



WATER-STARVED COURSE

There are many predictions about the look of future courses when increased water rationing kicks in. Many remind me of the nightly news, which often presumes we have memories shorter than a fruit fly's lifespan. Despite the recent and recurring gnashing of teeth and wringing of hands, we don't have to look past the droughts in California or recently in Georgia to see the future of golf courses, but more importantly, to know most of them will survive in some form we'll recognize.

The reality since the start of course building in America 120 years ago is that most would have never been built had they waited for adequate water resources to irrigate to "full ET loss" that many courses view as necessary today. The baby boomers can recall the variations of turf quality

have reduced water availability can learn from those who never did.

An example I'm familiar with is one of my designs – Colbert Hills in Manhattan, Kan. Built at the height of the building boom, it has the length of a college championship course and the environmental sensitivity to be Audubon Certified. But, according to ET charts, those 150 acres of turf require about 72-million gallons an average year, and more in recent droughts.

Manhattan, Kan., has no ground water and insufficient rain harvesting capability to sustain a golf course, so Colbert Hills relies on city water for most of its irrigation. Favorable rates in its early years changed with the city's water rate policy, increasing its irrigation water costs to about \$3,000 per million gallons. In 2010, they used only 27-million gallons, equating to

three occasions. They lost some play to better-irrigated courses. Ironically, many players, including the Web.com mini tour players, preferred the greater challenge of their fast fairways.

After having gone to the precipice last year, they have doubled their water budget, but it is still far less than full ET, with much better results. They are still extremely water conscious. Superintendent Matt Gourlay tweets his followers about every rain event.

They have also implemented other common sense, necessity-is-the-mother-of-invention type water-reduction techniques. They use a moisture sensor to supplement Matt's "old school" gut feel. They maxed out water reduction through their sophisticated irrigation system, which features a weather station, smaller sprinklers and tight spacing, and part to part circles between greens to surrounds, and fairways to rough. They turned off 500 sprinklers to reduce irrigated turf by about 40 acres. They converted to drought tolerant rough varieties. Fortunately, in a prairie setting, the browning and natives look right at home, which might not be the case at all courses.

I am not under the impression that water reduction will be easy, and without consequences to golf's business model. But, I am under the impression that **golf will find a way to adapt**, much as it has adapted from the original Scottish game to locales all over the world.

from greens to fairways to rough that occurred every summer, although it seems a distant memory for most. But again, even in today's modern irrigation climate, the "nightly news" (golf division) still seems to focus on those top-level courses. Across America, the vast majority of courses have never had enough irrigation.

Even as irrigation systems got better, most courses still experience times when water is short, and superintendents must accept some tinges of brown, sometimes far more than they would like. Those who have irrigation systems everywhere but now

about 25 percent ET replacement of the dry year demand, which textbooks tell us is the critical minimum water amount for most turf before dormancy or death. Their plan was actually to irrigate at 25 percent, and when that critical level resulted due to lack of rain, then water a few minutes a night to keep moisture in plant tissues. It helped reduce irrigation (and disease) that the course had never irrigated greens more than once every four days since opening a dozen years ago.

The self-imposed water restrictions showed on many days, with zoyzia fairways going dormant last year on

I am not under the impression that water reduction will be easy, and without consequences to golf's business model. But, I am under the impression that golf will find a way to adapt, much as it has adapted from the original Scottish game to locales all over the world. Water reduction is hard work, and perhaps the hardest part is mentally adjusting to the conditions before realistically attacking the problem. We may be short of water in many places at some point in the future, but my guess is superintendents will have no shortage of good, old-fashioned "Yankee ingenuity" which will go a long way to mitigating any problems they face. **GCI**

SEEKING TURF'S HOLY GRAIL

by Helen M. Stone

A look at some of the available turf types that offer playability, heat resistance and reduced water use.

Water conservation is nothing new in the golf course industry. Although golf course superintendents have been struggling with the mistaken public perception as water spenders, water savers is a more accurate label.

New technology saves millions of gallons (and dollars) worth of water as irrigation systems are fined-tuned, weather data incorporated and soil science extracts the most from every drop applied. Maximum water conservation is a medley of several elements, each of which play a part in stretching this precious resource.

"We try to develop bents that tolerate heat and need less total water," says Leah Brillman, Ph.D., director of research and technical services at Seed Research of Oregon in Corvallis, Ore. "But you need good soil and efficient irrigation, since you end up irrigating to the driest point on the course. It's always got to be a combination of turfgrass breeding, management and irrigation

systems to maximize water savings."

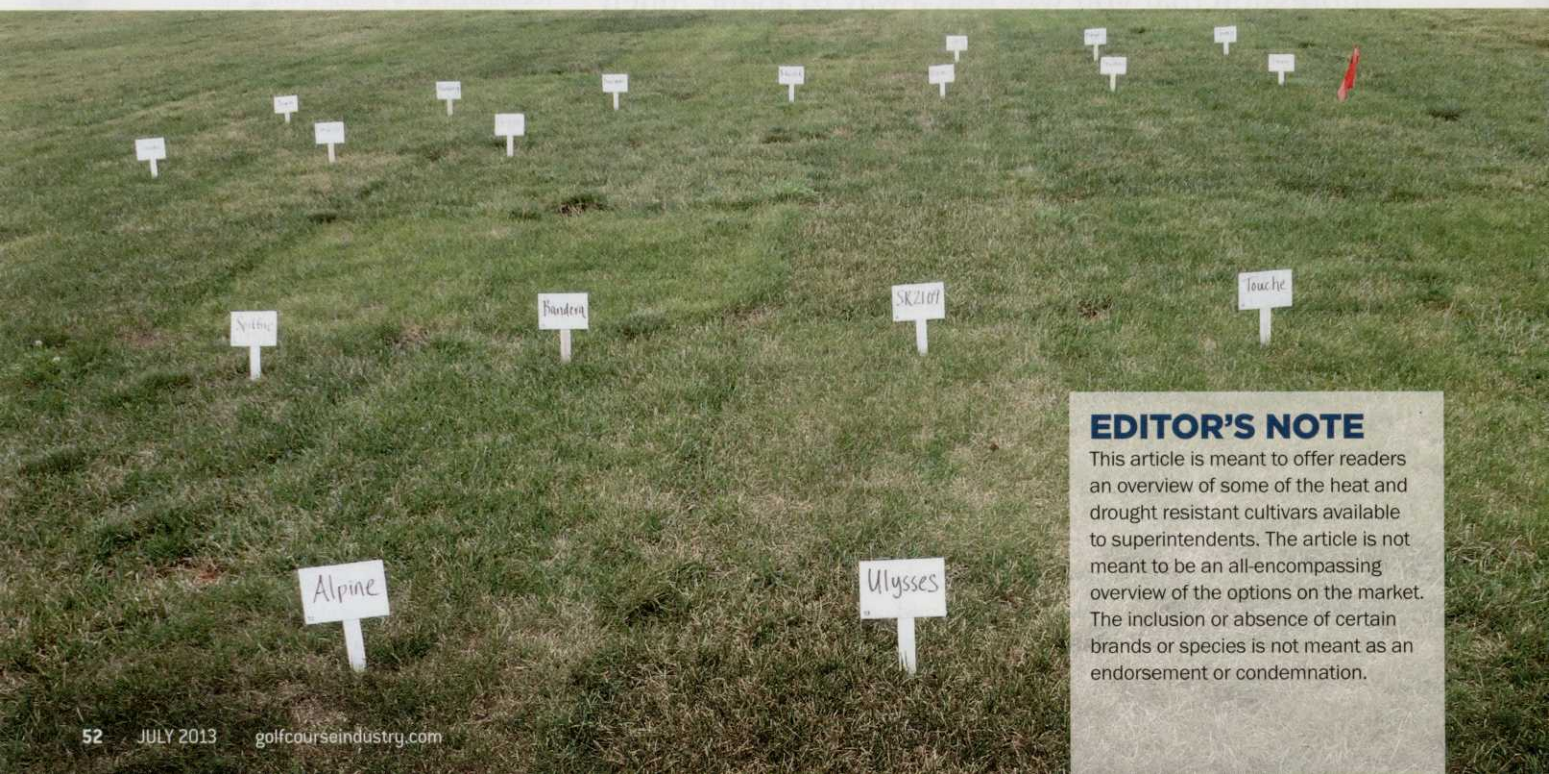
Brillman notes grasses that show good heat tolerance can also be water savers. "Some of our newer creeping bentgrasses, especially 007, Tye and MacKenzie (yes, it's named after golf course architect Alister MacKenzie) have done really well under heat and drought stress."

Developed with germplasm from Rutgers University, the new "super bents" show better overall performance on golf courses. In addition to water conservation, they tolerate heat and are less attractive to typical turf insects while resisting turf diseases as well.

Penncross bentgrass, released in 1955, was developed at Penn State and is a long-time favorite. Its progeny includes a line of "Penn" bentgrass cultivars. Two of the newest are Pure Distinction and Crystal BlueLinks from Tee-2-Green. "Pure Distinction is a brand-new bentgrass," says Lew Sharp agronomist and golf course consultant for the company in

KEY POINTS

- In addition to turfgrass breeding and management, efficient irrigation systems are required to maximize water savings.
- Grasses that show solid heat tolerance traits can also be effective water savers.
- New "super bents" exhibit solid performance on golf courses and offer water conservation, heat tolerance, as well as disease and pest resistance.
- A number of water-saving turf varieties, including tall fescue, are available for fairways, roughs and out-of-play areas.
- Only recently have turf researchers realized how some varieties of Kentucky bluegrass exhibit drought tolerance.
- Conducting your due diligence with regard to water-saving turfgrass is critical when selecting the right turfgrass variety for your course.



EDITOR'S NOTE

This article is meant to offer readers an overview of some of the heat and drought resistant cultivars available to superintendents. The article is not meant to be an all-encompassing overview of the options on the market. The inclusion or absence of certain brands or species is not meant as an endorsement or condemnation.



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“You’ll likely be living with the turfgrass variety you choose for years. Research and choose the best varieties available.”

– Murray Wingate, Lebanon Turf Products

Hubbard, Ore. “It has four times the root mass of other grasses in the market. It actually likes drier conditions, so it requires less water and fewer inputs than other varieties. It will really save time and money.”

Crystal BlueLinks can also take the heat with ease. “Crystal BlueLinks requires less fertilizer, water, and fungicides to stay healthy.” Sharp says. “It establishes very quickly with very deep roots, and great lateral growth.”

Most “high density” bentgrasses require a bit more management to control thatch. Top dressing and verticutting are usually recommended. However, the water savings, plus lower inputs of pesticides and fertilizers, more than make it worth the slight extra effort.

To adapt to the drier, hotter conditions of the South and West, Bermudagrass is often used. Its biggest drawback is its brown color during winter dormancy. While some courses accept that “brown is the new green,” although most still overseed with perennial ryegrass.

There is a dizzying selection of perennial ryegrass on the market, and while quick establishment and a smooth spring transition are probably the two biggest concerns, saving water

is also a huge issue in regions where Bermudagrass thrives.

“Pennington’s APR 2015 is qualified as a ‘Water Star’ and is showing great drought tolerance for a ryegrass,” says Russ Nicholson, chief agronomist for Pennington in Madison, Ga. It will be available this fall.

Nicholson is active in the Turfgrass Water Conservation Alliance (TWCA), a non-profit organization working to establish a scientific method to distinguish water-saving turf varieties. Grasses are established under optimum conditions, then subjected to drought stress.

Integra II was bred for wear tolerance and disease resistance, but was tested and certified as a Water Star; the same goes for Applaud II. Both boast solid color and quick establishment.

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For fairways, roughs and out-of-play areas, there are many turfgrass choices that can make every last drop count. Tall fescues are a popular choice for landscapes, but double as a good choice for roughs. It's tall mowing height allows it to grow massive roots so that irrigation schedules can be stretched to the limit.

Monet or Van Gogh are recommended if you are renovating, says Murray Wingate, turfgrass marketing and sales manager at Lebanon Turf Products. Monet received consistent high rankings in NTEP (National Turfgrass Evaluation Program) trails for overall quality, traffic stress and fall density. Van Gogh was singled out for its outstanding drought tolerance amid a field of low-water-use tall fescues, and was high in overall quality as well.

Hard fescues can be allowed to go without mowing for weeks, notes Nicholson. "A new one released this fall is Survivor. It's good for out-of-play areas; kind of an ecology mix meadow setting," he says. "If you don't fertilize heavily you only need to mow once a month or not at all. It's shorter than your knee, and you can still go out and find a ball in it. A lot of guys will add wildflowers so you have some color there, too."

Kentucky bluegrass has fallen in and out of favor for fairways, but with improved varieties over the past five years, is now once again recommended. "Mallard, Monte Carlo and Ridgeline all have disease resistance and tolerate wear very well," says Nicholson. "But it's only in the past couple years that we found out how drought tolerant they are. It gave them a new lease on life and we are pumping out a lot of seed now."



Desert Mountain in Scottsdale, Ariz., The Cochise Course.

Choosing the right Kentucky bluegrass can make a noticeable difference in a water budget. "Kansas State University ran drought trials with bluegrasses," Dr. Brillman explains. "Over the course of four months, some only needed eight inches of water; others needed 22 inches."

Whatever your need, there is a water-saving turfgrass to fill it. Do your homework to find out which cultivars do the best in your region. Use the research by universities and NTEP. "You'll likely be living with the turfgrass variety you choose for years," says Wingate. "Research and choose the best varieties available." **GCI**

Helen M. Stone is a West Coast freelance writer and a frequent GCI contributor.



FOR MORE

For more information about the National Turfgrass Evaluation Program (NTEP) enter www.ntep.org into your web browser to check out the website. Enter bit.ly/16dShA7 into your web browser to read the Green section Record article, Report Card for Turfgrasses. You can also check out the July 2011 Green Section Record article, Searching For the Right Stuff: Tolerating Hot and Dry, by entering bit.ly/16ES3y into your web browser.

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Bill Brown, CGCS, is CEO of Turf Republic and founder of iTurf Apps. Bill has spent 20 years on golf courses, including the last 5 years at Hartefeld National Golf Club. He's served as an officer and board of director for the Philadelphia Association of Golf Course Superintendents, as well as served on national committees. Contact him at billbrown@turfpublic.com.

NODE TO NODE TO TODAY

As I embark on my first social media column with Golf Course Industry, it is a bit ironic that it is the magazine's annual water issue. I am going to a place I reference often, so please bear with me. In my announcement assuming the role of CEO of the new startup Turf Republic, I referenced Steve Jobs' commencement address. In it, Steve talks about connecting the dots:

"... you can't connect the dots looking forward; you can only connect them looking backwards. So you have to trust that the dots will somehow connect in your future. You have to trust in something – your gut, destiny, life, karma, whatever." This really couldn't be more true and I would be willing to guarantee if you all took a moment to look back, your dots would connect too."

So what does connecting the dots have to do with me, water, GCI, Turf Republic and social media? Some of you may think I'm already stretching the column – long internodes between the nodes, to put it in turf terms – but I'm not.

I have always been a tech guy. I like to reside on technology's cutting edge and I like to stand at the front of the line when the "next big thing" comes out. When social media hit the scene, it was innovative and cool and I, of course, jumped on.

Back then it was about Brittney Spears shaving

Who could forget #whosgotmyhose and the #LSOT awards? Both of these hashtags served a very good purpose; one for learning and the other for release.

her head and what Starbucks Ashton Kutcher was going to order a latte. Social media in our industry took root in 2009. Many of us turned to social media, a much larger diverse network, to solve our problems. I tell this story often in my social media seminars. The first time social media had an impact on me professionally was on a Friday in July of 2009. A fellow superintendent was looking for help, his pump station had gone down. He tweeted some photos and symptoms of the issue. Colleagues began chiming in and sharing their thoughts and experiences with this particular type of pump station. By day's end, social media and the intuitive-

ness of interconnected superintendents combined to fix the pump station.

The summer we all wish to forget came next, the summer of 2010. Social media flexed its muscle power that summer. Who could forget #whosgotmyhose and the #LSOT awards? Both of these hashtags served an integral purpose; one for learning and the other for release. Water was a big topic of conversation in 2010. I wrote a few columns that summer focused on utilizing soil moisture meters, and remote access via iPhone and iPad to control irrigation cycles.

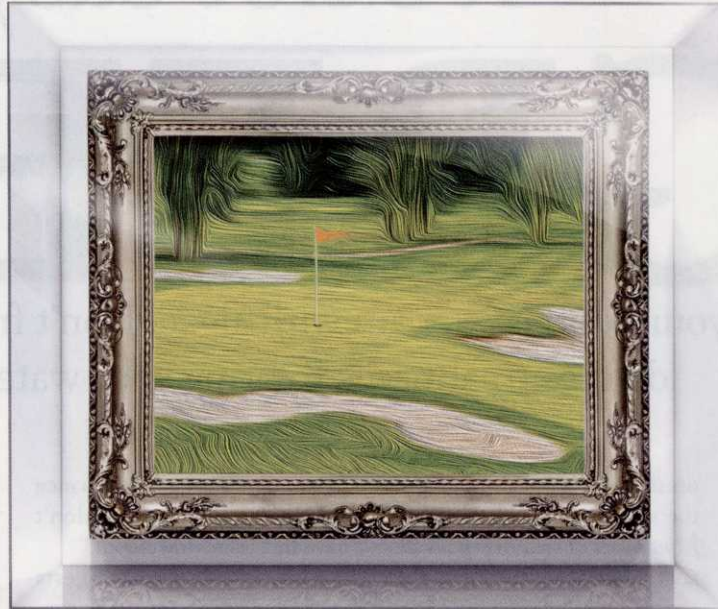
The summer of 2010 an idea was born – Turf Republic. Some think this was a whim, something thrown together to bring a more social approach to turf. However, those who know me and understand how I operate, know what Turf Republic is built on and the type of impact it will make. The vision, philosophies and assets of Turf Republic come from an understanding of where we are and where we need to be in the future.

While Turf Republic is young, I could not be more excited about the direction it's going.

So how do we connect these dots, nodes to internodes?

Well, I have trusted my instinct my entire career and life, for that matter. I have had ideas, some good some bad, but have always gone with them. Even the bad ideas have their dots connected. So you may wonder how we go from me in 2009 to today writing a column for Golf Course Industry's water issue? Well my love for technology and passion for the industry paved the way for my use of social media and the genesis of my iTurf Apps platform in 2009. The first time social media made an impact for me was in 2009 when several of us assisted breathing life back into an irrigation pump station for a fellow superintendent. In 2010, social media helped an entire industry endure one of the toughest summers on record. It also educated us in many areas on water and turf management. That same year an idea called Turf Republic was born, and early this year a phone call that had the words "So what's this Turf Republic?" brings me to where I am today.

I look forward to this new journey with you all and look forward to the future and connecting more dots. **GCI**



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by Katie Tuttle

It's not easy being GREEN

So your pond is overrun with algae. Don't fret. Here are three diverse treatments to bring your water back into shape.

When people think of golf courses, the first thing that probably comes to mind is the idea of lush, green, well-manicured greens. However, ponds, reservoirs and hazards on your course are just as important to keep looking good and healthy.

If you are looking for a product to help keep algae off your ponds and water hazards, Colleen Clifford, marketing manager at Aquatrols, suggests using their product Radiance, which is different from most algaecides.

"You have to spray [other products] across the surface," she says. "As it falls through the water column, it kills the algae on the way down. And then it [lands]

on the bottom of the pond, or the water area, and sits there. After years of treating the water area, you end up getting copper landing and building up on the bottom, which really you don't want there."

Radiance, however, is different. "Instead of having to spray it across the top, you swish it up in a bucket of water and chuck it out into the water on top of the surface, and it will automatically disperse itself. It disperses vertically and horizontally, so it's everywhere in the water column," Clifford says. "As the copper attaches to the algae and kills it, all the free copper that's left then spreads out further until all of it is used up. It works a little better

from a long term maintenance standpoint because you don't have that recurring bloom."

Although Clifford suggests using Radiance over other copper products when controlling algae long term, she doesn't suggest it for a large infestation of algae. Instead, she recommends a standard-based copper product.

"It works better maintaining against low levels and continuous, it's not a knock-down product," she says.

No matter what you choose to do to help maintain your water, it's best to always start as early in the season as possible. This is because there will be less algae to kill, so you're more likely to kill a majority of it. Any algae not

killed will rebloom and continue the problem.

Another reason to kill it early in the season is that the lower the algae count is at the initial kill, the less likely it is to damage the pond life around it. As the algae dies and decays, it causes a crash in the oxygen level, and a large enough crash could kill the fish in the pond.

If you're in the process of creating or renovating the ponds on your course, there are ways to proactively prevent algae from taking over the water. Kyle Kanny, superintendent at River Ridge Golf Course in Oxnard, Calif., says a lot of their algae control is managed by the pond structure.

"Our first course has eight acres of lakes but they are only six feet deep at the deepest point," says Kanny. "This allows the water to heat up and water temperature is a key component of algae development." Because of this, algae was able to grow and spread across the pond.

On the second course, the lakes were built at a minimum of 15 feet, which allows the temperatures to stay cooler. However, the water can't be allowed to just stay still.



A golf course pond before and after treatment with Aqua-T



Before treatment, this lake at River Ridge Golf Course was wall-to-wall algae.

“It’s important to mix the water so there isn’t a layering of temps,” says Kanny. “This can be accomplished with fountains and aeration bubblers.”

Another tip Kanny has is to avoid as much fertilizer runoff as possible.

“Avoiding fertilizer runoff into lakes is critical, as dissolved nutrients that stimulate aquatic plant growth can result in the depletion of dissolved oxygen, or eutrophication,” he says. A downside to the ponds on the first course, on top of being shallow, was that the course was located near an operating landfill. Because of this, they were inundated with seagulls.

“[They] provided a layer of guano that provided the nutrients necessary to grow an algae layer that, when we killed it with chemicals would sink and add to that ‘organic’ layer,” Kanny says. It became a vicious cycle.

When this happened, Kanny realized they had to remove the organic layer at the bottom of the lake, which they did by having US AquaVac vacuum the lake bed and collect the sediment into a geotextile bag.

“This process reestablished our depth and removed the nutrient source.”

“Our first course has eight acres of lakes but they are only six feet deep at the deepest point. This allows the water to heat up and **water temperature is a key component of algae development.**”

– Kyle Kanny, River Ridge Golf Course

US AquaVac doesn’t just specialize in algae. They advertise their services to provide “muck, sludge, silt, and sediment removal services to re-establish your pond’s bottom and greatly reduce the amount of bacteria, toxic gases, ammonias, bad odors, and algae that accumulate over time.”

If you are looking for an eco-friendly way to keep your pond maintained, you might want to try Aqua-T, a product by Ecologel Solutions. Unlike most algacides, Aqua-T is completely biological. According to Jim Spindler, agronomist for Ecologel Solutions, the product is made up of thousands of naturally occurring bacteria, which are already found in ponds. When put in the water, the bacteria eat the nutrients that cause algae bloom.

“It takes the organic material that’s in the water solution and starts digesting it,” says Spindler.

If you deny the algae the nutrients it needs, you will prevent it

from having the ability to bloom.

“By denying a food source, you not only will kill off existing blooms, you also help prevent future blooms from occurring,” says Sarah Spatola, marketing coordinator for Ecologel. “[However] you’re not going to see a knock out right away. It’s going to take some time.”

Since Aqua-T is not meant to be a curative, it can be put down at any time, although spring (when the water temperatures start to rise) is best. It’s also important for people to note that it will not give immediate results. Instead it should be used as more of a preventative and a program product.

“Some people will use it in conjunction with another algacide,” says Spindler. “They kill algae and then start an Aqua-T program to start taking away the nutrients that the algae would normally use. It’s a program where you’ve got to regularly apply the bacteria. We keep

the population numbers of the bacteria up so we recommend to go out with an initial dose that gets the numbers high, and then every two weeks add some more bacteria to keep the numbers high and continually working on those nutrients in that water.”

Spindler says others have used a dye to keep sunlight from reaching the algae.

“The algae is a simple plant that needs sunlight as well as nutrients, so using a dye with Aqua-T will also help. If it doesn’t have sunlight and it doesn’t have food, it’s not going to go very far.” **GCI**

Katie Tuttle is GCI’s assistant editor.

For some interesting insight into how superintendents dealt with pond algae nearly 75 years ago, check out Blast From The Past in the iPad or iPhone app version of this story.



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.

TURF'S MOST IMPORTANT CHALLENGE

In a recent visit with my 4-year-old granddaughter, Ella, she introduced me to her new neighbor and playmate, Lucy.

"This is my grandpa," Ella said, adding, "He makes a lot of funny noises!"

Clearly, Ella thinks I am firmly settled in geezer land!

She might be right. After all, I've been involved in the golf turf industry for nearly 50 years. What changes I have seen in those five decades.

Today's equipment barely resembles those used in the 60s. A strong argument could be made that turf irrigation has experienced more change and progress than anything else a superintendent manages.

My first working experience on a golf course was at a very nice private club. It was in the middle 60s and the fairways were not irrigated, except for a few areas we tried to water with a Rain Train traveling sprinkler. The course was bordered on three sides by the University of Wisconsin Arboretum, and during dry periods we worried about a grass fire that could move into the wooded arboretum. We kept the John Bean sprayer filled with water and ready to go.

The club decided to make a major improvement and invest in an automatic irrigation system with electro-mechanical controllers, the first in our state. We had green fairways! The installation was so impressive that we hosted a WGCSA meeting and the afternoon was spent with demonstrations and education about this watering system marvel.

I interned at a nice club that had center row quick couplers valves for fairway irrigation. The valves were about 80 feet apart – too close and the result was chronic wet areas in the middle of fairways. Greens and tees were watered from a sod cup in the center of each. It was quite a sight to

see a John Deere 310 backhoe parked on the 18th green one day, digging up a leaky steel pipe in the middle of the green! Obviously, uneven distribution was a problem with all systems like this one, and the use of Cushmans and a night employee created issues, too.

I was hired to manage a private course that had the first irrigated fairways in Wisconsin. The system I inherited was installed by the famed irrigation engineer Scott Stewart in '38 and we were still using it in '73.

When I look back to watching my grandfather use a forked stick to dowse for spring water on his farm, to contemporary golf course irrigation considerations, I really do feel my age.

Greens and tees were still watered with hose and roller base sprinklers. We quickly updated to provide perimeter irrigation, but we still had to wrestle with finding and training someone to do the watering at night. The fairway valves were 100 feet apart and we did a lot of hand watering to even out distribution.

We got caught up in '88 with a Toro Network 8000 system. A good investment, yet long before I retired it was becoming outdated. Since then, the club has replaced controllers and heads, working toward every superintendent's goal of uniform coverage.

And so it has been all across golf. For me, at least sourcing water wasn't an overwhelming problem; after all, we get 34.5 inches of precipitation per year and the course is on the shores of a lake. We have riparian rights and although we have to filter the water, it is reliable and the cost is basically the cost of electricity to pump it up and onto the course. Not so in other parts of the country. Water shortages have forced new technologies, acceptance

of recycled water and changes in areas irrigated. The limits of water sources have initiated breeding programs in search for drought tolerant grasses suitable for golf.

Pump stations have undergone substantial engineering improvements. I started with a small building, a huge pressure tank and water probe, and left a top-notch poured concrete building with variable frequency controls. It was reliable and efficient.

I have witnessed huge improve-

ments in turf cultivation equipment and the positive effects those machines have had on turf rooting and the resultant decrease in water requirements. Also, superintendents have taken advantage of the wide range of surfactant products available, which have made our use of water more efficient. They aid with infiltration and retention and are key components of many water management programs on golf courses.

Our golf course was built in 1920, and I have always marveled at the careful grading that was done to move surface water around the course. Today we see civil engineers designing grading projects for golf courses to divert and capture storm water and urban runoff for use in irrigation.

Let's not forget how much weather forecasting has improved in recent years. Every superintendent now has access to forecasting not even imagined a few years ago. Those forecasts

(MILLER continues on page 79)