

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

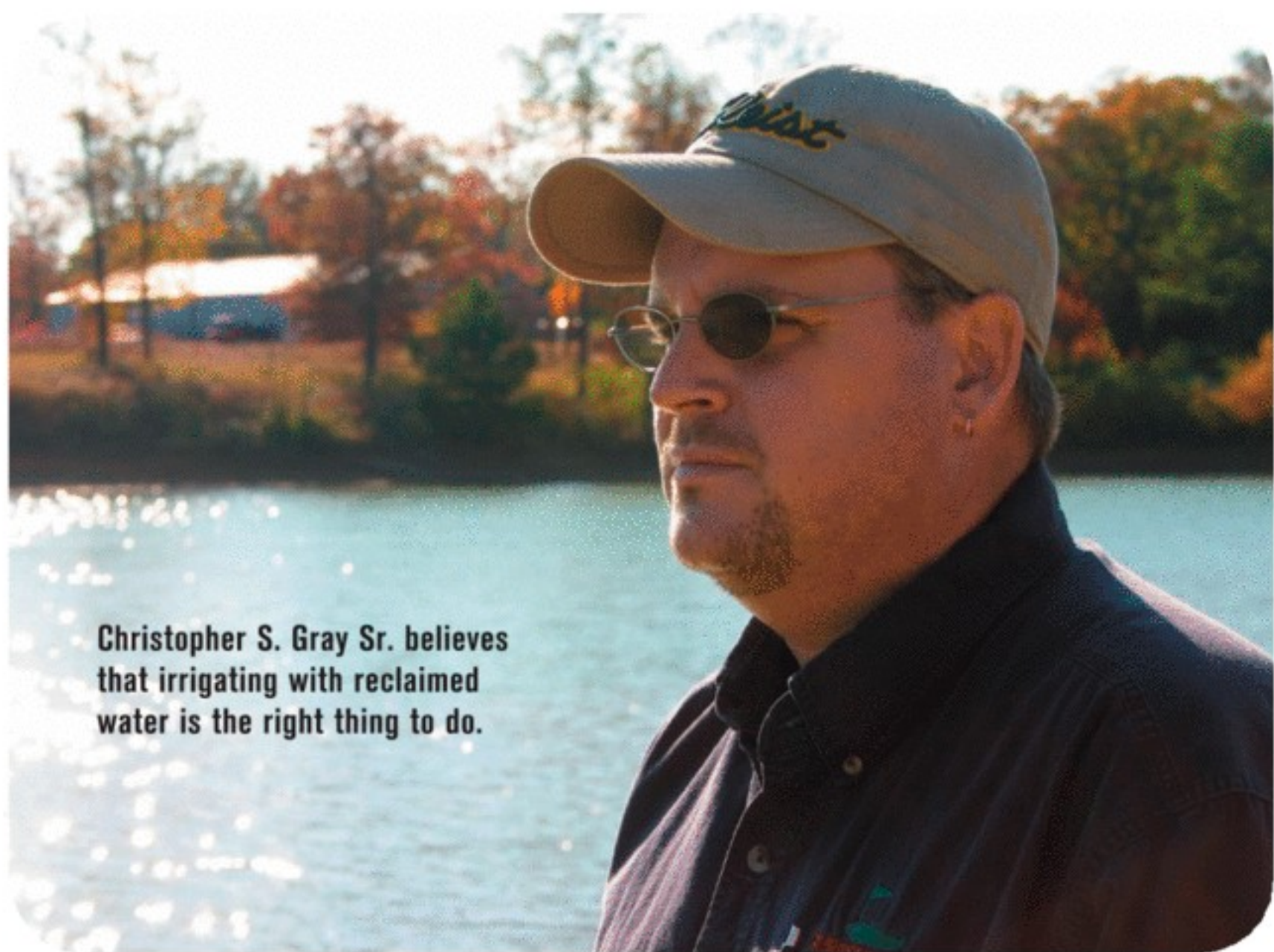
do. He believes superintendents who don't educate themselves about the possibilities of reclaimed water now could find themselves out of a job later.

"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



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

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.

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.

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.” ■

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

DAVID D. DAVIS
IRRIGATION CONSULTANT



Undoing Overseeding

As several courses prove, cutting back on the agronomic technique equates to reducing water use. But at what cost? **BY ANTHONY PIOPPi, CONTRIBUTING EDITOR**

When the discussion came up at Marriott Golf concerning two properties in southern Florida that had long been overseeded in the winter, it was decided there didn't seem to be a good reason to continue the practice of carpeting the course in green during the season.

"We couldn't make a business case or an environmental case that we needed to overseed," says David Robinson, the company's director of golf grounds.

Marriott decided to buck the trend and bet that golfers playing the Grande Lakes and Grande Pines courses in Orlando wouldn't mind. "We decided to take that gamble," Robinson adds.

The estimated savings at Grande Pines alone was more than \$110,000, including a revenue increase realized by not having to shut down the course for overseeding.

Money alone is not the driving force; there is also the subject of water savings. "We certainly take that into account," Robinson says.

He points to 2007 when Naples, Fla., where another Marriott golf property is located, was in a severe drought and the company decided against overseeding the course.

"It wasn't the right thing to do environmentally," Robinson says.

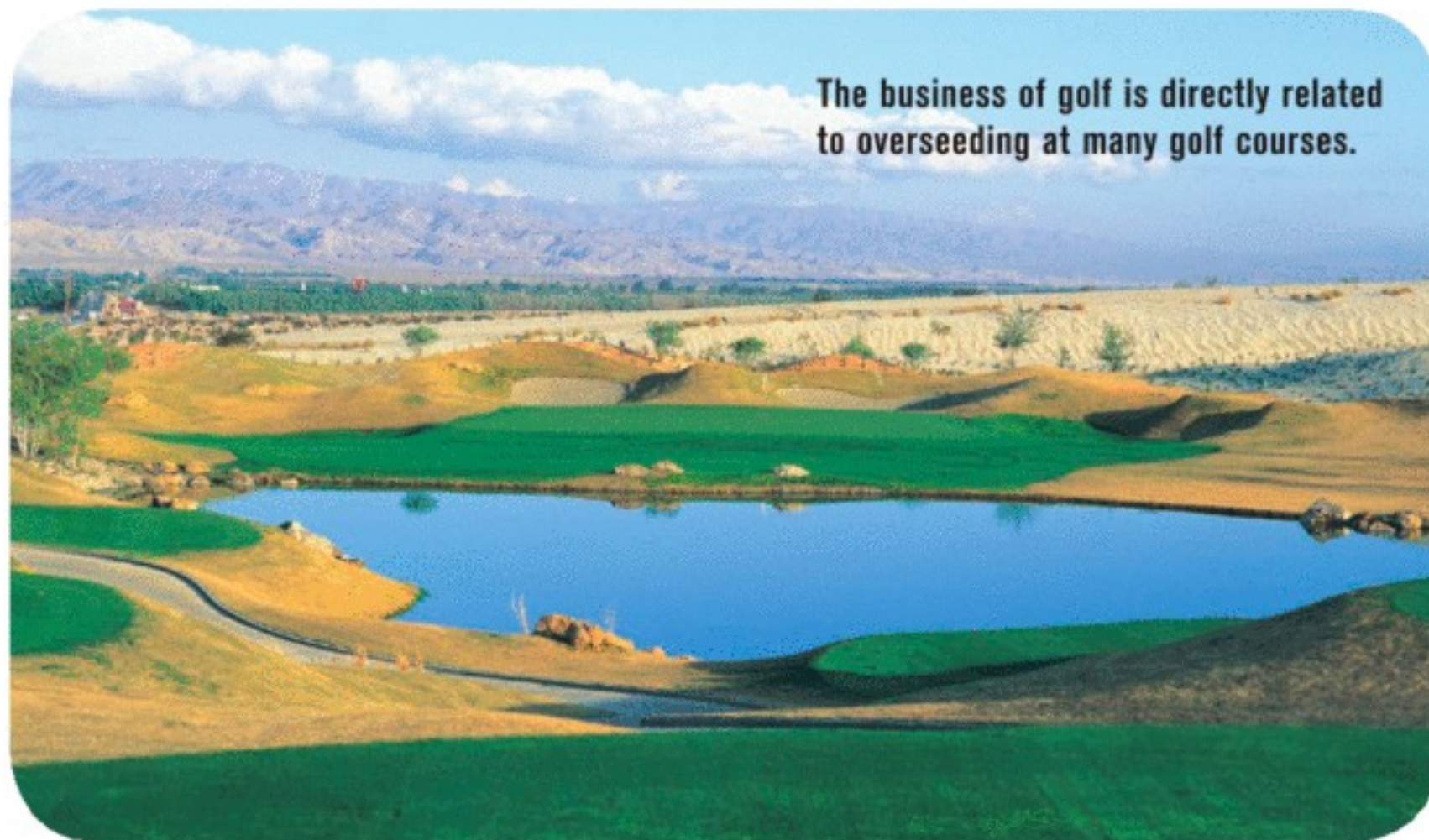
With the growing concerns about water a hot topic in many parts of the country where winter overseeding of bermudagrass golf courses is standard, maintenance of those layouts during the winter months is sure to change. But the problem for many of the courses that would rather not put down the ryegrass is that they are in highly competitive golf vacation areas where green equals gold and a layout that is anything but lush is somehow considered sub par.

Mike Huck is a former agronomist for the United States Golf Association's Green Section who now runs his own consulting firm, Irrigation and Turfgrass Services, in

Dana Point, Calif. Huck says while many courses are aware of the water problems and would like to reduce their usage, foregoing overseeding is out of the question. He points to places like Palm Springs and the Arizona areas of Phoenix and Scottsdale, where the golf industry relies on the business of winter snowbirds to survive. Fearful that those players would bypass turfgrass that doesn't radiate a deep emerald hue for one that does, courses overseed specifically to entice and retain that clientele.

"If they don't make it then," Huck says of the courses and their winter business, "then they don't make it."

Even many private courses are of the same mindset that green is better than
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The business of golf is directly related to overseeding at many golf courses.



WATER WISE

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brown. For instance, at the 27-hole North Ranch Country Club in Westlake Village, Calif., Director of Agronomy Rich Wagner is finally making progress to have overseeding of the course reduced.

He convinced the green committee to cut back on the process this year, but then the board of directors overturned the decision. In 2009, however, the fairways will no longer be overseeded, just the rough — which has a shade problem and does better in the winter with overseeding — and the surrounds of the bentgrass greens. Wagner estimates that his annual price tag of \$450,000 for water could be halved with the decision.

At Tucson Country Club, the membership has decided against overseeding this

year. Of the 75 percent of members who responded to the question of whether the practice should continue, 75 percent said no, according to new Superintendent Tim Vondra.

The main reason for the change is the loss of golf during the two transition seasons. The course would be closed for a week in the fall and for at least two weeks in the spring. "It's a choice they've made to have better golf all year round," Vondra says of the decision.

This year's overseeding will skip fairways but include approaches, collars and tee tops, a necessity to prevent wear in many instances. Reducing water usage also played a role in the decision. According to Vondra, appearances in the water-taxed area of the country are important.

"We're not just a private club not doing anything; we care," Vondra says.

Tucson Country Club is the only course in that area that does not overseed fairways, Vondra says. The water savings was realized immediately. The scaled-back overseeding took place in September and, by early November, Vondra estimates he had saved 35 acre feet of water, which translates to more than 11.4 million gallons of water.

The reduction in overseeding also translates to members leaving for greener courses. "We had seasonal members that weren't happy with the decision and have gone to other places," Vondra says.

The problem is how players view the surface on which they play. "The thing we still deal with is people's perception that

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dormant bermudagrass is dead,” Vondra says. “It has a [negative] connotation.”

On the other side of the country in North Myrtle Beach, S.C., Superintendent Sean Donahue has reduced overseeding at Tidewater Golf Course and Plantation thanks, in part, to a change in the management company that runs the facility. Donahue says when Troon Golf was in charge, he was putting down 800 pounds to 900 pounds of seed per acre per season. When the local company Burroughs and Chapin Golf Management took over, Donahue was allowed to reduce the output to 400 pounds. It was down to 325 pounds per acre last year, and he’s hoping for another cutback this season.

Donahue likes the move because the smaller rate requires less irrigation, which

is helpful since the course has low-quality water. “The less we water, the better we will be in our soils,” he says.

Marriott deals with the same problem with The Rookery at Marco in Naples, Fla. “The water quality is poor and in winter time we’re not getting the summer flushing rains,” Robinson says. “It’s difficult to maintain quality turf.”

Unfortunately, Marriott believes it can’t change its agronomic practices. “To stay competitive in that market, we need to overseed,” Robinson says.

In the near future, it may be out of the hands of courses and management companies as to whether overseeding occurs. Huck says a series of dry winters in the Rocky Mountains and Sierra Nevada Mountains are a cause for alarm. The wa-

ters of the Sacramento Delta Region, which feed much of the fresh water to Southern California, are down significantly. The state has already forced a cutback in the water that can be drawn from that source and further tightening is expected to protect the damaged ecosystem in the delta.

Huck says voluntary cutbacks are in place, “but they’ll become mandatory if we don’t have good, rainy winters.”

The key to saving water is educating golfers as to why overseeding entire layouts is unnecessary and, even more important, will not deter their enjoyment of the game, Vondra says.

“I would argue that dormant bermudagrass is a better surface from a golfer’s perspective,” he says. “We can market that to people and they’ll understand.” ■

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One superintendent says foliar feeding is the optimum way to achieve the best plant health, appearance and playability – as evident by the turfgrass in this photo.



Balancing Act

Superintendents maintain equilibrium for foliar feeding frequency

BY DAVID FRABOTTA, SENIOR EDITOR

Heightened demand for consistent and pristine putting surfaces have fueled a frenzy in foliar feeding during the past decade. Superintendents have relied on leaf-uptake formulations to keep turfgrass growth steady and predictable.

Ideally, the best way to keep turfgrass growing at a consistent rate is to feed it just enough for each day. Of course, daily fertility treatments are impractical considering labor demands, but many superintendents strive to keep fertility regimens at very close intervals so they can maintain regulated growth without unpredictable flushes.

“Foliar feeding is the optimum way to achieve the best plant health, appearance and playability,” says Ron Swing, the certified superintendent of ArrowCreek Golf

Club in Reno, Nev., which features 36 holes, including the Arnold Palmer-designed Legend Course that plays on bluegrass.

Many superintendents agree that controlling growth flushes allows plants to stay healthy, but the real benefit to controlling growth is the ability to provide optimal playing conditions.

“I don’t think it’s as beneficial for the grass plants as it is for the players,” says Doug Petersan, superintendent of the Austin Golf Club, a Ben Crenshaw/Bill Coore design that plays on zoysiagrass. “It keeps greens as consistent as possible on a daily basis.”

Back at ArrowCreek, Swing says his crew applies nitrogen and other specific micronutrients every 14 days on his bentgrass greens. “Weekly would be better, but logistics and budgetary constraints here don’t allow for more frequent applications,” he says.

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Balancing Act

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Ideally, he says he would be able to do tees and approaches with regular foliar feedings as well. With a higher budget, he would also supplement granular applications on the fairways with monthly micro-nutrient foliar applications.

Petersan also fertilizes on a 14-day schedule, and he puts down about 2 pounds of

nitrogen per 1,000 square feet on his Crenshaw bentgrass greens.

Some clubs strive to fertilize even more often, especially ones that have a high profile among golfers and within the industry.

“With the liquid fertilization, we are typically applying no greater than seven-day frequencies, and it is not unusual to feed every five days depending on plant needs at specific times of year,” says Brad G. Kocher, a certified superintendent and senior vice president of grounds and golf course management at Pinehurst (N.C.) Resort.

Kocher says Pinehurst’s foliar is typically left on the leaf blade, and liquid is typically



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The real benefit to controlling growth flushes is providing optimal playing conditions.

washed in with a little overhead irrigation. All the nutritional applications to greens at Pinehurst are from liquid sources unless new greens are being grown in.

Pinehurst grows bentgrass on its greens, and the rest of the course is Tifway bermudagrass. “It is important to know which nutrient sources are capable of foliar absorption and which are better taken up by roots if you are applying foliar and not watering in,” Kocher notes.

Nolan Wenker, superintendent of Langdon Farms Golf Club in Aurora, Ore., conducts soil tests to determine which nutrients might be missing from his turfgrass, but he says his foliar feeding program on greens has provided a good base, and he seldom needs to supplement inputs. He applies .2 pounds of 24-8-16 fertilizer every two weeks from March through October, targeting 5 pounds to 6 pounds a year.

“Two weeks is a pretty happy medium,” Wenker says. “A lot of guys do one-tenth of a pound a week, but I really don’t think there are drastic positive effects (with one-week frequencies). Two-tenths every other week seems to do pretty good.” ■