



WATER WISE

Less Is More

BY LARRY AYLWARD, EDITOR IN CHIEF

He didn't have to do it, but Christopher S. Gray Sr. decided to implement a reclaimed water irrigation program at the Marvel Golf Club, where he is the general manager and golf course superintendent.

It's not that Gray's course doesn't have access to plenty of fresh water for irrigation. Marvel Golf Club, after all, is located in Benton, Ky., which is not exactly the arid Southwest. In fact, Gray's club could easily draw fresh water from a nearby lake.

But Gray believes that irrigating with reclaimed water — because he *can* irrigate with it — is the right thing to do.

"There's no reason I have to do it, but I do it because it's the most environmentally sensitive thing to do," Gray says.

Gray began the program about two

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years ago. It entails recapturing all storm water and household wastewater generated by the homes surrounding the golf course. It is then treated and pumped into the course's irrigation retention ponds where it is used to irrigate the course.

These days, with an impending freshwater crisis threatening to doom this nation and this planet, more superintendents like Gray realize they need to conserve fresh water. While most superintendents consider themselves to be responsible users of fresh water, they realize they can do even more to be better stewards.

Dara Park, assistant professor in the

department of horticulture at Clemson University, has watched this attitude build among superintendents in the South, who are studying alternative ways to reduce water use. Park says their thinking has been spurred by dry conditions the past few years throughout the South. "Most of them understand the implications," Park says.

But some superintendents, especially in the North, might have to be reminded more that they need to conserve water. While Rick Slattery, superintendent of the Locust Hill Golf Club in Fairport, N.Y., believes most superintendents are responsible irrigators, he says, "There's a lot of room for improvement."

PHOTO BY: ISTOCK INTERNATIONAL INC. (TOP) AND COURTESY OF CHRISTOPHER S. GRAY SR. (RIGHT)

Slattery says superintendents in states such as California and Florida, where water restrictions are common, are ahead of the curve on the topic of conservation because they deal with it every day. But superintendents in wetter states, such as New York, Ohio and Indiana, don't face such restrictions and aren't as apt to feel as pressured to reduce water use.

"By nature, human beings don't react until there's a crisis," Slattery says.

Even in Southern California, some superintendents need to be reminded how important it is to conserve water, says David D. Davis, an irrigation consultant and president of David D. Davis and Associates in Crestline, Calif. Davis says most superintendents in the region have become more accustomed to droughts and water restrictions over the years and are more cognizant of the freshwater shortage in their state and other areas of the Southwest. But there are a few superintendents who still view irrigation as "an annoyance," Davis says. Hence, they aren't very concerned about reducing water on their courses.

"[This attitude] exists with a lot of superintendents who are older," Davis says, noting that many of them are computer illiterate and can't operate computer programs for irrigation.

But these superintendents are in the minority. Most superintendents don't have to be reminded of the urgency to save water. And many of them are looking at using reclaimed water to do just that.

The claim for reclaimed

When Gray came to Marvel three years ago, he studied his options for freshwater conservation. At the time, the course was irrigating with fresh water from a nearby lake through a system of

pumps and lift stations. Gray discovered the infrastructure was in place at the course to implement a reclaimed water program; all of the wastewater generated from homes on the course was fed to a pipe that went to the area's sanitation district.

"We just cut into that pipe and redirected it to the irrigation line," Gray says, noting that local regulatory authorities had no problem with his plan. "We haven't incurred a lot of additional costs. We're just moving water in a different direction."

Gray has positioned himself well for the future when more courses in his region could be forced to irrigate with reclaimed water in the coming years. "This will be a problem that golf courses have to deal with sooner or later," he adds.

Gray has his course ahead of the curve. His peers in the region have someone they can turn to for advice on the subject. Gray hopes they

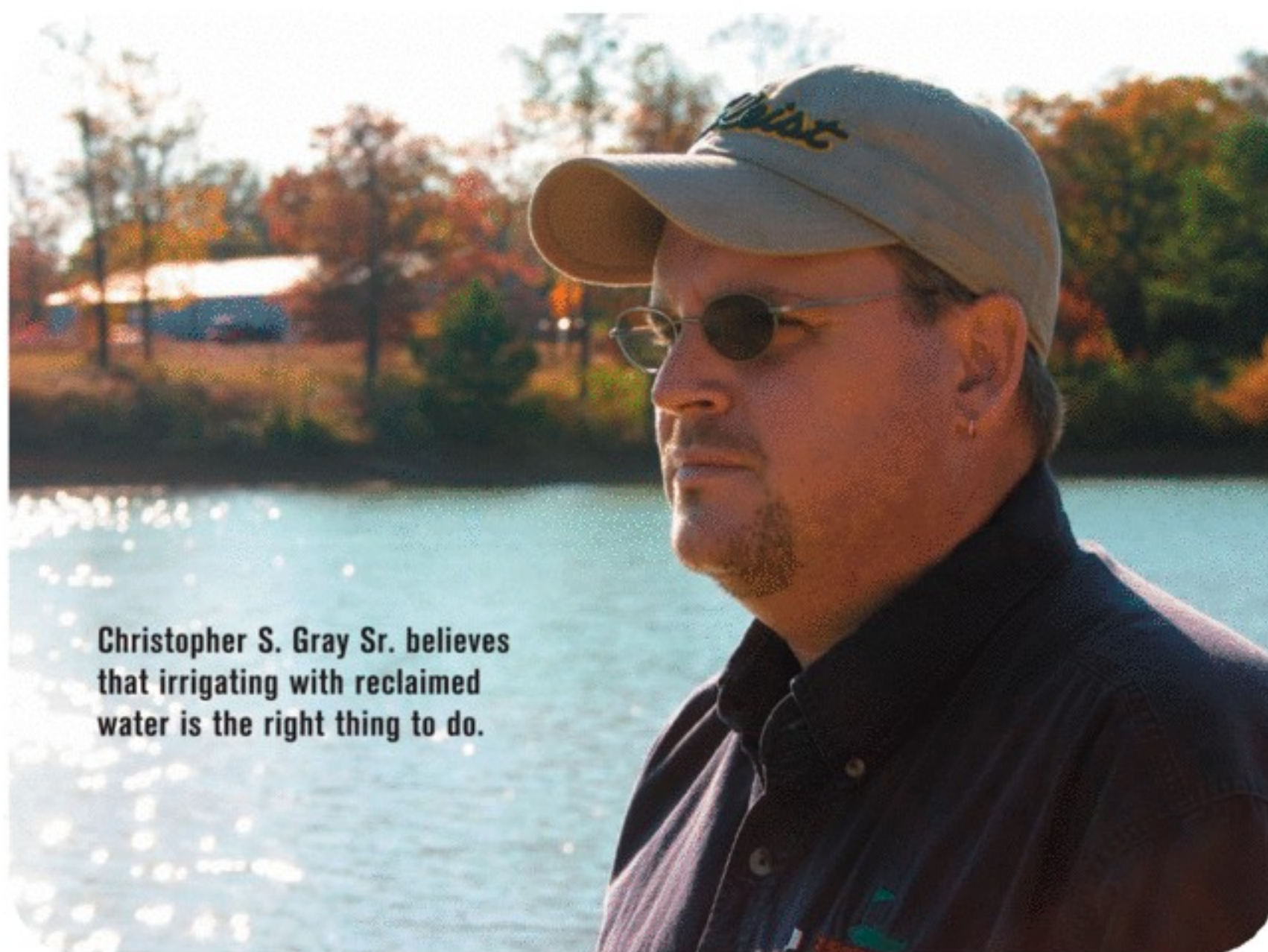
do. He believes superintendents who don't educate themselves about the possibilities of reclaimed water now could find themselves out of a job later.

"You want to understand it now so you can be more proactive instead of having to be reactive when you're put on the spot and told you have to use this type of water," says Gray, who was named the 2008 recipient of Rain Bird's Intelligent Use of Water Award for his reclaimed water project.

Gray says other courses are probably in similar situations where they can tap into an existing pipe to extract reclaimed water. Of course, regulatory guidelines could be different from region to region.

Nobody doubts that reclaimed water, also known as effluent, will continue to grow for golf course irrigation from California to Maine. At the recent Green Start Academy, a two-day educational and networking event for assistant superintendents, North

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Christopher S. Gray Sr. believes that irrigating with reclaimed water is the right thing to do.



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Carolina State Associate Professor of Cropscience Dan Bowman asked the 54 attendees how many of them used reclaimed water at their golf courses. Not many hands went up. "That will change," Bowman told them.

Park says more Southern courses are irrigating with reclaimed water, and more superintendents are studying the feasibility of irrigating with it.

"These people are smart," Park says. "They're watching the legislature. They see policies being changed or made, and they're asking questions of how it's going to influence their water use."

Park expects that even more courses will irrigate with reclaimed water in the next 10 years because they will be forced to.

"I think the pressure will be put on

municipalities to supply it," she says. "That pressure will come from the state and local levels as well as end users."

Mark Jarrell, certified golf course superintendent of Palm Beach National Golf and Country Club in Lake Worth, Fla., agrees that reclaimed water can play a major role in water reduction. But it's not the be-all answer, especially considering the cost of infrastructure at courses not set up to deliver the irrigation method.

"Effluent irrigation is a big part of the answer to water reduction," Jarrell says. "But there will have to be more delivery systems."

At the Los Angeles Country Club, Certified Superintendent Bruce Williams exhibits a doubtful look on his face when asked if the classic course could ever irrigate with effluent.

"We're not on effluent water because there's no infrastructure to get it to us," explains Williams, the club's director of golf courses and grounds. It's not that the infrastructure couldn't be built, but such a project would require 15 miles of underground piping to be constructed, Williams says. "Unless legislation is put in place for that to happen, I doubt we will see it here in the next 15 to 20 years," he adds.

It's safe to say that many new golf courses will be designed and built with effluent irrigation in mind. Cal Roth, vice president of agronomy for the PGA Tour, points to two new PGA Tour golf course developments in San Antonio, which comprise the TPC San Antonio, that feature closed-loop irrigation systems designed to catch water and recycle it back onto the course. The courses, scheduled to open by 2010, wouldn't draw from a nearby aquifer.

"There's absolutely no water that can leave the property," Roth says.

While many superintendents rave about going the reclaimed water route, it's not the perfect avenue. Superintendents have discovered that irrigating with reclaimed water has its issues, most notably that the water contains salt and heavy metals, which could cause turfgrass problems. The good news for superintendents in wetter climates is that hard rains will help flush salts and heavy metals through the turfgrass.

Another issue regarding reclaimed water is that it could get costly if its demand increases. Davis says water districts that supply reclaimed water could soon charge for it (if they don't already) if they see it as substantial income base.

The technology factor

Shawn Emerson, the director of agronomy at Desert Mountain Resort in Scottsdale, Ariz., would like to thank irrigation companies for their help in making equipment that can irrigate as efficiently and precisely as a laser-like pass from Peyton Manning. This is vital on two fronts. While superintendents look for ways to reduce water, they must continue to please their courses' golfers, who desire emerald-covered fairways to go with verdant putting greens.

"The irrigation companies have made more strides in efficiency than any other part of the industry," Emerson says. "They're ahead of the game in regard to the efficient use of water. And they're getting better at it."

Manufacturers and suppliers of seed, wetting agents and other products are also making a difference.

Jarrell is impressed with moisture sensors and gear-driven heads. "[With moisture sensors], you can just go to your computer and see that there's plenty of moisture on the No. 14 green," he says.



Clemson's Dara Park says more Southern golf course superintendents understand that they need to be better stewards of water.

Davis has been working with a new nine-hole golf club whose superintendent is using moisture sensors and soil amendments to offset the \$1,500 water bill each month. "The club just can't afford the water bill," Davis adds.

Slattery says money spent on wetting agents to reduce irrigation is money well spent.

"If I go a month without using wetting agents, I see it on the golf course," he says. "And then I'm applying more water because those isolated dry areas need more water."

Bowman says new golf courses must be planted with more drought-tolerant turfgrass to reduce irrigation. Those doing the choosing must pick carefully, considering that they must pick varieties for quality of playability while requiring less water.

Park knows it's a costly measure, but she says superintendents should explore plans to install new irrigation systems to save water. Plans could be implemented over a 10-year-period to spread out the cost.

"The new irrigation systems are great and can really help to save water," Park says.

Slattery will attest to that. He had a new system installed at Locust Hill in 2006.

"I can say for a fact that I'm using less water because I have much more control over what I'm doing than I did in the past," he says. "I was putting out 250,000 gallons a day before. With my new irrigation system, I'm putting out more like 160,000 gallons."

But Slattery believes not enough superintendents are taking advantage of new technology, such as software to tighten up water schedules.

While there is outstanding equipment and products to help golf courses save

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What Can an Irrigation System Audit Do for You?

By David D. Davis

The irrigation system audit can be a valuable management tool for the golf course superintendent. Some sites require only a simple audit procedure. Sites that are more complex require more sophisticated audit and evaluation procedures.

The golf course audit involves more than merely evaluating sprinkler performance. Evaluation of all components is usually a very good idea. Therefore, in most cases, trained individuals should conduct audits.

A good audit can do the following, if not more, for the golf course and its superintendent:

1. Establish condition of golf course irrigation system components.

- a. Sprinkler locations: spacing, interference with distribution by trees.
- b. Sprinkler state of repair: whole, damaged, worn nozzles.
- c. Sprinkler installation: tipped, shallow and raised.
- d. Sprinkler operating conditions: pressure and flow rate.
- e. Pump station performance: flow, pressure, amperage, voltage.
- f. System leakage: pipe, fittings, sprinklers, valves.

2. Establish or verify condition of golf course features.

- a. Above-ground condition: greens, tees, fairways and roughs.
- b. Sub-surface condition: soil, root zones, moisture levels.
- c. Wet versus dry spots: observable by sight.

3. Establish baseline to develop and maintain short- and long-term operating budgets.

- a. Utilities: water, power, chemicals, labor.
- b. Estimated lifetime: irrigation system components.
- c. Estimated lifetime: soils, plant materials.

4. Establish baseline for operating programs and schedules.

- a. Environmental guidelines for use of potable and non-potable waters.
- b. Local agency restrictions: available water.
- c. Local agency requirements: water and power conservation.
- d. Special operating programs and schedules for overseeding, fertigation, leaching, cooling and syringing.
- e. Drought management program, schedules.
- f. Programs and schedules to minimize or eliminate wet and dry spots.

5. Establish public image of intent to manage water and power consumption.

- a. Records of water and power consumption: Accurate records are essential to prove usage is within agency guidelines or limits.
- b. Cooperative relationship: non-adversarial with regulators as much as possible.
- c. Outreach: educate public on golf course special uses of water and power. Water used on golf course helps the environment in most cases more than it hurts the environment.

David D. Davis is a Crestline, Calif.-based irrigation consultant and president of David D. Davis and Associates. Davis is also immediate past president of the American Society of Irrigation Consultants and a member of Golfdom's editorial advisory board.



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water, Bowman warns superintendents to watch out for snake-oil products and equipment that will do nothing but cause them headaches. Beware of super-duper, sponge-like products billed to absorb 500 times their weight in water when incorporated into the soil, Bowman says. And watch out for equipment like "giant magnets" that, when clamped on to an irrigation main line, are said to re-arrange the molecular structure of salt in water so the salty water doesn't hurt the turf when pumped out.

"The point is, there are a lot of products on the market," Bowman says. "Some of them work great ... and some probably don't work at all."

The basics

From a basic standpoint, there's a lot golf course superintendents can do to reduce water. For starters, they can stop watering for the lush, green look.

Roth says "minimal water use is the standard" for the three different tournaments the PGA Tour holds weekly.

"During tournaments, there's not a concern if the turfgrass goes brown," he says. "We play a lot of tournaments where the turfgrass is off color by the end of the week. It's fairly normal to have a lot of

brown turfgrass out there to provide good and firm playing conditions."

Jarrell says he's not opposed to cut back on water use to the point that the turfgrass is less green, if golfers are accepting of that. It makes sense on several fronts, from environmental to financial. Regarding the latter, the game's cost could be reduced if inputs like water are reduced, Jarrell adds.

Superintendents can also reduce irrigation by naturalizing more areas on their golf courses. Gray has done this at Marvel. "There are a lot of areas between the tees and the fairways where the golf balls are never going to go," Gray says.

Greg Lyman, director of environmental programs for the Golf Course Superintendents Association of America, suggests that superintendents conduct irrigation audits to find out where they can save water on their golf courses. (See sidebar on page 33.)

"They can find out where they can make improvements, from individual heads to new pump stations to new controllers," he adds.

Bowman says superintendents should have written water management and conservation plans in place. Then they should evaluate the plans and tweak them. Bowman also suggests superintendents evaluate their irrigation systems during routine drives around their golf courses. He calls this taking "informal audits."

Bowman also stresses the importance of practicing cultural methods, such as fertilizing with potassium, to reduce water use. "Potassium helps plants reduce water use to some extent and helps turfgrass deal with stress better," he adds.

Park is also a proponent of managing turf properly from a cultural perspective to reduce irrigation.

"Typically, if you over-fertilize you



North Carolina State's Dan Bowman warns superintendents to watch out for water-reducing equipment and products that make claims that are too good to be true.

“Environmentally, the reduction of turfgrass could create a problem with the carbon footprint.”

DAVID D. DAVIS
IRRIGATION CONSULTANT

will have increased water use," she says. "You also have to manage the soil properly to make sure you have proper infiltration and drainage."

Golf courses in the Southwest have been taking out turfgrass to reduce irrigation. The Southern Nevada Water Authority implemented a program to pay golf courses \$1 per square foot to remove turf and convert it to landscaping that doesn't require irrigation.

This is all and well, but Davis warns golf courses to be careful and not to take out too much turfgrass because of its cooling effect on the area around it and the ability for turfgrass to filter contaminants.

"Environmentally, the reduction of turfgrass could create a problem with the carbon footprint," Davis says. "We may be saving water, but we're creating another series of problems." ■