"WATER WISE" | A THREE-PART SERIES

Sponsored by: RAIN BIRD. AQUATROLS®

PART 3

The World of Water to Come

About This Series

Welcome to Part Three of *Golfdom's* three-part "Water Wise" series, which aims to educate golf course superintendents and other industry personnel on the irrigation issues facing the golf course maintenance industry.

While it's 16 years away, it's easy to imagine what golf course irrigation will be like in 2025. Considering that the United Nations predicts that two-thirds of the world's population will live in countries that face serious water shortages in 2025, it's easy to assume that the golf course industry will be under incredible scrutiny for its freshwater use then.

Part Three of this series is titled "The World of Water to Come." It includes the views of several longtime superintendents on golf course irrigation in 2025. A second story, an essay written by Christopher S. Gray Sr., discusses the mindset superintendents must possess toward irrigation in 2025. Gray should know. He's one of them.

Part One of the series, titled "Getting Out the Word," appeared in our November issue and reported on what the golf industry needs to do to get out the message to golfers and non-golfers alike that it uses water wisely.

Part Two, "Less Is More," appeared in our December issue and reported on what superintendents are doing to conserve water, from using more effluent to cutting back on overseeding. The series is available at www.golfdom.com.

– Larry Aylward, Editor in Chief

What will golf course irrigation look like in 2025? | See page 54

ALSO:

Conserving for the Future of Golf

By Kathy Conard

What will irrigation be like in 2025? Will there even be irrigation on golf courses? As sustainability becomes a buzzword, you have to ask yourself what will ever-increasing water regulations be in 16 years. Better yet, what can you do now to prevent water shortages from forcing those regulations? Aquatrols believes in a winning combination, both for the present and the future: a good irrigation system and wetting agents.

Good irrigation systems make sure that water is distributed uniformly across the turfgrass surface. But what happens to water once it leaves the irrigation head? Science takes over and interferes with how water interacts with soil.

Unfortunately, things like soil-water repellency, the natural way water moves through a soil profile and soil physical properties can cause a well-designed, well-managed irrigation system to lose that high efficiency once it tries to penetrate the surface and move throughout the rootzone. We can't change the properties of water or soil, but we can control how water moves into and throughout the soil. In order to maintain adequate soil moisture content and to get water, fertilizers, insecticides and fungicides uniformly distributed, you need to use a wetting agent to optimize your irrigation and input efficiencies.

Aquatrols wetting agents are proven to reduce run-off, improve uniform penetration and distribution of water and inputs, and reduce water use by 20 percent to 50 percent depending on the turfgrass variety. You can still maintain healthy, great-looking turf because of precise water placement (and everything water carries) on the surface and throughout the rootzone — even with shorter irrigation times.

> "With an upgraded irrigation system and use of wetting agents, conservation does not have to be expensive and is a realistic option for everyone."

You're conserving water and maintaining your turfgrass in peak condition, which is not only good for the environment, but is good for the game of golf. If you can be seen as good stewards of water conservation, you will be less likely to be targeted unfairly by legislators or your community.

The other alternative is for golf to go brown — I know, I also shudder at the thought of this. Brown golf may not be a reality in the United States, where consumers prefer a pretty green course with fast, firm greens and attractive fairways. Good thing there are other ways to save water and use it more efficiently. Using other water sources, such as effluent, is another option. Effluent water is used in certain parts of the country and can be a great alternative as long as the city or municipality where a course is located has the facilities to process effluent and the golf course has a place to store it. Additional amendments and different cultural practices may also be necessary for its use. Let's face it: Effluent water is a great option in some areas, but it can be costly to recycle water.

With an upgraded irrigation system and use of wetting agents, conservation does not have to be expensive and is a realistic option for everyone that can easily be incorporated into existing turf management practices. If you reduce the waste of water now, you can preserve golf as we know it for the future.

Conard is Aquatrols' marketing manager for turf and ornamental. For more information or if you have any questions about wetting agents, you can contact Aquatrols at 800-257-7797 or visit the company's Web site at www.aquatrols.com.

AQUATROLS®

WATER IMPACT ALLIANCE

More Than a Philosophy or Slogan

By Michael Roberts

Each day, we make choices that affect our families, co-workers and our environment. Even seemingly mundane choices — like driving to work, planting a tree or buying a bottle of soda — have an impact on the world around us. The question is — will our choices help us leave behind a better world for future generations than the one that we inherited?

At Rain Bird, we ask ourselves that question every day. We understand the crucial role that water plays in a healthy, sustainable environment, and we embrace the ongoing challenge of using water effectively, efficiently and responsibly. As a result, our over-arching philosophy, The Intelligent Use of Water, guides everything we do.

As dedicated advocates for this precious and limited resource, we encourage each other to address the social, economic and environmental issues that influence how we use water on a daily basis. For Rain Bird, The Intelligent Use of Water is more than a philosophy or a slogan. It's our company's foundation, manifested in four distinct ways:

- Leadership. By sharing new ideas and enlivening old processes, Rain Bird is leading the charge toward more responsible water use. We bring together some of the world's leading experts on water, irrigation and conservation to openly discuss and debate important issues.
- Education. Knowledge is power. From our many white papers to the classroom programs we've developed with leading educators, Rain Bird constantly seeks out new and better ways to help others understand water's economic and environmental roles.
- Partnerships. Collaborating with like-minded individuals and organizations is a powerful way to inspire change. Rain Bird's partnership with Golfdom to bring you this Water Wise series is just one example of how we team up with organizations around the world that share our interest in responsible water management.
- Innovative Products and Technologies. From our highly efficient EAGLE rotors to our state-of-the-art MI Series Mobile Controller, Rain Bird products are designed to help our customers use water wisely. We strive to develop products and systems that apply water more effectively and efficiently than ever before.
- The Intelligent Use of Water reflects our dedication to water stewardship, and its vision is woven into the very fabric of the Rain Bird organization. That's why Rain Bird provides a variety of products and forums that have the potential to change the way we all think about the water we use each day.

> "We understand the crucial role that water plays in a healthy, sustainable environment, and we embrace the ongoing challenge of using water effectively, efficiently and responsibly."

We hope that you have benefited from the three-part Water Wise series in *Golfdom*, and that it has inspired you to join Rain Bird in its efforts to encourage the effective, efficient and responsible use of water.

Michael Roberts is director of golf irrigation for Rain Bird. For more information on Rain Bird's products or The Intelligent Use of Water campaign, contact www.rainbird.com.

WATER WISE

The World of

TOP PHOTO COURTESY: DAN DINELLI; PHOTO RIGHT BY: LARRY AYLWARD

BY LARRY AYLWARD, EDITOR IN CHIEF

While tending turfgrass in parched Southern California for the past decade, longtime golf course superintendent Bruce Williams has realized more than ever how vital it is to manage water properly.

"Water is an extremely precious commodity," says Williams, the director of golf courses and grounds for the Los Angeles Country Club. "Probably the most-important thing we do on the golf course every day is manage the water."

It is this mindset that more golf course superintendents, whether they hail from arid Arizona or waterlogged Washington, must grasp in the future. If they think the freshwater shortage is serious now, just wait until 2025. If they think their irrigation practices are being scrutinized now, just wait until 2025.

Unless the world's population acts swiftly, the United Nations predicts that two-thirds of the world's population will live in countries that face serious freshwater shortages in 2025. In America, at least 36 states expect to face water shortages within the next five years, according to a report from the U.S. Government Accountability Office. When one hears such alarming statistics, it's hard to consider where the

Water to Come

golf industry fits in the equation. Nobody will argue that healthy turfgrass is more important than healthy lives.

That said, golf will still be a viable industry in 2025, and golf courses will still use their share of fresh water. But how much fresh water they use in 2025 will depend more than ever on cost and availability. Golf courses' freshwater use could also diminish if they have more access to effluent water. And superintendents' water-management skills should improve immensely thanks to better technology.

Tomorrow's irrigation

In 2025, Matt Shaffer, superintendent of the Merion (Pa.) Golf Club, expects that authorities will allocate the amount of fresh water that golf courses can use for irrigation.

"It could get to the point where you're actually told how many acres of greens, tees, fairways and roughs you'll be allowed to irrigate," says Shaffer, adding that local water authorities in 2025 might also have the authority to turn off the fresh water flowing to a golf course if that course has used up its allocation.

"I'm sure they'll have some kind of automatic reading device that will be able to tabulate how much water we're taking out of an aquifer," Shaffer adds.

Mark Jarrell, superintendent of the Palm Beach National Golf and Country Club in Lake Worth, Fla., has probably been through more water restrictions in south Florida the past few years than all Northern superintendents combined. Hence, there's one thing Jarrell knows about the future of golf course irrigation.

"Everything will be geared toward conservation and doing as much as we can to save as much water as possible," he says.

In 2025, Jarrell and many superintendents agree that freshwater conservation will be spelled E-F-F-L-U-E-N-T.

"I think we'll see nearly 100 percent effluent in Florida by 2025," Jarrell says of golf course irrigation in the state. "While effluent irrigation is a big part of the answer to water reduction, there will have to be more delivery systems."

Williams also expects effluent water use to grow. He says about 33 percent of California courses irrigate with effluent, and he expects that number to rise in coming years if the infrastructure is available for courses to do so.

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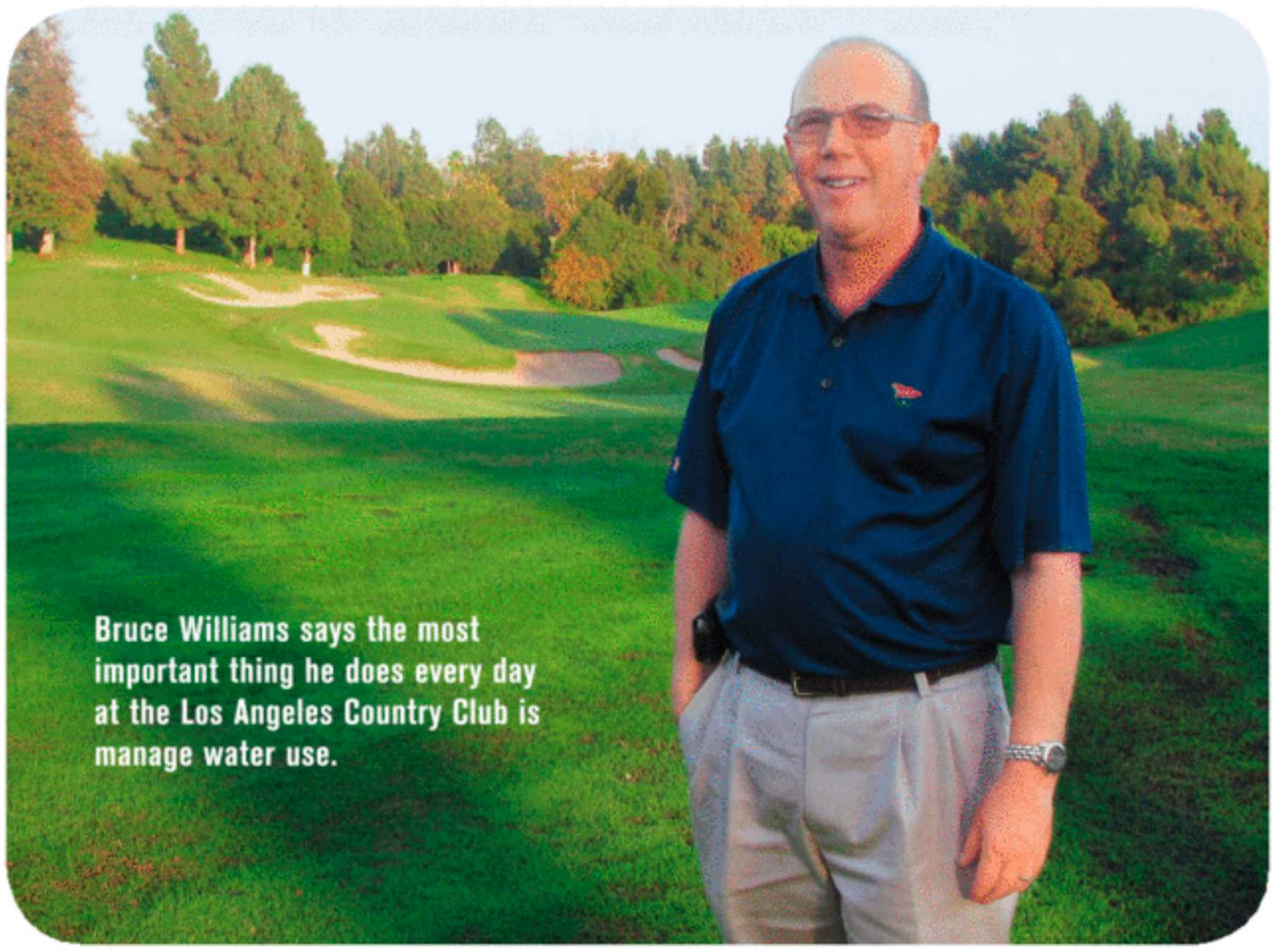

Bruce Williams says the most important thing he does every day at the Los Angeles Country Club is manage water use.

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"By the year 2025, I can easily see more than 50 percent of U.S. golf courses being on effluent water," Williams says. "It's very difficult in many states today to get a permit to build a golf course without showing that you're not going to use potable water."

Dan Dinelli, certified superintendent of North Shore Country Club in Northbrook, Ill., agrees that effluent water use will be more common at courses across the country, especially in communities where courses can tap existing sewer lines or are located near water treatment plants. "Effluent water has its maintenance issues," Dinelli says, pointing out it causes salt buildup in soil. "But they're mostly manageable issues."

Dara Park, assistant professor in the department of horticulture at Clemson University, expects golf courses in the South will be required by law to irrigate with effluent in 2025 as long as the infrastructure to do so is available. She says superintendents should start preparing now for the future with the help of local university and/or government personnel.

"The most important thing is to get involved," Park says. "Know what's going on in your town and city."

Superintendents also agree that freshwater conservation will be spelled S-E-N-S-O-R-S. Soil sensors are devices that allow superintendents to better understand what's going on below ground and ultimately lead to a reduction in water usage. This relatively new wireless technology could be widespread in 2025, superintendents say.

Shaffer calls wireless sensors the wave of the future.

"Sensors are our CT scans," he says. "They allow us to look into the substrate. We've always had to react to what's on top [of turfgrass] without any knowledge of what's happening underneath. Now sensors will give us the opportunity to peek into that."

Shaffer believes sensors will be mandated for use by 2025. "They will be the only way you can truly manage water," he adds.

The word Dinelli uses to describe sensor technology is "awesome." He is impressed with how sensors can track and grasp temperature moisture and even salinity in soil.

Regarding the latter, sensors could play a huge role in monitoring salt buildup in soil if effluent irrigation does become more widespread, Dinelli points out.

Along with sensors, superintendents are counting on irrigation manufacturers to deliver even better and more refined equipment and products to help save water.

"We have some tremendous companies that are dedicated to managing water on this planet," says Williams, who recalls the days of hooking up to fire hydrants to tap water for golf course irrigation. "Today, the engineering that goes into [irrigation technology] really creates the ability for us to apply water effectively and efficiently. I don't anticipate that it will lessen. Competition is keen among the major players."

> "The United Nations predicts that two-thirds of the world's population will live in countries that face serious freshwater shortages in 2025."

Dinelli expects more irrigation systems to act as delivery tools for other products, including fertilizer and pesticides.

"Irrigation systems are significant investments, and you can really take advantage of the technologies out there by using them as delivery tools," he says.

Shaffer also expects "great advances" in golf course irrigation, including changes in sprinkler head technology. Shaffer hopes future technology enables him to change the radius of irrigation heads from the controller. "Then you can use the same head for watering perimeters as you do for watering greens, just by changing the radius," he says.

Shaffer also wouldn't be surprised to see irrigation systems that increase heads from 1,500 to 2,500.

"The more heads you have, the more control you have so the less water you use," he says. "But the up-front cost to do that can't be ridiculous."

Park expects more courses will use wetting agents, surfactants and soil

Dan Dinelli is one of several superintendents who is impressed with wireless sensors. Dinelli calls the technology "awesome."

PHOTO LEFT COURTESY: DAN DINELLI; PHOTO RIGHT BY: HOWARD P. NUEMBERGER

amendments in the future to conserve water and prevent localized dry spot.

One sure way to get golf courses to use less water today and in the future is to charge more money for it, says North Carolina State Turfgrass Professor Dan Bowman. "Pricing pressures work better than mandates," he adds. "That's what Las Vegas has done to get golf courses and other big water users to reduce their inputs."

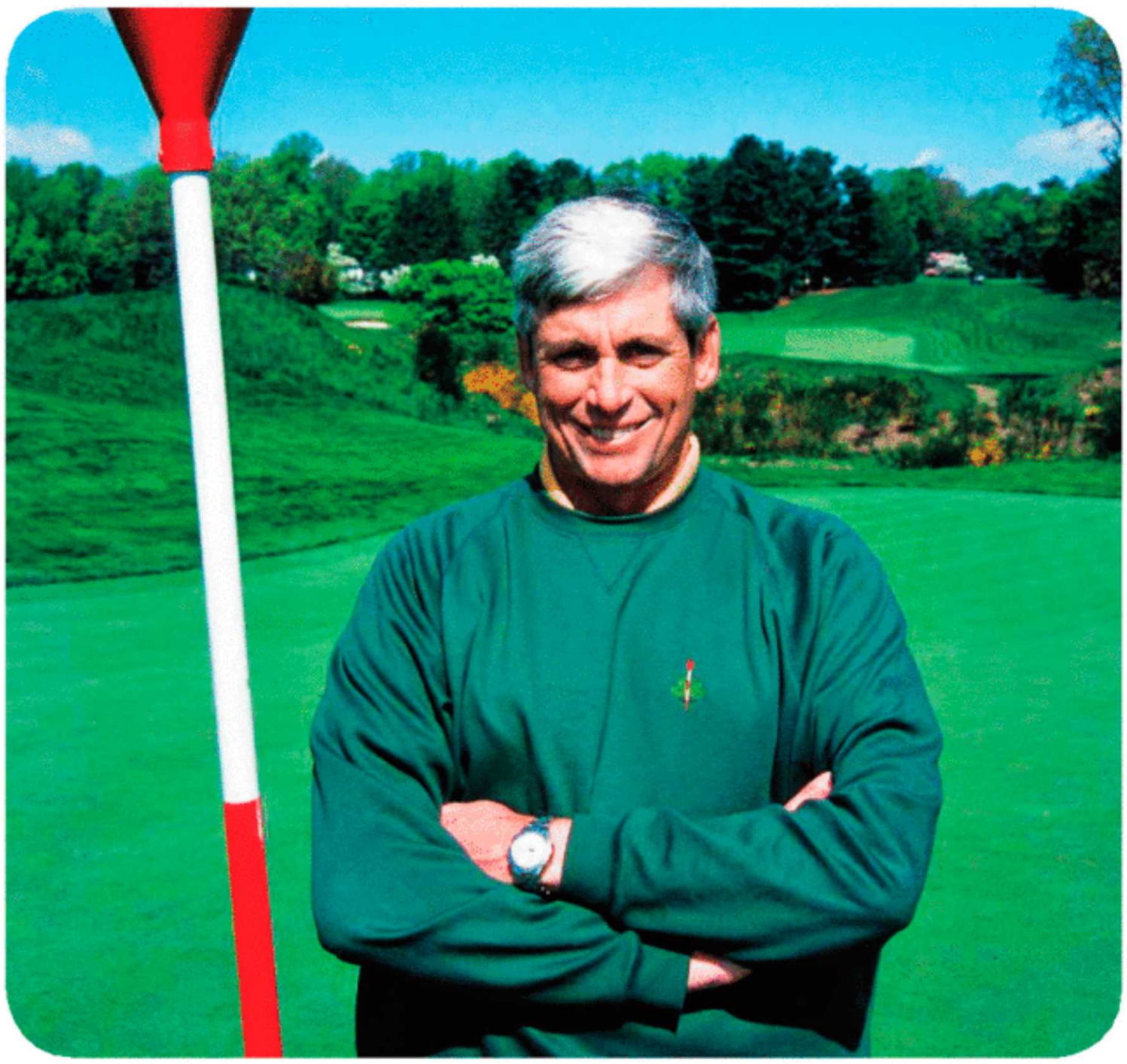
In 2025, new golf courses will continue to be designed to use less water and will feature more non-irrigated natural areas. According to the American Society of Golf Course Architects, the incorporation of natural runoff patterns as well as wetlands into the design will help capture and filter potential contaminants, and allow for water to replenish aquifers.

"Experienced golf course architects bring a lot of knowledge to the table about how a golf course can be designed or renovated to use water efficiently and make sure that the water that is used is managed properly," says Bruce Charlton, president and chief design officer of Robert Trent Jones II International, as well as president of the ASGCA. "This goes beyond things like using recycled water and looks at aspects like topographical characteristics, how water flows naturally and grass varieties."

Speaking of grass, the question begs to be answered: Will golf courses be more brown than green in 2025?

Dinelli hopes not. Despite many calls for less irrigated turf to the point of letting it go brown, Dinelli says going brown is not such a good idea, especially in the North. Dinelli understands the idea of letting turfgrass, whether bluegrass or bermudagrass, go dormant with the idea of it coming back. But he says if he lets his bentgrass greens and tees go brown, they could end up dying.

"Personally, I take a lot of pride in growing a healthy plant," Dinelli says. "Now that doesn't mean I over-water or over-fertilize. It's just that a healthy plant offers me sustainable playing conditions."



Matt Shaffer, superintendent of Merion Golf Club, expects "great advances" in golf course irrigation technology. Shaffer hopes that future technology enables him to change the radius of irrigation heads from the controller.

Dinelli associates brown with turfgrass stress, which means the turfgrass is more prone to disease and weed invasion and doesn't stand up to play very well. In these instances, brown turf is bad, Dinelli says.

"Most of your environmental benefits from turf occur when grass is actively growing," he states. "Turfgrass helps cool the atmosphere. Well, that only happens when it's green and transpiring, not when it's dormant or dead. When the color is brown, the surface gets hot, so the cooling gets compromised."

Shaffer believes superintendents today and in the future should use less water. He hopes real-time data can help them do so.

A say in the matter

As is today, so shall it be in the future: It's vital that the golf industry has representatives at negotiating tables where freshwater legislation is created. And these tables aren't just set up in Washington; they're in towns across America.

"If you're not sitting at these tables when the rules are made, you're prob-

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ably not going to find yourself in a very good position after the rules and policies are set," Williams says. "We need people in our associations and our industry as well as volunteers to be involved in the decision-making and policy-making."

Those people should come to meetings armed with sound science to prove the golf industry is doing its part to irrigate responsibility, Williams says. They need to point out that golf uses its share of water as part of a viable economic industry. And they need to tout superintendents as irrigation experts who use the most precise equipment in the world to water their golf courses, Williams says.

"The public is often uninformed, and people think golf courses are generally just a water abuser," Williams adds. "But once they're apprised to how [golf courses use water], they realize that we're part of the solution rather than a big part of the problem."

Mark Esoda will attest to that. The certified superintendent for the Atlanta (Ga.) Country Club spearheaded an effort by the Georgia Golf Course Superintendents Association to enact Best Management Practices for irrigation, a move that has benefited the golf industry's image statewide. The Georgia GCSA involved the Georgia Environmental Protection Division (GEPD) in the project, and their relationship has blossomed into one of respect.

Esoda and the Georgia GCSA continue to take their message to the public. Esoda says the Georgia GCSA is telling its story to water councils, environmentalists and the general public. Esoda hopes more chapter associations go on the education and public relations fronts.

"I'm really optimistic that if we walk the talk and stand up for ourselves, we will be well respected in 2025," Esoda says. ■

Lead or Be Left Behind

In the next 15 years, our industry will face enormous pressure to regulate the amount of water used on golf courses. How will you react?

BY CHRISTOPHER S. GRAY SR., CONTRIBUTING EDITOR

I love working at a public golf course. There is no other place on earth you can witness such a diversity of people.

In July, a golfer came to my course, and I can't get him out of my head. The most noticeable feature was his hair, which was a 1980s-style mullet. He was also wearing spandex running shorts with his collared golf shirt. I only wish I had a camera to take a photo of him.

When I saw him practicing on the putting green, I stared at him for a few seconds and then smiled. I thought if he thought his distinctive look made him happy, then so be it. He's not hurting anyone. But the bottom line is the mullet man had found his comfort zone, and he wasn't willing to leave it.

While I can enjoy this type of behavior with fashion statements, I become concerned when it shows up in our industry. I believe that if you think you have hit the perfect place with both your golf course and career and intend to simply continue to do what you have always done, you should retire and find something else to do. You're crazy if you don't think your industry is not changing around you.

This is especially true with water management. If you think you have learned all you can about water management, prepare yourself for a very rude awakening because things will change drastically in the coming years.

Environmentally, the future of golf course irrigation can be summarized with two words: quantity and quality. In the next 15 years, our industry will face enormous governmental pressure fueled by misinformed public opinion and hard-core environmental groups

to regulate the amount of water used on golf courses. Many industry experts agree that the quantity and the quality of water needed to sustain golf courses is the most important crisis facing our industry.

Golf courses use approximately 2.1 billion gallons of water per day (or 0.5 percent of the nation's total fresh water annually). At a time when there is increasing turmoil over access to fresh water, the general public will not tolerate such a huge amount of water use by an industry that they perceive to be a recreational activity rather than a business industry that contributes $76 billion dollars to the economy each year. These looming regulatory restriction mandates will not only alter how golf courses are managed, but also completely change the face of our industry as a whole.

The public's growing concern over the diminishing availability of fresh drinking water will undoubtedly limit a golf course's ability to tap into fresh water as an irrigation source. Recycled water will become the main water supply for golf courses, and the only water supply in many circumstances. Those superintendents who lack the necessary skills to manage their golf courses with recycled water, because of a lack of knowledge or experience, will suddenly find themselves in an unfamiliar and uncomfortable employment situation.

One major setback we need to overcome is that many of us have never been educated and trained in the growing area of water issues. While attending college, technical schools or earning a turf certificate, we all were formally trained on the various types of fertilizers and pesticides, and how to calculate the amount of nutrients and active ingredients applied. Most of us also participated in internship programs where we learned more of the hands-on approach of managing the golf course by mowing, spraying and irrigation repair. As assistants, we were taught to manage other people to accomplish the jobs necessary to prepare the golf course for daily play.

Throughout the process of learning how to become a successful golf course superintendent, becoming skilled in water management was geared more toward understanding how the irrigation system functioned and repairing leaky pilot valves than the subjects of irrigating with recycled water and learning conservation practices such as how to harvest rain water during storm events. In short, as an industry, many of us of are woefully unprepared for the environmental challenges that lie ahead in the world of water management for golf courses.

These new impending restrictions and reductions in water quality will demand a better understanding of irrigation and support technology to help counterbalance these new industry challenges.

For years, I've spoken with fellow superintendents who truly believe that all irrigation companies and their systems are the same — that each one simply throws water. That mentality has to change. Each irrigation company and the technology it represents with its products has its differences. It's easy to group them all in the category of water throwers, but much more difficult to understand their differences. But these technological differences are vitally important to our future success simply because every golf course poses unique challenges in which to utilize them. Every golf course is different, so every irrigation system is also going to be different. Making sure we understand all the technology available to us will give us the adaptability we'll need to survive in the next 20 years.

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Christopher S. Gray Sr., the general manager and superintendent of the Marvel Golf Club, says his peers must prepare now for irrigation in 2025.

PHOTO COURTESY: CHRISTOPHER S. GRAY SR.

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Selecting the right irrigation system and technology for your course will be the cornerstone of a successful future with irrigation practices. Some irrigation systems are more water and energy efficient than others, due in large parts to the overall design, the pumping station, the individual heads and regular maintenance practices. Since all water is pumped, the energy component of each unit of water must be considered. New systems should be evaluated and bought on a "life cost" basis, rather than the traditional initial cost of the system. It's also imperative that these newer systems contain the technology to collect vast amounts of data of the irrigation system's actual use on the golf course. This is the valuable information needed for assessing not only how our individual golf courses are performing, but also how our industry is performing.

Philosophically, we need to make some serious changes. The way we operated our courses only a few years ago is not the same way we do it today. One reason is because we have learned through our continuing education to be better and more effective with our methods to manage our golf courses with fewer inputs. The other reason — and one that is much more difficult with which to deal — is the new challenges and restrictions that force us to completely re-examine the methods necessary to manage our golf facilities. But this latter reason is one of our greatest strengths. As an industry, our constant ability to adapt and overcome difficult and, often times, unforeseen obstacles has proved one of our most defining attributes.

The time has come, yet again, for us to showcase this ability by rethinking our current water management practices for not only our golf course, but also for our entire industry.

As superintendents, we are the people who ultimately control the amount of water used on golf courses. Each day, we assess turf conditions, evaluate the impending weather conditions, take into account the time frames of fertilizer and pesticide applications and determine if irrigation is necessary and, if so, how