering greens and tees with either hose-and-roller base sprinklers or quick-coupler valves and sprinklers on keys. Both were inaccurate and inefficient. Younger superintendents cannot imagine stringing out and rolling up a mile or so of hose every night. The biggest issue was finding and training a dependable night waterman. The wear-and-tear on watering vehicles was costly. For the night waterman, storms were scary.

If fairways were irrigated, it was with implements like Rain Trains or with center-line, quick-coupler valve systems. The one I inherited had valves 100 feet apart, leaving huge scallops that were either ignored or required endless hand watering. A nearby course had 80-foot spacing and significant wet areas around each valve. I found it interesting that during a televised discussion of the U.S. Open we learned that Bill Coore and Ben Crenshaw removed hundreds of irrigation heads from Pinehurst No. 2 and returned to single-row irrigation

“Even though our course was built in the early years of the last century, the architect clearly understood the need to accommodate drainage in his design.”

on the fairways; it was one of several factors they used to return the course to its original design and the way it played 75 years ago. Throughout the tournament you could see the scallops, dry edges and uneven coverage. What a perfect example of progress in irrigation.

Imagine the elation when we installed a double row Network 8000, only the second in Wisconsin. Nozzle selection, precise timing, two-speed and part-circle heads – it was a sea change. Since that installation in 1988, the only parts remaining are the piping and the wiring. Everything else has been upgraded.

Pump stations have made significant improvements, too. From water probes and mercury switches to variable frequency systems, the problems have diminished and the accuracy improved exponentially.

Page through any turf journal and you will see ads and articles dealing with irrigation equipment, manufacturers and distributors. It is powerful evidence as to how important water is to turf.

The massive and disastrous drought afflicting vast areas of our country in recent years leads many to assume that conversations about water issues are really about irrigation. Personally, I include drainage as a factor as important as turf irrigation.

For example, for the 40 years I worked on golf courses, only three

years could qualify as drought years. Also, our course was on the shore of a 10,000-acre lake. We had riparian rights and had a DNR permit to use that water for irrigation. In the course's nearly 100-year history, the level hasn't dropped to the shutoff level for irrigation.

Also, our town receives almost 35 inches of precipitation each year, and we receive precipitation of some description on 120 days of the year. The hottest all-time temperature was 104 degrees, and we only cross the 90-degree threshold about a dozen times each year. Add to that the courses built on poorly drained soils and disrupted soils, and you can understand why drainage is so important.

I learned the most important issues in golf course design were: Drainage; drainage; and drainage.

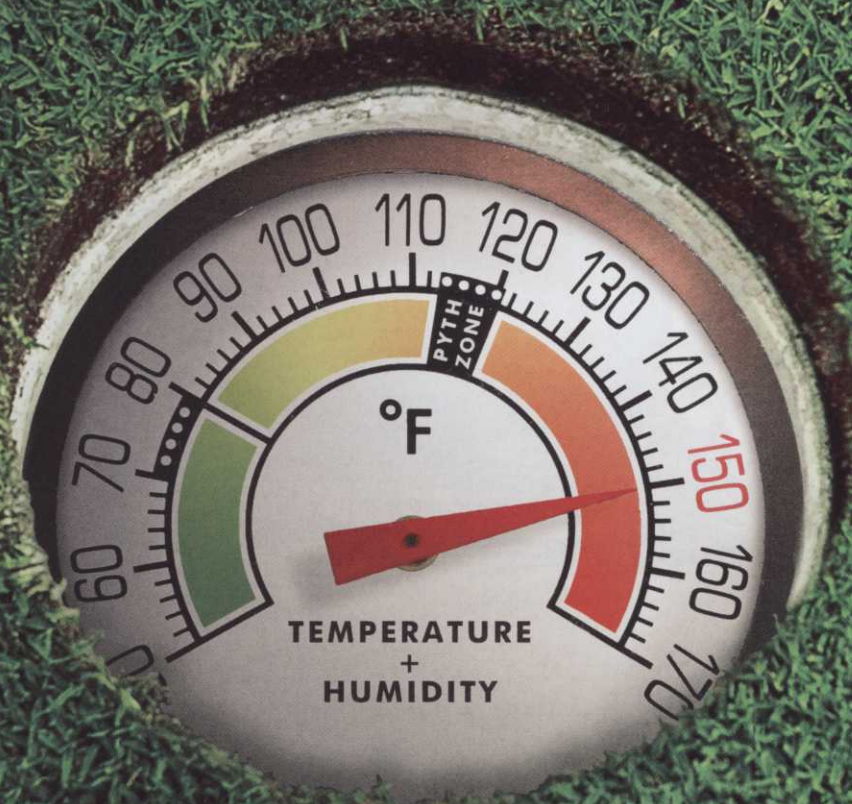
In the early days of golf course construction, it was understood that internal drainage developed over centuries. Therefore, only a small fraction of the soil moved today was moved then. And on those days when big storms roll through and heavy rain comes all at once, surface drainage keeps it out of the lake, off neighbors' property and over to low areas on the golf course.

Golf's forefathers understood what I hope isn't forgotten amidst all the excitement of irrigation technology. Irrigation and drainage – they go hand-in-hand. **GCI**



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Mr. "Travels with Terry" Terry Buchen goes deep into his archives for the best water and irrigation innovations he's come across over the last decade.

**I've been all over the world** visiting golf course superintendents and observing how they've applied their smarts and ingenuity to innovate and problem solve.

What has always amazed me the most is how a superintendent or equipment manager can solve a major problem with a seemingly minor modification to an existing golf cart, or create something so useful and mind blowing out of scrap bits of metal, a handful of common parts, and a few oddly sized sheets of plywood.

Necessity is the mother of invention, it's said, and the following Top 10 reflect just how superintendents, assistants or equipment managers – when they put their minds to it – can solve just about any course-related (and in this case water-related) problem.



## 1. Hose Reel Trailer

**Rick Tegtmeier, CGCS, director of grounds**  
**Des Moines Golf Country Club**  
**West Des Moines, Iowa**  
**First featured in May 2010**

This trailer built in-house along with a manufactured hose reel that makes the golf maintenance staff much more efficient and makes their jobs much easier. The trailer's ATV tire, wheel, axle and hub kit; high-impact fenders and stainless-steel hitch parts were acquired from Northern Tool & Equipment. The trailer's tongue and framework were homemade using 1½-inch square metal tubing. The hose reel holds 100 feet of 1-inch diameter hose while using a Lesco rosette nozzle. A 15-foot, 1-inch diameter hose to connect the hose reel to the quick coupler valve was acquired locally. The material costs were \$875 each for the three trailers built, which took about 20 hours each to construct. There is also a 12-volt battery operated hose reel available from Cox Hose Reels.



## 2. Wetting Agent/Fertigation System

**Barry R. Adams, superintendent**  
**Roseburg Country Club**  
**Roseburg, Ore.**  
**First featured in October 2010**

This wetting agent canister and fertigation system is used with quick coupler keys and sprinkler head inserts. The sprinkler head connection for the Rain Bird Model 700 has a universal head adaptor, schedule 80 6-inch and 2-inch nipples, a 1-inch faucet valve and a 1-by-¾-inch F & H Rain Bird swivel that costs about \$107. A Hypo Filter Wetting Agent Canister, 1½x¾-inch (MIP x FHT) fitting, a ¾-inch FPT x ¾-inch FHT fitting, a ¾-inch MHT x ¾-inch MPT fitting and a ¾-inch schedule 80 close nipple had total assembly costs of about \$55. The 100-foot, 5/8-inch diameter Fexogen hose, plastic sprinkler head base and ½-inch adjustable brass impact sprinkler cost about \$77. The A.M. Leonard-Hozon Siphon Mixer Brass Fertilizer Proportioner attachment costs from \$15 to \$32.50 and the 5-gallon plastic bucket is less than \$5.

This system works great to apply wetting agents and fertigation at the same time or separately using a sprinkler head run time. It also works quite well when hooked-up to a quick coupler valve instead of having an employee hold a hose, as one person can monitor several of these operating at different areas on the course at the same time. Even a gang of portable sprinkler heads can be connected together to cover multiple dry spots. The fertigation system works great during grow-in on small-seeded areas and as needed elsewhere. It took about 1½ hours to assemble all of the parts.



## 3. The Bazooka

**Lake Bluff Golf Club**  
**Lake Bluff, Ill.**  
**Rob Foster, director of golf & park maintenance**  
**First featured in February 2013**

Being prepared well in advance for the annual blowing-out of the irrigation system is paramount. "The Bazooka" is an adapter for hooking-up two air compressors simultaneously to the pump station's 12-inch diameter discharge pipe that is ready to go every fall. It was designed and built by the superintendent and his staff. It is made mostly of 2-inch diameter galvanized pipes, with multiple shut-off valves, hook-ups for 2-inch and ¾-inch diameter hoses from the 210 & 375 CFM air compressors, respectively, set at about 550 total CFM, where the regulator is set at 55 PSI. The irrigation system is blown-out two complete times and it takes about one-and-a-half days to do a really good job. It took about two hours to assemble the parts, which cost about \$500. It is stored in the pump house.



#### 4. Portable Sprinkler

Cape Girardeau Country Club  
Girardeau, Mo.

Brad Twidwell, superintendent & general manager  
First featured in February 2013

An old 1989 Toro GM 3000 triplex greens mower frame was recycled and used as the base. A 1970s vintage Toro model 405 full-circle brass sprinkler head was attached to the frame where the steel reducer portion was welded to it. A 1-inch galvanized coupling is connected to the sprinkler head and to a 1-inch diameter 90-degree elbow that has a male slip connection where the 1-inch diameter hose is attached with hose clamps. Each 1-inch diameter hose is 100 feet long and is attached to a quick coupler valve. It will not tip over and it covers approximately a 100-foot diameter circle. It took about 45 minutes to assemble mostly from used parts and spray paint cans already in stock. Extra irrigation parts cost about \$20. It is primarily used during recent drought conditions.



#### 5. Centralized Hose Rack

Hermitage Country Club  
Manakin-Sabot, Va.

John Haley, director of golf course operations  
Eric D. Spurlock, Manakin Course superintendent  
First featured in November 2008

This was designed and built to better organize all of the hoses and watering accessories for quick and easy access at a centralized location at the turf care center. Many sections of hoses can be stored. A wooden box with hinged cover mounted on one end of the post keeps quick couplers, nozzles, fittings, wetting agent canisters organized and close to the hoses. Also, it is great that it is portable so it can be moved wherever needed.



#### 6. Moisture Meter Modification

Hillcrest Country Club  
Bartlesville, Okla.

Matt Wilson, superintendent  
Steve Ball, equipment technician  
First featured in March 2014

This Field Scout TDR-100 (about \$735) handheld moisture meter stand was built in-house and saved the club about \$300 versus purchasing one welded together as a single unit. The stand was built so the staff did not have to bend-over to take the moisture readings. The handle (and neck) was made using  $\frac{1}{2}$ -inch square tubing and it was extended an additional 2 inches on one side to account for the electrical plug coming out of the display unit. The display unit is mounted to the 2-by- $\frac{1}{8}$ -inch metal flat stock with 2-inch wide industrial Velcro. The cord is attached with 4-inch black nylon cable ties on the neck. The probe unit slips into  $1\frac{1}{4}$ -by- $\frac{1}{8}$ -inch thick flat metal stock block held in place with one  $\frac{1}{4}$ -by- $1\frac{3}{4}$ -inch long bolt with locking nut. The metal pieces were all welded in place and then painted with Rust-Oleum black hammered paint. It took about two hours to design and build the first stand and another two hours to paint/drying time. The materials cost about \$20 for each one. The display and probe units can be easily removed from the stand as-needed.



#### 7. Irrigation Parts & Supplies Mobile Storage

Palmas Del Mar Country Club  
Humacao, Puerto Rico

Osvaldo Cruz, director of golf course operations  
First featured August 2007

Par Aide Divot Mate Containers were not used on the par 3s any longer so they were recycled by using them to store irrigation parts and supplies. They were mounted onto the back of the EZ-Go WorkHorse

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irrigation technician's cart by bolting them to the sides of the bed using 1/2-inch diameter nuts, bolts and locking washers. The container's hinged top keeps everything dry inside and they hold 4 gallons each. They cost about \$48 each when purchased new. It took about one hour of labor time to install all of them.

## 8. Trailer Turf Modifications

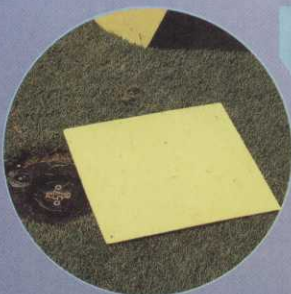
**Aspen Corp.**  
**Golf Division**  
**Daniels, W.Va.**  
**Donnie Adkins, president**  
**Ronnie Adkins, Vice president**  
**First featured in December 2008**



This Pronovost Model 5103S three-sided dump trailer is used during irrigation and drainage piping installations on existing golf courses and has a 10,000-pound capacity. Larger special-order turf tires and wheels, modified tandem axle beams to double their strength, added 4-inch lift to raise the dump body from rubbing on the larger turf tires and the trailer hitch was lowered about 8 inches to compensate for the trailer body being about 12 inches higher than before. Scrap metal was used to pre-fabricate in-house. The cost for labor and materials was about \$5,000.

## 9. Protecting Sprinkler Heads from Aerifier Tines

**Lakewood Country Club**  
**Rockville, Md.**  
**Chris Ayers, CGCS**  
**Mark McGreevy, assistant superintendent**  
**Larry Baxter, Jr., equipment manager**  
**First featured in November 2006**



Each sprinkler head and quick coupler valve (and any other visible irrigation and drainage equipment) is covered with 12-by-12-inch, 16-gauge pieces of steel plate to protect them from fairway aerifier tines. Two 4-by-8-foot, 16-gauge steel sheets (\$75) were required to make 32 individual steel plates using a circular saw with a special steel cutting blade. A grinder was then used to smooth out any sharp edges and then they were painted "safety yellow" using a rust-proof paint (\$35). There are enough plates for placing them on the next hole after the current one is being aerified. No sprinkler heads have been damaged since using this great idea. It took four to five hours of labor time during the winter off-season.

## 10. Sink Drain Soil/Moisture Profiler

**Gateway Golf & Country Club**  
**Fort Myers, Florida**  
**Jim Phelps, Superintendent**  
**First featured in June 2010**



A unique soil/moisture probe profiler made out of a 1 1/4-inch diameter by 12-inch long chromed sink drain extension pipe, with a 1-inch diameter by 16-inch long wooden dowel placed inside, which effectively pushes the soil sample plug through the end of the pipe. This nice size plug provides viewing of the soil, moisture levels, thatch, organic matter and turf canopy much better, and it is much easier to replace the plug than when using a standard size soil probe. Great for checking moisture levels prior to hand or overhead sprinkler watering. An added bonus is the end of the pipe is like a knife blade and it penetrates the dense turf canopy producing a clean, sharp hole. The materials cost about \$10 and there was no real labor involved. **GCI**

*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](mailto:terrybuchen@earthlink.net).*



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**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](mailto:bvinchesi@irrigationconsulting.com) or 978/433-8972.

## MANAGING OR USING?

USGA initiative another sign of increasing awareness to water issue.

**H**ave you ever given your golf course irrigation system water supply more than just a passing thought? Do you just use your water, or do you actually manage your water? There is a difference.

To be more specific: Are you using the water for the purpose of irrigating or are you managing your water by taking charge and care of it? In today's water environment it is imperative to manage your water, not just use it.

Because water management has become such an important issue, the USGA has launched a new initiative regarding water and its management. As part of this initiative, the USGA Green Section agronomists have added an Irrigation and Water Use Efficiency visit to their repertoire of services. During a visit, the USGA representative will document irrigation practices, and discuss a water management plan, use of best management practices and preventive maintenance programs. They will also suggest hiring of specialists (irrigation consultants, irrigation contractors, pond management firms, pump station technicians) where necessary.

The USGA also has added a new resource center section to its website titled: "Golf's Use of Water." It can be viewed at [www.usga.org/water](http://www.usga.org/water). In addition to having sample best-management plans and case studies, the site covers topics, including but not limited to water conserving grasses,



The USGA has launched a new initiative regarding water and its management.

ET for various turfgrasses, deficit irrigation, reclaimed water and cultural practices.

The website has several sample drought contingency plans, as well. If you have not prepared a drought contingency plan, you should. Drought management plans, along with best management plans, are an essential part of managing water.

The good thing about the website is it's not limited to just information for golf course maintenance or board personnel. Right on the home page under the "Why Water Matters" section there is an article titled "I Don't Play Golf: Why Should Golf Courses Get Any Water When Water is Scarce?" The article talks about the three main issues related to water use and conservation that affect golf courses no matter where they are located. The first is energy consumption. Even if water is free, it has to be

pumped, so there is always a cost associated with its use. The USGA is not alone in linking energy use with water use. Dr. David Zoldoske, director of the Center for Irrigation Technology at California State University in Fresno, a leading expert on irrigation water use, is fond of saying that "every gallon of water has a kilowatt of electricity behind it somewhere."

The second issue is water quality. It mentions that fertilizers and pest control products need to be properly applied on a golf course to keep them from impacting the environment.

The third section discusses how the use of water influences the playability of a course. As we all know, over watering will negatively impact the firmness and speed of the golf playing surfaces. Lastly, additional resources are also provided.

The site has a whole set of instructional videos covering various water conservation measures and tips. These include: "Tips and Tools to Reduce Water Use," "Watering for Healthy Turf" and the "Federal Perspective on Water Use and Golf" by the EPA's Veronica Blette.

All of this information and education is all well and good, but if you are managing your water, then you have to measure it. Many people involved with water, including myself, would argue water that is not measured cannot be managed.

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“How can you manage something when you do not know how much is being used? If you know how much you are using, and where it comes from, then you can make informed decisions based on the collected data.”

being used? If you know how much you are using, and where it comes from, then you can make informed decisions based on the collected data. If you are estimating or guessing, you are not being as judicious with your water as you could or should be. Although many courses measure their water use, there are a number – possibly the majority – that do not. Most courses measure because they are required to by regulation or as part of the order of conditions of a water withdrawal permit. This suggests that most water measurement is occurring east of the Mississippi and not in the western part of the

U.S., where water rights instead of permitting is the predominate water allocation mechanism.

In truth, nearly all golf courses measure their water use through their pump station's flow meter, which operates the pump station controls. Besides flow, it also measures water use. However, you cannot claim that you measure your water use if you never read the amount of water used or reset the totalizer tracking the overall water use. If you are interested in managing your water, then record your water use daily and tracking it weekly, monthly and annually. You should become familiar

enough with your course's water-use numbers that an anomaly in the numbers will immediately raise a red flag in your mind. If your pump station does not have a flow meter, get one.

If you are pumping from just one source of water, then the pump station flow meter will suffice, but if you are pumping from multiple water sources or have one or more make-up water sources (streams, wells, wastewater) for your irrigation water supply, then each of those also need to be measured and monitored. When you look at water management, you need to be aware of, and manage all of, the inputs and outputs on your facility. In some cases, you may also need to monitor/measure surrounding property if it influences your ability to get water.

Superintendents, as caretakers of water, monitor, measure and manage their water use. The USGA and other professionals are there to help you. **GCI**

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# After the flood

By Gregory E. Martin



Plagued by too much water, the Oak Meadows Golf Preserve renovation focused on linking the course more intimately to environmental improvements, making the entire preserve more sustainable, beautiful and engaging.

**O**ak Meadows Golf Course in Addison, Ill., lies within the Salt Creek watershed in eastern DuPage County 15 miles west of Chicago. It contains wetlands, ponds, prairies, old-growth oak-hickory forest and a stretch of Salt Creek. Salt Creek is a meandering oxbow stream that runs from north to south through the forest preserve. On the west side, low-slung, open countryside sweeps down to the creek, and residual stream pockets dot the floodplain. The east shoreline is heavily populated with oaks and hickories and rises quickly from the creek bank.

Golf course architect C.D. Wagstaff built the golf course in the early 1920s. At the time, it was the stylish and prominent Elmhurst Country Club, which featured an expansive Tudor-style clubhouse and traditional “parkland” layout. It became part of golfing history in 1941 when Ben Hogan, one of the game’s greatest, won the Chicago Open at the club. However, after years of declining membership and decreasing profits, the owners were forced to sell in 1985.

A highly maintained, turf-based, for-profit golf course may not seem to fit within an agency founded on conservation. But the Forest Preserve District of DuPage County has a stated mission to “acquire and hold lands... for the education, pleasure and recreation of its citizens.” As such, over 100,000 golfers enjoy the district’s three courses each year, just as visitors enjoy its off-leash dog areas, archery ranges, model airfields and campgrounds. For many golfers, the courses serve as a key introduction to the greater forest preserve system.

But Oak Meadows is at a crossroads. Fire destroyed the clubhouse in 2009, and commercial and residential development upstream has increased the volume and intensity of floodwaters from Salt Creek. Over the past few years, grounds maintenance practices have been reduced to “reaction and restoration,” and operational and maintenance stresses from increasing floods,

continued market pressures and playability issues have compelled the Forest Preserve District to review potential improvements for this facility.

“For decades, Oak Meadows acted as a ‘for-profit’ golf enterprise that also provided valuable stormwater retention for area residents,” says Ed Stevenson, director of golf enterprises for The Forest Preserve District of DuPage County. “But the ability to run a successful golf business suffers greatly every time the property floods, which now happens more often.”

As a result, the district decided to create a plan that would re-establish Oak Meadows as one of the finest public golf facilities in northern Illinois while measurably improving ecosystems within the 288-acre forest preserve, reviewing opportunities to improve Salt Creek, and expanding stormwater-storage benefits for the surrounding community.

Martin Design worked closely with The Forest Preserve

District Planning Office to complete a master plan that would meet or exceed the defined goals. It presented the plan to the Forest Preserve District Board of Commissioners for approval in the fall of 2012.

The master plan phase was followed by a subsequent “concept verification phase” that substantiated the plan concepts, project benefits, construction costs and scheduling outlined in the master plan. After concept verification provided evidence of the master plan, design detail and feature planning proceeded in hopes of meeting a summer 2015 construction start.

The subsequent analysis began to reveal the issues confronting the forest preserve. A preserve improvement like this involves numerous permitting agencies and stakeholders. The permit process is intense, involving the U.S. Army Corps of Engineers, Illinois Department of Natural Resources, Illinois Environmental Protection Agency, DuPage County

Highway Department, DuPage County Department of Environmental Concerns, City of Wood Dale, Village of Addison, Kane DuPage Soil and Water Conservation District and the DuPage River Salt Creek Work Group.

During the planning and design phases, it was evident that the Forest Preserve District was intent on comprehensive and wide-ranging improvements for the property.

The vision for Oak Meadows rejected the assumption that improving golf amenities requires sacrificing the property. Instead, the Oak Meadows’ plan encourages the property to expand and improve habitat and hold more floodwater while providing more sustainable, flood-resistant golf operations.

#### **A BETTER EXPERIENCE**

While this site is engaging, it is deteriorated. Virgin and ancient landscape features are evident, but cultural pressures, decades of intense maintenance, increasing golfer expect-

The new Golf Course Industry app.







tations, and suburban stresses have obscured or eroded its beauty. Most noticeably, extensive tree planting obstructs views and creates canyons for golf corridors. Recent stream bank stabilization has braced the edges with little nuance, variety or habitat diversity.

The plan calls for Oak Meadows to explore and expose a wonderful landscape, to create an experience that allows the golfer to progress through the site gracefully, peacefully and thoughtfully while restoring and then exposing the simple dignity of this complex ecosystem. An effort was made to ensure the character of the historical Elmhurst Country Club remained apparent. Portions of the original routing were kept to honor the club's past.

The new design will offer a 7,100-yard par-72 course. And rather than resist Mother Nature, it will complement and support flood events. The plan keeps portions of the original Elmhurst Country Club routing, but features a compelling assortment of new holes. The routing will provide a variety of uphill, downhill holes; some will cross or parallel Salt Creek, or ramble through wetlands, or jump from hillside to hillside; some will be open, others, framed by oak-hickory forest. Ultimately, the site will encourage golfers of all abilities to participate and enjoy the course.

Oak Meadows, first and foremost, needs to appeal and to satisfy a variety of golfer interests. The greater goal is to establish a unique sense of place. By linking the golf course more intimately to a high-functioning environment, golfers will be more engaged and surrounding communities will benefit.

Oak Meadows accommo-

dates the public as a golf course and a preserve. The purpose is to develop a course that respects the landscape, allowing the game to be played while revealing the environment, its history and restoring its vital function.

#### IMPROVING STORMWATER-MANAGEMENT FEATURES

Prior to its purchase of Oak Meadows, the Forest Preserve District had concentrated on acquiring new open space to offset fast-paced development. Now, with fewer options for new acquisitions, its focus has shifted to improving the functions of existing properties. The district is using the course redesign to provide stormwater-storage potential for the entire preserve.

"At face value, it was assumed that any efforts to protect the golf operation from the impacts of flooding would simultaneously reduce the property's usefulness for stormwater management," Stevenson says. "But the master plan for Oak Meadows was born out of a desire to challenge this assumption to produce a more fully enduring golf property for

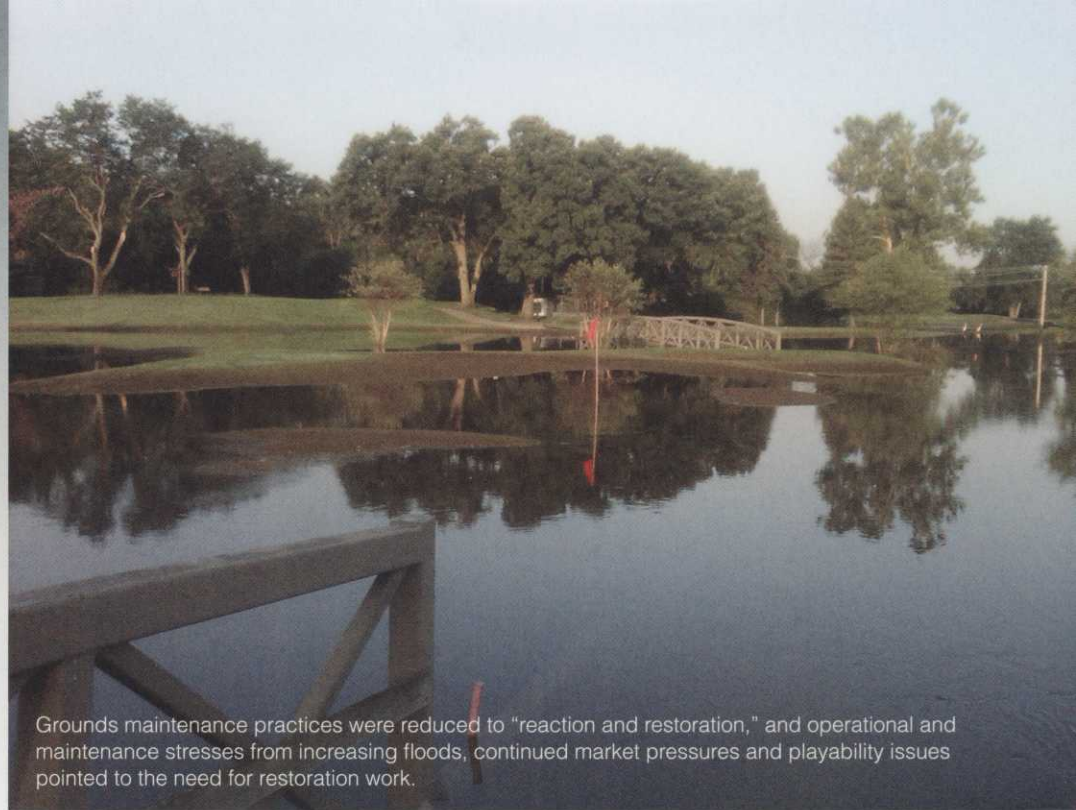


both recreation and preserve function."

This typical suburban stream is the epicenter of faster moving stormwater surges. As an urban stream, Salt Creek has many of the characteristic associated problems. Early attempts at stream manipulation by Elmhurst Country Club included construction of flood control berms adjacent to Salt Creek to limit the creek's ability to access its floodplain during smaller storms. Additionally, natural stream bank vegetation was replaced with turfgrass when the course was developed

in the 1920s. Turfgrass area expanded and the shallow turf roots allowed the creek to erode into the banks. Also, a tributary to the north of Salt Creek was completely redirected and piped south, providing little functioning pollutant removal or habitat value.

Because there is a 1.5:1 volume mitigation minimum requirement for fills within the Salt Creek floodplain, the design team scrutinized cuts and fills within that area. As a result, the project provides more than 30 acre-feet of floodwater-storage – over 10 million



Grounds maintenance practices were reduced to "reaction and restoration," and operational and maintenance stresses from increasing floods, continued market pressures and playability issues pointed to the need for restoration work.



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Additionally, bank improvements will allow water from Salt Creek to inundate the surrounding preserve much sooner during a storm, which means the preserve will be able to improve the creek's overall water elevations by approximately 6 inches for a 10-year rain event. New floodplain terraces along the banks with vegetative hummocks and hollows will increase the residence time of runoff, as well.

"In general, this project offers an opportunity to create a significant stormwater benefit in a highly developed area of DuPage County that is typically difficult to achieve while at the same time providing a benefit to the golfing and recreational community," says John Mayer, a civil engineer with Engineering Resource Associates.

### CONDITIONS

In 2007, 2009 and 2012, the DuPage River Salt Creek Workgroup monitored points along the creek's watershed, which encompasses 152 square miles of urbanized land in western Cook and eastern DuPage counties and includes the creek's 42-linear-mile main stem. The group selected several locations to set baseline conditions. Results showed degraded aquatic communities throughout the waterway. Further statistical analysis revealed that poor habitat explained the majority of the degradation. The area behind the low-head dam at Oak Meadows in particular suffers from low levels of dissolved oxygen.

Workgroup surveys in 2007, 2009 and 2013 measured Salt Creek's Index for Biotic Integrity [IBI], a metric that quanti-

tatively assesses the composition of biologic communities. The statistical analysis helps illustrate the complexity of an ecosystem by measuring the range of plant, animal and invertebrate diversity. Along the stretch of Salt Creek that flowed through Oak Meadows, results showed the waterway contained a poor diversity of native fish and aquatic insects.

Decreasing levels of dissolved oxygen and increasing levels of suspended sediment negatively affect the fish and macro-invertebrates that inhabit the waterway. In short, Salt Creek has developed into a hostile environment for aquatic organisms.

Early attempts to stabilize the shoreline and prevent flooding did little to slow erosion. Constructed berms only helped to keep receding floodwater from re-entering Salt Creek, aggravating flood damage to the golf course. Within the channel there is little to no variation in water depth or velocities. Off-channel wetlands, tree cover and necessary backwater pooling is non-existent and two small dams block the upstream passage of fish. The lack of variation of water depth, water speed and little backwater shelter limited any opportunity to maintain or increase fish and insect populations, the central goal of the Clean Water Act.

Working closely with Interfluv Inc., the Oak Meadows design team has outlined a plan that will improve stream hydraulics, water quality, sediment migration, backwater habitat and biological diversity.

### WETLAND EXPANSION AND NATIVE RESTORATION

The project improvement



Oak Meadows Golf Preserve  
Forest Preserve District of DuPage County

## Plan Development

In 2011, the District submitted a nationwide request for qualifications from golf course architects to investigate the feasibility of its comprehensive and wide-ranging goals for Oak Meadows. Those include:

- Maintain or increase on-site stormwater storage capacity
- Create new wetlands and improve the overall environmental quality of the forest preserve
- Redesign the course to make fairways, tees and greens less vulnerable to flood damage
- Protect and increase golf revenues by reducing interruptions due to floods
- Reduce long-term maintenance costs and increase "greener" maintenance practices
- Identify the location and needs of a new clubhouse based on changes to the course

After a substantial nation-wide search, the District selected Martin Design Partnership Ltd., which assembled a team of golf course architects, architectural historians, civil and environmental engineers, biologists and hydrologists to develop a plan for Oak Meadows and to determine costs and alternatives.

calls for extensive habitat expansion, including the restoration of nearly 67 acres of riparian, prairie, savanna and woodland terrain. "This will provide a needed transition area between the creek, wetlands and upland areas and areas that will be used for active recreation," says Erin Pande, ecological services director for ERA. "The native plantings associated with the wetland creation and upland enhancement components of the project will be crucial in providing these benefits. Bank erosion will be slowed and stormwater runoff will be slowed by deep-rooted native vegetation and naturally

treated through containment and filtration prior to entering Salt Creek."

The proposed plan involves the removal of non-native invasive vegetation along the banks of Salt Creek and cutting back the incised banks to allow the river to access the floodplain areas. The banks will be modified to create a floodplain terrace. Hummocks and hollows will be created within these areas to increase the residence time of stormwater runoff and create complex habitats through interspersions of wetland and riparian vegetation. The net effect is the addition of nearly 33 acres of wetland.

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### IN-STREAM IMPROVEMENTS

Salt Creek is the epicenter of a fast-moving stormwater-removal system. Over the years, landowners have attempted to address flooding problems associated with that system.

Salt Creek has been channelized, deepened and straightened to prevent floodwaters from overflowing into the surrounding land, but high-velocity waters trapped inside the channel eroded the banks. The replacement of streamside vegetation with turfgrass further weakened the banks. To stabilize the shoreline, structural solutions were installed. While these methods stabilize the banks, they do not deal with existing biological issues.

Regulations require municipal wastewater treatment plants to make necessary upgrades to improve levels of dissolved oxygen. To increase levels, the municipality of Wood Dale suggested modifying the dams at Oak Meadows. As early as 2008, studies identified the removal of the dams as cost-effective ways to improve water. The modifications will require approval from the Illinois EPA and continued monitoring to ensure levels of dissolved oxygen increase.

Working closely with InterFluve Inc., the team devised a plan to improve the function of the stream channel to more historical locations and function. Early analysis revealed how the increased frequency and magnitude of urban runoff had changed the channel, disconnected it from the floodplain and created a stream largely devoid of habitat. To improve this, the dams will be removed and the channel narrowed to develop greater water variation and sediment continuity, as

well as to allow flood water to spill onto the floodplain with greater frequency. The narrow channel will allow "pool and run" areas to develop and persist. In-channel habitat will include varied gravels and boulders as well as large wood all to promote species habitat.

Part of the Oak Meadows plan includes modifying the Salt Creek's center flow line. This combined with additional flood attenuation and reconstruction of the banks with bioengineering soil stabilization methods will improve the bank structure and improve pollution assimilation and water quality. The methods will include surface fabric bank treatments and fabric-encapsulated soil [FES] lifts with log-rock toes installed at and below the water line to provide scour protection at sensitive river bank areas.

These treatments will allow vegetation to take on the work of stabilizing the stream banks as they did historically. This "softening" of the stream and floodplain interface has added benefits for both water quality and habitat. The small tributary to Salt Creek will be re-meandered to its pre-existing 1939 location. The combination of these practices will reduce nutrient and total suspended solid [TSS] loads.

"Complexity fosters biological diversity, one of the key design goals of the project," says Stephen McCracken, Dupage River Salt Creek Workgroup and The Conservation Foundation. "A healthy system is a complex system and can accommodate a variety of changing conditions inherent in urban streams. Further, these small grade control devices will reestablish natural sedi-

ment transport through the system and allow water levels upstream to fluctuate under natural seasonal conditions."

These improvements will create cover for fish and haul-out locations for turtles, induce local scouring, and create a more heterogeneous stream bed. As part of this phase, a small tributary north of Salt Creek will return to its 1939 meander, providing improved habitat and reduced total suspended solids.

Streambank, side channel and floodplain wetlands will add diversity as well as needed flood refugia for aquatic species living in the flash flood regime of this ultra-urban stream. Modifications will foster flood energy to dissipate across the floodplain. The frequent inundation of this surface will drive improvements in biological function and the connection between the channel and floodplain interface.

### PROJECT MONITORING

Watershed-wide monitoring by the DuPage River Salt Creek Workgroup (DRSCW) in 2007, 2009 and 2012 had shown aquatic communities to be degraded throughout the watershed. Statistical analysis these communities distribution revealed that poor habitat throughout the basin explained the majority of that degradation. The watershed-monitoring program included a number of locations at the site allowing a baseline condition to be set. Initial monitoring and analysis of Salt Creek identified that the area behind the dam at the southern portion of the property, suffered from low levels of dissolved oxygen (DO).

Recent regulation has required upgrades to existing

municipal wastewater treatment plants to improve Dissolved Oxygen (DO) levels. The municipality of Wood Dale, suggested an interim solution that included removal of the dam. This initial step required State environmental protection agency (IEPA) approval with a condition of monitoring and review. The dam will be removed as part of the improvements to the stream channel and monitoring will continue to ensure DO levels are increased.

This continued monitoring is vital. Post project review and analysis will illustrate the positive effect of habitat formation on water quality. DRSCW will continue to conduct monitoring of DO, fish and insects at the site to evaluate water quality and ecological impacts of the improvements.

The IBI statistical analysis, usually in impaired waters, illustrates the complexity of an ecosystem by measuring the range of plant, animal and invertebrate diversity. The success of the river restoration plan will be judged by improvements in aquatic biology and visual aesthetics.

DRSCW surveys in 2007, 2009 and 2013 show the site to have poor fish and insect populations. The actions under the river restoration plan have been carefully chosen to improve conditions for a more diverse, native river fish and insect population. Hosting those populations will help the surface water management agencies on Salt Creek meet their obligations under the Clean Water Act. **GCI**

*Gregory E. Martin is the president of Martin Design Partnership based in Batavia, Ill.*

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**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.

## THE 3.5 PERCENT SOLUTION

Overlooking water's value is a big mistake for golf course operators.

According to the U.S. Geological Survey, 71 percent of the earth's surface is covered with water. Most of it – 96.5 percent, in fact – is in our oceans. The rest of it – about 3.5 percent of the world's water – is in icecaps, glaciers, rivers, streams, lakes and in the form of water vapor. It's that 3.5 percent that we're lusting over, fighting for and paying increasingly larger amounts of money to access.

Ironically, many water users – clubs and courses included – are unaware of the value of water. For a resource that is in such short supply in many areas, the fair-market value of water is a sometimes overlooked and undervalued asset.

The due diligence that is dedicated to water for golf course transactions is often inadequate to the value of the asset, according to some water experts.

"The most common mistake is taking water supply for granted. Some golf course managers assume that water will always be available and cost-

“It's the 3.5 percent that we're lusting over, fighting for and paying increasingly larger amounts of money to access.”

competitive, similar to other utility services, like power,” says Boise-based WaterExchange Managing Director Clay Landry.

This is an outmoded way of thinking, Landry warns. “Ignoring water supply issues can lead golf course managers to assume unknown risks, overlook profitable water marketing opportunities and pay too much for water.”

Landry says WaterExchange has seen golf course transactions in recent months in which water supplies received only cursory research during the due diligence phase. “More attention to water risks is warranted, particularly in states like California and Texas where drought is threaten-

ing golf course water supply reliability,” he says.

At Water Research in Phoenix, Senior Associate Matt Payne recommends that golf's water users view water as an asset to be managed for maximum value.

“Water rights and their market value are poorly understood. In most markets, water rights are thinly traded and few comparable sales are available for valuation. In addition, many water rights have distinctive features that complicate valuation,” Payne says.

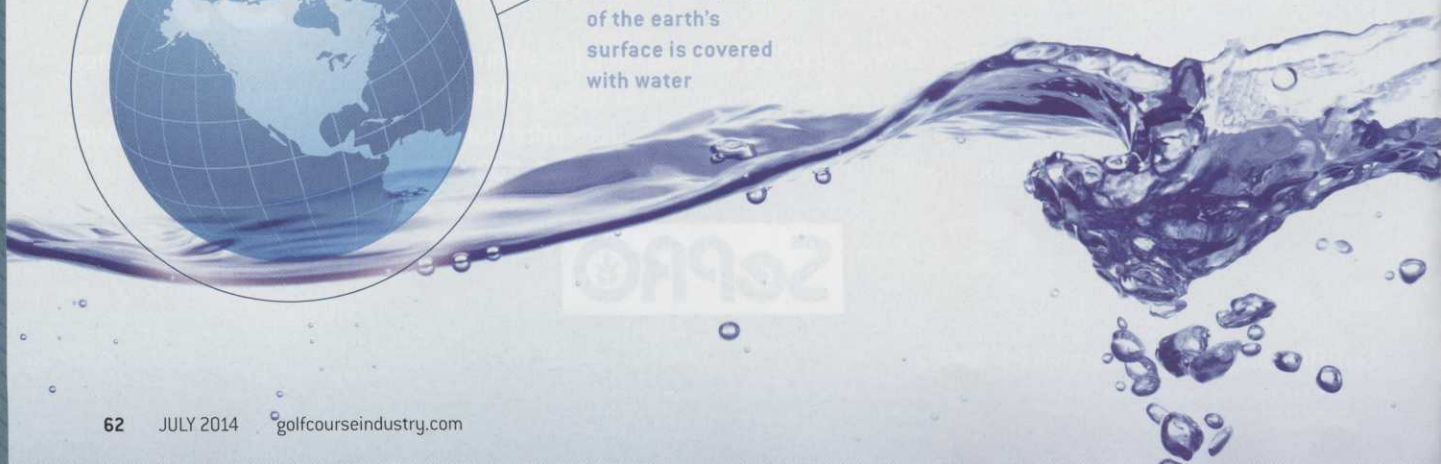
Payne adds that proactively valuing water rights and investigating their marketability will go a long way toward optimizing asset management from water supply and financial standpoints. What's more, understanding water-related risks and evaluating those risks against overall property value is the best guidance for golf course users.

For course owners and managers, the USGA is an excellent resource, providing guidance and best practices



71%

of the earth's surface is covered with water



concerning water use through its various publications and educational programs. Eighteen regional agronomists lend their expertise regarding turfgrass.

“The USGA has sponsored turfgrass research since the 1920s. When you look through the archives, you can connect much of this 90-plus years of research to developing grasses that use less water for (golf course) maintenance,” says Kimberly Erusha, the managing director of the USGA Green Section.

In the late 1980s, the USGA Turfgrass and Environmental Research Program set a goal to develop grasses that required half the amount of water that most turfgrass at the time needed. Buffalo grass, which uses less than one inch of water per month; seashore paspalum, which can tolerate high salt water for irrigation; and more cold-tolerant Bermuda grasses have since

“ Everyone it seems is talking about this limited resource. The smartest golf course owners, managers and superintendents are actually doing something about it.”

been developed with the USGA’s support. In addition, cultivars have been developed that better tolerate environmental stresses.

The USGA’s Erusha points out several opportunities for courses to conserve water:

- Focusing resources on maintenance on the highest priority areas where the game is played.
- Identifying areas of the golf course that can be maintained with significantly

less water, fertilizer and pesticides. These naturalized areas can provide environmental and economic savings.

- Taking advantage of new technologies to upgrade irrigation systems.
- Training maintenance staff to use moisture meters to manage water use more precisely.

Everyone it seems is talking about this limited resource. The smartest golf course owners, managers and superintendents are actually doing something about it. **GCI**

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BY JOHN TORSIELLO



# PUMP STATION BLUES

**Looking to replace your pump station?** No need to fret and fuss over a decision that'll last 20 years. Consider these factors before purchasing a new one.

**H**as the old girl seen better days? Is she causing you more headaches than she's worth? We talked to several industry experts who shared their opinions on how best to approach the major step of replacing your course's water pumping station and system.

"Superintendents need to make sure that the pump station meets their flow and pressure requirements," says Brian Vinchesi, a design engineer with Irrigation Consulting. The super-



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intendent or an outside professional should determine the optimum flow and pressure for the pump station, he says. Once that is accomplished, service will be important.

“What good is it to purchase a station if there is no local company to service it?” Vinchesi says. “Additionally, pump stations last a long time. Is the company you are buying it from going to still be in business in 20 years when it needs service or parts?” Vinchesi says regional pump station manufacturers can sometimes leave a superintendent high and dry (pun intended) when they retire, causing golf courses to have to buy new control panels so they were serviceable.

All pump stations are manufactured by outsourced components except for a few parts, so it’s important to look for quality components and the warranty on those components, says Wayne Mills, superintendent at La Cumbre Country Club in Santa Barbara, Calif.

“I have seen in my 30 years companies come and go, or are bought by a competitor,” Mills says. “So do not count on them being around in 10 years when you really start to need them.”

Superintendents should approach the decision of re-

placing their pumping station in a measured manner, says John Pollok, Ewing Irrigation’s southwest agronomist.

“First things first,” he says. “You want to know who is going to service the pump station. A pump station is like a very expensive, exotic car and not every mechanic can work on it.” Also, determine who will be servicing the station.

“Regardless of what type of station you purchase, what bells and whistles you have installed, it will need to be serviced and it will go down,” Pollok says. “It’s Murphy’s Law. Your pump station will typically go down in August when it’s hot and dry, but not January. In my first year as a superintendent, my pump station went down Friday, Sept. 13, two days after I finished aerifying greens and overseeding the rest of the golf course. By the time it was up and running again (two weeks later), we had to re-seed the course.”

Consider all of the factors that contribute to the overall performance and the lowest cost of ownership over the life of the system, says Rex Hansen, west regional sales manager at Rain Bird Golf. Some of the key features include:

- Product quality;
- Energy savings features;

## SELLING IT

You’ve identified the need, now how do you sell this costly expenditure to your members or senior management? With maintenance and operation records, says irrigation consultant Brian Vinchesi.

“Document how often the station is out of service, how long it takes to water the golf course if it is too small, and how often and how much you are paying for it to be serviced,” Vinchesi says. “Pictures also are needed. Most members have never seen the pump station nor even know where it is. If the pictures show a rusted piece of equipment with wires hanging out of it, most people can relate to that. I once had a superintendent who was having trouble getting a new station bring his board through the pump house. He had approval by the end of the meeting.”

It comes down to the fact that water is critical to healthy turf, says Richard Ziegel, sales manager for Pumptronics. “No matter how much fertilizer you put down or what cultural methods you use, without water you will not have healthy turf,” he says. “The pump station is the heart of your irrigation system, and critical to its use. In my mind, it is probably the single most important piece of equipment a superintendent has.”

- Water savings features;
- Technology integration between the pump station and the control system;
- Remote monitoring; reporting and control; and
- Local service and support.

Without VFD, the pump station runs wide open all the time when there is demand and it shuts off when there is not a demand.

“What happens is your station will cycle, meaning it will turn off and on repeatedly trying to maintain the proper flow, which is never good,” Hansen says. “A pump station needs to be a well-oiled machine, it needs to purr like a kitten otherwise you are wasting money, energy, placing wear and tear on your pipes, valves, heads, motors and pumps.”

Whomever you purchase your pump station and system from must be reliable and have readily available replacement parts to go along with excellent service, Pollok says.

“You also need a good warranty, and always purchase from a reliable company, as most of the parts, components, pumps and motors are extremely similar,” Hansen says. “Variable frequency drive (VFD) is as close to mandatory as there is on any station. This allows your expensive, ‘exotic car’ to run at the correct speed based on the demand.”

Different pump types have differing features, says Richard Ziegel, sales manager for Pumptronics. “Vertical turbines are usually the most efficient and longest lasting, but are costly and can be loud,” he says. “Submersibles are quiet



The industry has come a long way with pump station features, many of which deal with course-specific issues.

# QUICK TIPS

Ideally, you want a pump station installed before the old one breaks down or before overseeding, says John Pollok, Ewing Irrigation's southwest agronomist.

"There is typically an eight to 10 week lead time on a new pump station," he says. "It's not an item that is hanging out at Walmart. These pump stations are built per spec and a labor dispute in the country that these components are made could delay the process even longer."

Purchase the station as soon as possible, Pollok says, and install it when you don't need to water for a few days.

Reduce the installation cost by either building a new pump house, or serving as the general contractor.

"The course could also buy a prefab building with the station to save on cost," Gregg says. "After the sale, benefits of a new pump station are the warranty, start up and future service."

When a new pump is ready to be turned on, Pollok advises to lower the rate of flow by 50 percent and gradually raise it up over a few days. "The new pumps will work much more efficient and the speed of water will flow through your pipes at a quicker pace," he says. "This typically causes damage to pipes, fittings and valves. I'd recommend not turning it on Friday afternoon, as Mr. Murphy knows what will happen."

and less expensive, but can be difficult to service and need deeper wet well depths. Centrifugal pumps are usually the least expensive option and are easy to service, but they are not as efficient and can have issues like losing prime. Proper pump choice is a matter of matching the best pump style to what they have in place, what they want to spend and what they are trying to achieve."

A built-in computer is necessary, as it alarms staff when the system goes down, Pollok says. It gives data, such as current

flow, faults within the system and gallons used, and you can set parameters to adjust time of use and flows easily. It also helps trouble shoot your pump station when it goes down.

"Injection systems built into the pump station and its computer can be very a beneficial feature," Pollok says.

So how do you determine what's important and what isn't when you purchase a new pump station?

"Do you need AC in your car?" Pollok asks. "If you live in Phoenix, yes. If you

“All pump stations are manufactured by outsourced components except for a few parts. So look for quality components and the warranty on the components. I have seen in my 30 years companies come and go, or are bought by a competitor. So do not count on them being around in 10 years when you really start to need them.”

— Wayne Mills, La Cumbre Country Club

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live in Maine, maybe not. The superintendent who pumps 15 million gallons of water a year on his course probably doesn't need many of the available options. However, when I was pumping 400 million gallons of water in Las Vegas, our pump station had its own AC unit and a lot of bells and whistles because it was our lifeline and we needed to protect our asset."

It's a case-by-case basis, he says, and the industry has come a long way with pump station features.

Communications and integration are the "frontier technologies" in pump stations, Hansen says. When properly used, these technologies can add significant value by saving water, electricity and labor. Furthermore, these technologies can be used to mitigate risk by constantly monitoring the system and automatically taking action in the event of a problem. For example, a system that compares actual flow to theoretical demand can sense a pipe break and automatically shut itself down before a green is washed out.

Consider how the pump

## NEW OR USED?

Buying a used water pumping station is an option for superintendents, but one that should be approached with extreme caution and much consideration.

The price of a used pump station can be significantly less expensive, says Dan Gregg, regional sales manager of prepackaged pump stations for Flowtronex. But, he warns, with no warranty you may not know the history of the station and there is no guarantee it won't go out as soon as you start it up. Also, the station may have out-of-date technology and wind up costing the course more money to operate, negating the savings up front. In addition, getting a station to fit an existing location could be difficult, and pump column length may need to be changed, costing money.

"There is only one potential benefit from buying a used pump station; perceived lower initial cost. The downsides, however, can be considerable," says Rex Hansen, west regional sales manager of Rain Bird Golf.

Pump stations are specified, designed and manufactured to meet the unique requirements of each golf course. A used pump station will likely be a compromise and will therefore not be designed to optimize overall operating costs.

Hansen recommends considering a used pump station when these conditions exist:

- The used station is relatively new and is known to be in good or excellent condition;
- It must be thoroughly tested, both electrically and hydraulically to confirm it is functioning properly;
- The price of the pump station is very low; the cost of water is low;
- The cost of electricity is low;
- A reputable irrigation consultant is involved to help assess the risk/reward ratio; and
- Management is comfortable with the risk and has available funds to purchase a new station if something goes wrong.

Irrigation consultant Brian Vinchesi says in most cases a used pump station is a bad idea. "The used pump station was custom designed for the golf course it came from with a certain discharge pressure and flow," he says. "All golf courses are different, so the golf course purchasing the used equipment most likely has a different flow and pressure requirement, and 90 percent of the time that can't be overcome. If you are thinking of buying a used station, do an extraordinary amount of homework and investigation. Unlike a used car, you can't get a 'Carfax' on a used pump station."

Gregg, Flowtronex's regional sales manager of prepackaged pump stations.

station have a variable frequency drive. "Look at pump and motor efficiencies," he says.

70 percent and submersibles 60 percent."

Seek expert advice when considering the purchase. "We had myself and a group of members composed of a civil engineer, a marine engineer and someone who had worked in the oil industry," Mills says. "We looked at components' quality and if they were readily available for replacement, simplicity of design and a good service network. We also talked to other supers in the area on their experience with service and issues they had with stations." **GCI**

John Torsiello is a Torrington, Conn.-based writer and frequent GCI contributor.

“First things first. You want to know who is going to service the pump station. A pump station is like a very expensive, exotic car and not every mechanic can work on it.”

—John Pollok, Ewing Irrigation

communicates with the irrigation system, how accurate the reporting software is, the service and quality of components, warranty coverage for parts and labor, and the efficiency of the pump, says Dan

"The more efficient a motor runs, the longer it lasts," Gregg says. An additional consideration is the return on investment and what costs are associated with pumping water. Vinchesi advises the pump

"Higher efficiencies cost more up front but pay for themselves over time. Minimum motor efficiencies should be in the 93 percent plus range. Pumps vary, but turbines should run at least 84 percent, centrifugals

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## COMBINING THE ART WITH THE SCIENCE

### Does Pinehurst No. 2 set up another unrealistic expectation?

For those who watched the men's and women's U.S. Open at Pinehurst, it was clear the USGA was sending a message. That message was golf courses have the opportunity to reduce water and on a larger scale lessen the inputs which will ultimately benefit the environment. Whether you agree or not depends a lot about the membership expectations at your individual course.

What was done at No. 2 was amazing. I'm a huge fan and it's probably one of the best restorations in my lifetime. Unfortunately, the dramatic look of the course and reduced inputs which led to the brown appearance resulted in polarizing opinions.

I'm pretty sure it wasn't the intention or opinion of the USGA to say this type of dramatic renovation and maintenance practices is right for every golf course. Unfortunately, the polarized nature of many viewers led to some far-reaching thoughts.

I followed several conversations on Twitter during the event and there were plenty of opinions being shared. Below are a few of my favorites.

Jason Goss (@gossturf) said, "If you don't like or understand the look and playability of Pinehurst No. 2 this week, then you are what's wrong with golf." Although I understood the look at Pinehurst this week, I can certainly sympathize with those who didn't, so maybe I'm what's wrong with golf.

Riding the fence was Brandon Horvath (@UTTurfPath). In a variety of discussions, Brandon stated what a lot of us in academia and probably the industry were thinking, that the message should be "about how GCS's are exc. stewards of their resources

(incl. H2O). And less about how much less." Brandon is spot on. If we continue to put numbers on what a course like Pinehurst can conserve, then those same numbers may ultimately be the standard for other courses that operate under completely different circumstances.

On the other side, was the always opinionated Donald Trump (@realDonaldTrump) who ruffled feathers during the U.S. Open. The best conversation was with Golf Channel's Matt Ginella (@MattGinellaGC). Trump ultimately ended that conversation with "@MattGinellaGC Sadly Matt, you don't understand golf (even though you think you do). I have numerous courses [sic] that are far superior to Pinehurst." He clarified his thoughts on the course with, "The only reason I am critical of the Pinehurst look is because I'm a lover of golf – and that look on TV hurts golf badly."

The bottom line is superintendents are stewards of the land, environmentalists and conservationists. Does this mean every course should – and more importantly "can" – look like Pinehurst? The answer is obviously "no" for a variety of reasons, but I think that's not what the USGA was saying. They're much smarter than that, but they also know that you sometimes have to make a huge statement to drive a message home. The message is we can all do more to reduce our inputs, conserve water and reduce pesticides. It wasn't their intention to suggest every course should use single-row irrigation, remove their rough and convert to Bermudagrass.

In watching some interviews, the message was clear that the unique

situation at Pinehurst resulted in some dramatic savings in water usage among other things. Dr. Kim Erusha stated it best when she said, "Pinehurst is a unique location... If we can use less water resources in those areas, we can save not only a lot of money, but we can also make that a lot more environmentally beneficial, as well."

I don't believe anyone is going to argue with the benefits of that message or the results on this "unique" piece of sandy property. Conservation and reductions in water usage are going to be at the heart of policy pertaining to the golf course industry in the coming years. While the men's and women's U.S. Open at Pinehurst highlighted some of the ways courses are reducing their inputs, I hope it's not spun in a way that all golf courses should be maintained in that manner.

What makes courses unique are their own special characteristics. Pinehurst now has its own, but so does Augusta National. Is one right and the other wrong? I don't think so. They're both unique and that's what makes them special.

The most interesting thing was as this was going on, Trump announced his acquisition of Turnberry, one of the world's greatest links courses. Turnberry, which has hosted four Open Championships, is known for its browned-out fairways that are firm and fast in true links fashion. If Trump's comments about Pinehurst are any indication, you can expect a different "look" to Trump Turnberry moving forward. The big question will be whether the R&A sees these potential changes as a reason to exclude the course from its Open rotation. **GCI**

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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](mailto:terrybuchen@earthlink.net).

## QUICK COUPLER SWING JOINT MODIFICATIONS

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## IRRIGATION TECHNICIAN'S VEHICLE

Brian Goleski, superintendent, J.R. Wilson, equipment manager, and Carlos Chavez, irrigation technician, at the Noyac Golf Club in Sag Harbor, Long Island, N.Y., successfully modified the 2012 Toro Workman 4300HD into an irrigation vehicle. The Reelcraft Model #EP2405-23-18-10FFTW4 Nordic Series Electric Hose Reel (\$4,000) has a 1-inch-diameter, high-pressure water hose 125 feet long for hand watering greens, etc. National Tools & Equipment provided the Model 41891-2456 tool box (\$300). Inside the tool box is a Warn Air-Power SPI Model #76800 Electrically Operated Air Compressor (\$1,000) that is directly connected to the vehicle's 12-volt battery. There is also a 20-gallon air tank, with a quick-connect air hose fitting. There is lots of room for the technician's tools, parts and supplies. It took about 10 hours to install all of the improvements.





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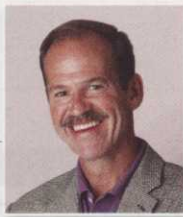
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## LESSONS FROM PINEHURST

A year ago I wrote that the highly publicized “double-down” U.S. Opens at Pinehurst would be a public referendum on what a golf course is supposed to look like. I was right...and I was wrong. Here are the lessons I think we learned from this remarkable event:

**IT CAN BE DONE.** Thanks to years of careful planning, spectacular preparation, total commitment from ownership and a fantastic agronomic team, the Pinehurst folks pulled off the nearly insane feat of hosting two majors in two weeks. The overall reviews from players of both genders were almost unanimously positive.

And the biggest concerns – logistics like security, access, and parking, – exceeded expectations. To make that happen, hundreds of people on the agronomy and operations teams worked for 20 or so days without a break or even much sleep. Mission accomplished, but I can't think of a compelling reason to ever try it again.

**THE PUTTING SURFACES GAVE A GREAT FAREWELL PERFORMANCE.** The cold, wet spring, on-and-off rain during the fortnight and amazing cultural management made the durability of the A-1/A-4 greens a non-issue. They were still rolling magnificently when Michelle Wie closed the show. Right now, the new Champion surfaces should be coming in. Bentgrass' last hurrah at one of the most prominent warm-season courses in the world was a resounding success.

**MR INSIDE OR MR OUTSIDE.** Bob Farren is a friend, so I'm biased, but I have to say he did an awesome job as the “face” of Pinehurst Resort. After

spending four years telling the story of the reinvention of No. 2, he was flawless in front of the cameras.

And, Bob's “Mr. Outside” role was perfectly complemented by “Mr. Inside,” Kevin Robinson (along with assistants Alan Owen and John Jeffreys), who executed the agronomic operations plan perfectly despite a few weather curveballs. This notion of having one agronomic leader deal with the public while another stays behind the scenes is not new, but superintendents hosting future majors should consider this the model for how it's done.

**THE WATER THING.** The USGA – particularly Mike Davis – was ecstatic over the crispy, fast-and-firm fairways that resulted from the removal of a bunch of irrigation heads and a sea-change in cultural practices. Farren said the restoration resulted in 65 to 70 percent reduction in applied water. Ben Crenshaw told me he hoped every course would see Pinehurst as an inspiration to reduce water even a little. I agree in principle, but that leads me to my final points...

**BROWN IS STILL NOT BEAUTIFUL FOR MOST PEOPLE.** I personally loved the look. Johnny Miller (yes, that Johnny Miller) told me he liked it because it was reminiscent of the great Australian courses. Others raved about continuing the naturalized, minimalist trend of Crenshaw/Coore, Doak, Kidd and Hanse. The deconstruction of Pinehurst No. 2 created a new-old thing: a throwback course that is tough, visually stunning and memorable. It's the kind of course that makes many players itch to go check it out in person.

That said, many supers I've heard from said some version of the following: “I liked it, but my members would never accept it.” Frankly, I have to agree. The tastes of the average American golfer are – like it or not – still shaped by Augusta National and the soothing television-driven look of wall-to-wall green. Only the most discriminating low-handicappers would prefer that look every day.

And, let's not forget that green is the color of healthy turf. Any rush towards browner courses (and I can't see one) ignores the fact that healthy, growing turfgrass provides substantial environmental benefits. If we continue to prove we merit the water we use to maintain healthy turf, green will always be golf's predominant color. That said, Pinehurst may not have started a revolution, but it planted seeds for an evolution of attitudes about what constitutes good golf.

**THE REAL LESSON.** The most important thing to come out of this whole adventure is a brilliant lesson for every facility that wants to survive and thrive.

In my humble opinion, we should celebrate the fact that Robert Dedman Jr., Pinehurst's owner, made a calculated decision to rebrand one of the world's greatest courses to set it apart in a highly competitive business environment. Corporations and affluent golfers can choose from lots of fabulous places to drop big bucks to play golf. This gives them a new and compelling reason to come to the Sand Hills of North Carolina and enjoy Pinehurst Resort.

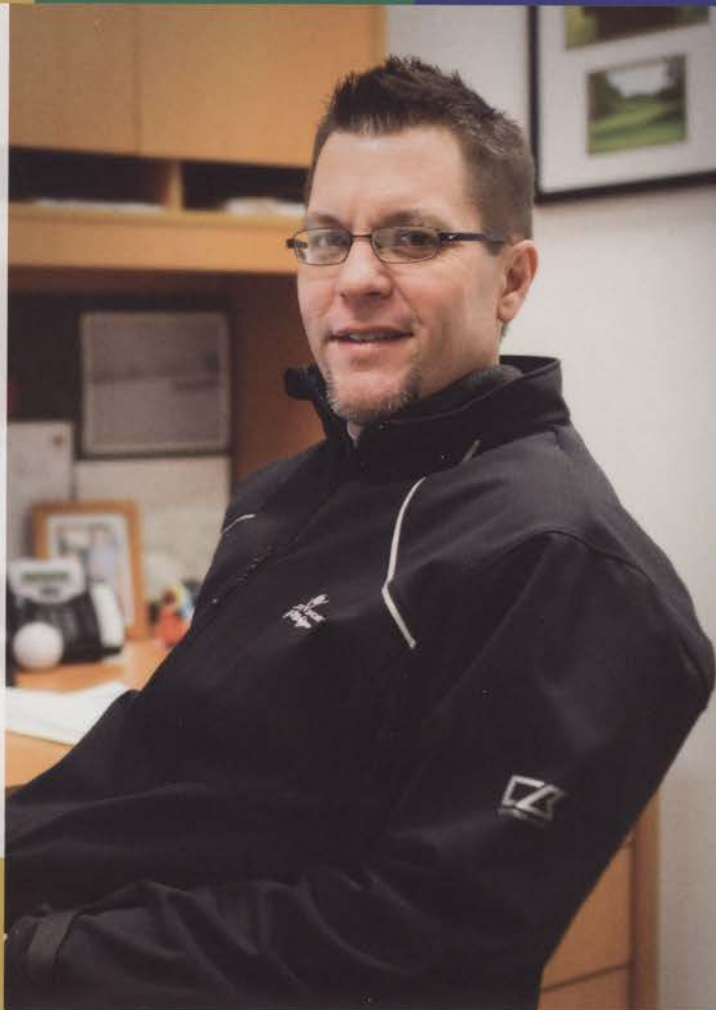
Dedman looked into the future and made a hard decision to ensure the long-term viability of his business. Shouldn't your facility do the same? **GCI**

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