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MYTH BUSTING

In the past, superintendents haven't looked at management companies in the golf market positively. Critics say companies treated superintendents poorly and were unprofessional. That has changed for the most part as management companies try to reverse their reputations.

Management companies are much more sophisticated than they used to be, says Ted Horton, a consulting superintendent who's part of the senior management team at ValleyCrest Golf Course Maintenance.

Top agronomic officers at the National Golf Course Owner Association's multicourse owners meeting earlier this year addressed this issue.

"The superintendent is where the rubber meets the road," Horton says. "A superintendent who works for a management company must be a team player who's a good businessman and agronomic guy."

Ray Davies, director of golf course maintenance and construction with CourseCo, believes the TAO group spends too much time worrying about the image of management companies.

"They want the bad image put to bed," he says. "They're treating superintendents better now than they have in the past. The superintendent is the hero in our company. You are what you are. I'm not worried about image. It's a competitive issue, not an industry issue."

The TAO group conducted salary, longevity and compensation surveys among their companies and compared them to the GCSAA norm. In most cases, superintendents who work for management companies are earning equal or better in pay and had comparable or higher education than the GCSAA norm, Horton says.

"If you want to work and grow for one of these companies, you need to be more of a businessman than the norm," he says. "You need to work closely with the management team at each course and need to be astute with the numbers. I work with owners, and they want superintendents who work with the management team and keep an eye on the bottom line."

The goal at most management companies is to increase their portfolios with more golf courses, Horton says.

"Although each has a different niche, they feel the stand-alone operation probably doesn't have as high a degree of professionalism or that it can take advantage of the synergies of being managed in a portfolio with other courses," he says. "I see multicourse management companies growing at the expense of stand-alone operations, but I don't know if most of the golf courses in the country will be operated by management companies."

Horton says superintendents like the independence of working at a stand-alone course, but he believes most courses need a bit more supervision and expertise from a management group or company. Efficiencies from professional management eventually will be attractive to more mom-and-pop operations, but they don't want to lose control, Davies says.

"It's possible to do both," he says. "We don't put our name on the course. We operate the golf course on the owners' behalf. It reflects them. We don't want to brand the golf course, we want to brand our company. Our job is to reflect the owner's standards and values." GCI

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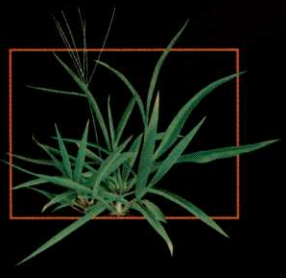

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(continued from page 30)

aggressive to achieve its market share goals.

"We do a lot of low-cost marketing via e-mail," he says. "We don't do a lot of print ads. If it's a zero cost, we won't cut back on it."

CHANGE FOR THE ENVIRONMENT

Like profits, the environment is a driving force behind operational changes.

"There's a lot of talk about being 'green,' but what does that really mean?" Zakany says. "Recycling or integrated pest management ... whatever it might be, you need to stand apart from the competition."

The collection of golf facilities IGM maintains is diverse, Zakany says. In several regions of the country, the No. 1 resource is water, and the company has made cutbacks. So, turf managers need to figure out several ways to conserve water and use it more efficiently. Examples include:

- Not overseeding
- Using moisture sensors
- Applying chemicals to retain moisture
- Planting drought-tolerant type turf
- Reducing the number of highly maintained acres.

"It's not all about color," he says. "It's about what you're doing for the environment. TV hasn't helped us any, although the British Open helped. It's good to see courses on TV that aren't Augusta National green."

Bielecki says all of BCG's golf courses are in Audubon International's Cooperative Sanctuary Program and have reduced the number of highly maintained acres.

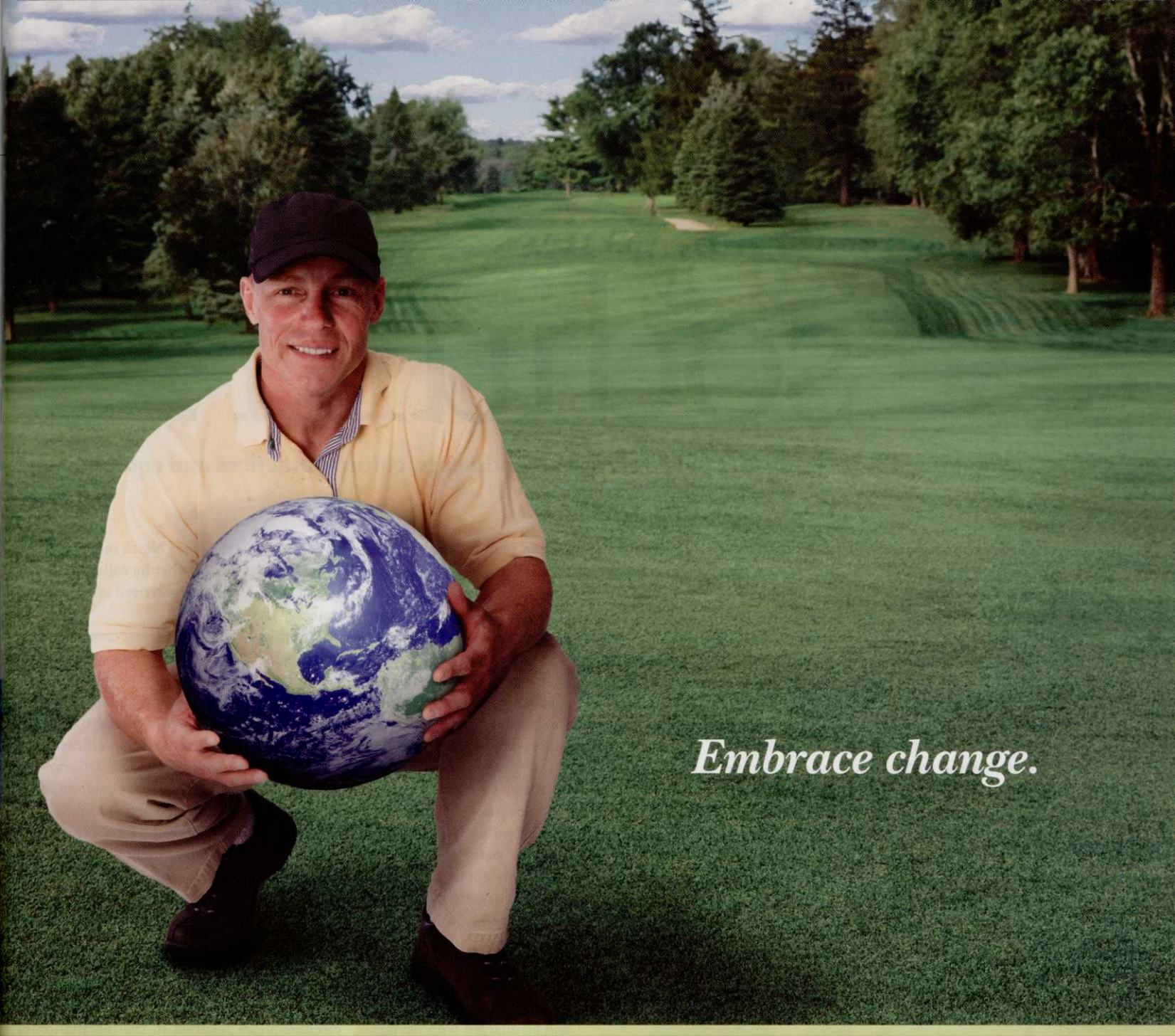
Using organic products is another operational change driven by the environment. However, organic products aren't short-term solutions; they're long-term fixes. Superintendents who choose to use these types of products need to stick with them because it takes longer to reap the benefits, Zakany says.

"Many management companies are incorporating organics into their turfgrass management programs," he says. "Costs aren't as high as they used to be for organics."

Implementing more environmentally friendly practices to maintain golf courses requires superintendents to clue in golfers on the maintenance business. One question looms in that regard: Can members live with a higher threshold of weeds or disease pressure?

"We want to respect and satisfy golfers yet dictate practices that are sound businesswise," Zakany says. "But you have to educate the membership." **GCI**

Despite all of Billy Casper Golf's operational suggestions, the company leaves it to superintendents to dictate and meet product expectations, like those at Lyman Orchards Golf Club in Middlefield, Conn.



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Starved by sodium

By Marisa Palmieri

Superintendents mitigate salt levels with amendments, cultural practices and equipment

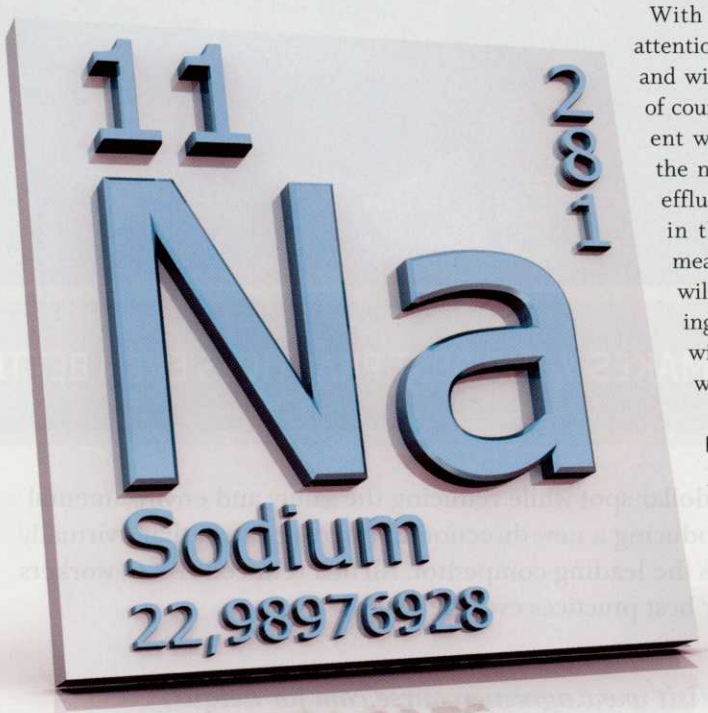
Sodium's effect on a turfgrass plant is like putting tape over a person's mouth, says Hans Gardner, golf course superintendent at Falcon Ridge Golf Course in Mesquite, Nev.

"Salt plugs up the sites on the roots that intake air, water and food, so the plant is only taking up a small portion of what you're putting down," he says, equating that to a human who can't ingest food or water and starves as a result.

"If you don't get rid of the salt, you're pretty much wasting fertilizer and water," Gardner says.

There are natural and man-induced reasons golf courses register high levels of sodium and other salts in soils and water. For example, it's common for coastal golf courses to suffer from high salt irrigation water. Arid regions, too, are typically predisposed to soils that accumulate salts because irrigation water evaporates quickly before it can move the minerals through the root zone, leaving sodium behind.

Another common reason for the problem is the use of effluent water, which typically has high sodium levels thanks to water softeners and other treatment processes.



With the public's increasing attention on water conservation and with only about 12 percent of courses currently using effluent water, few would dispute the number of facilities using effluent water will skyrocket in the years to come. That means more superintendents will be charged with navigating the challenges that come with highly sodic irrigation water.

MAKING APPLICATIONS

Just as there are a number of reasons for salt problems, there are a number of ways to mitigate them. David Soltvedt, CGCS, at the Ridge at Castle Pines North in Castle Rock, Colo., has dealt with what he calls a moderate sodium problem since he arrived at the 18-hole, daily-fee facility in 2004.

If nothing else, in his 12-year career working at six golf courses, he's learned water quality is relative.

The year Soltvedt arrived at the Ridge, the metropolitan water district forced the facility to switch from well water to an effluent/well water mix. Now, Soltvedt irrigates the course with an 80/20 mix. Since 2004, sodium levels have increased almost 500 percent.

"Our water isn't that bad – probably a five on a scale of one to 10 in effluent water quality – but nonetheless, our water isn't making it any easier," he says. "It's not so poor that we have to use sulfur injection like many facilities in the southwest."

For the Ridge, the biggest detriment of having high sodium water has been the soil's inability to drain properly, especially in low areas. These circumstances resulted in the installation of about a mile's worth of drainage since 2004, costing the facility about $25,000.

Soltvedt's ongoing plan to manage the sodic water includes applying wetting agents and calcium sulfate (gypsum). He also uses salt-tolerant turfgrass, Brightstar SLT ryegrass, when he grows in a new sod nursery or fills divots. The course has *Poa annua*/ryegrass fairways, Providence bentgrass greens, bentrass/ryegrass tees and bluegrass roughs.

Because sodium displaces calcium and magnesium in the soil, Soltvedt applies calcium sulfate at a rate of 500 pounds per acre to greens and tees annually. The application takes place during aerification; the material is applied and dragged in. At $800 a year, the cost of calcium sulfate is just a sliver of the maintenance department's annual budget, which Soltvedt declined to disclose.

Additionally, Soltvedt spends about $8,000 annually on wetting agents, which are injected in to the irrigation system, to help the water move through the soil.

In Mount Dora, Fla., Philip Morris Jr. also makes regular applications to control a salt problem created by effluent water. The golf course superintendent at Mount Dora Golf Club has been dealing with sodium-plagued, soil-sample results for the 18 years he's been at the 18-hole semiprivate course. On seven different occasions during his tenure, the green committee has talked about rebuilding the greens as a result of the sodium problems.

"This year, they were talking about spending a couple hundred thousand dollars on rebuilding the greens," he says. "But with the way the economy is, the bank said we couldn't rebuild."

Morris, who maintains the course with a $100,000 annual budget, asked for freedom to experiment this year to control the problem – dull, thinning greens that generally weren't responding to fertilizer.

"I said, just let me play around; don't tie my hands down," Morris says, noting two of the greens were registering sodium levels of 44 percent and 38 percent, classified as very high. "You would have thought I was taking a soil sample from Daytona Beach."

In April, Morris began monthly applications of a soil amendment called SaLibré at a rate of 32 ounces per acre. By late October, the sodium levels on the two problem greens mentioned above declined to 17 percent, classified as moderate. Morris says he's happy with the results, considering he uses about a half gallon per application, which costs less than $50 a month.

"With a small budget, you've got to be creative, and if you find a product that works, you don't stray too far from it," he says.

ADDING EQUIPMENT

Though Soltvedt and Morris haven't needed to install equipment to mitigate their water quality issues, Gardner can't say the same. Like most of the golf courses in southeast Nevada, Falcon Ridge Golf Club in Mesquite has a sulfur burner, which is a 5- by 3- by 3-foot machine that heats sulfur on-site to create sulfurous acid, which is the injected into the irrigation system.

Gardner has been at the 18-hole public course, which he maintains with a $1.2 million annual maintenance budget, for a year and a half, and had a hand in purchasing the system. He says all four courses in the area he's worked on dur-

The Ridge at Castle Pines has installed more than a mile of drainage to mitigate high sodium since 2004. Photo: David Soltvedt

ing the past 14 years have had a sulfur burner. Sodium problems are common in southeast Nevada, Gardner says, because many courses use effluent water or water from the Virgin River, which registers high mineral levels in the summer when it runs low.

Gardner grapples with salt levels that vary greatly from hole to hole – from below 200 parts per million to as high as 750 parts per million.

Superintendents use sulfur burners – or the alternative, sulfuric acid injection systems – for two primary reasons: displacing salts from the soil and clearing moss and algae from lakes and waterfalls by lowering pH levels quickly. The machines create sulfurous acid, which lowers the alkaline conditions in the water, which neutralizes the bicarbonates that harden the soil and deny water penetration. This process, assuming the course has adequate drainage, allows sodium and other minerals to be leached out of the soil.

One stigma these units face is they emit strong odor and that can be distracting for golfers and employees. Gardner says that was the case with earlier units, but that's not a concern with newer ones, like Falcon Ridge's.

The sulfur burner, which Gardner purchased from Aqua Dulce for about $15,000, burns about five to 10 bags of sulfur per day. Falcon Ridge consumes about a ton of sulfur every three weeks. Gardner estimates he most recently paid about $800 a ton for sulfur, which, like many commodities related to golf course maintenance, has been on the rise. In fact, the cost caused him to cut back in the late summer and early fall months since the weather has cooled down and the sodium-related issues lessened. He plans to run the machine again for a few weeks at a time when the weather warms up in March or April and again in May and June.

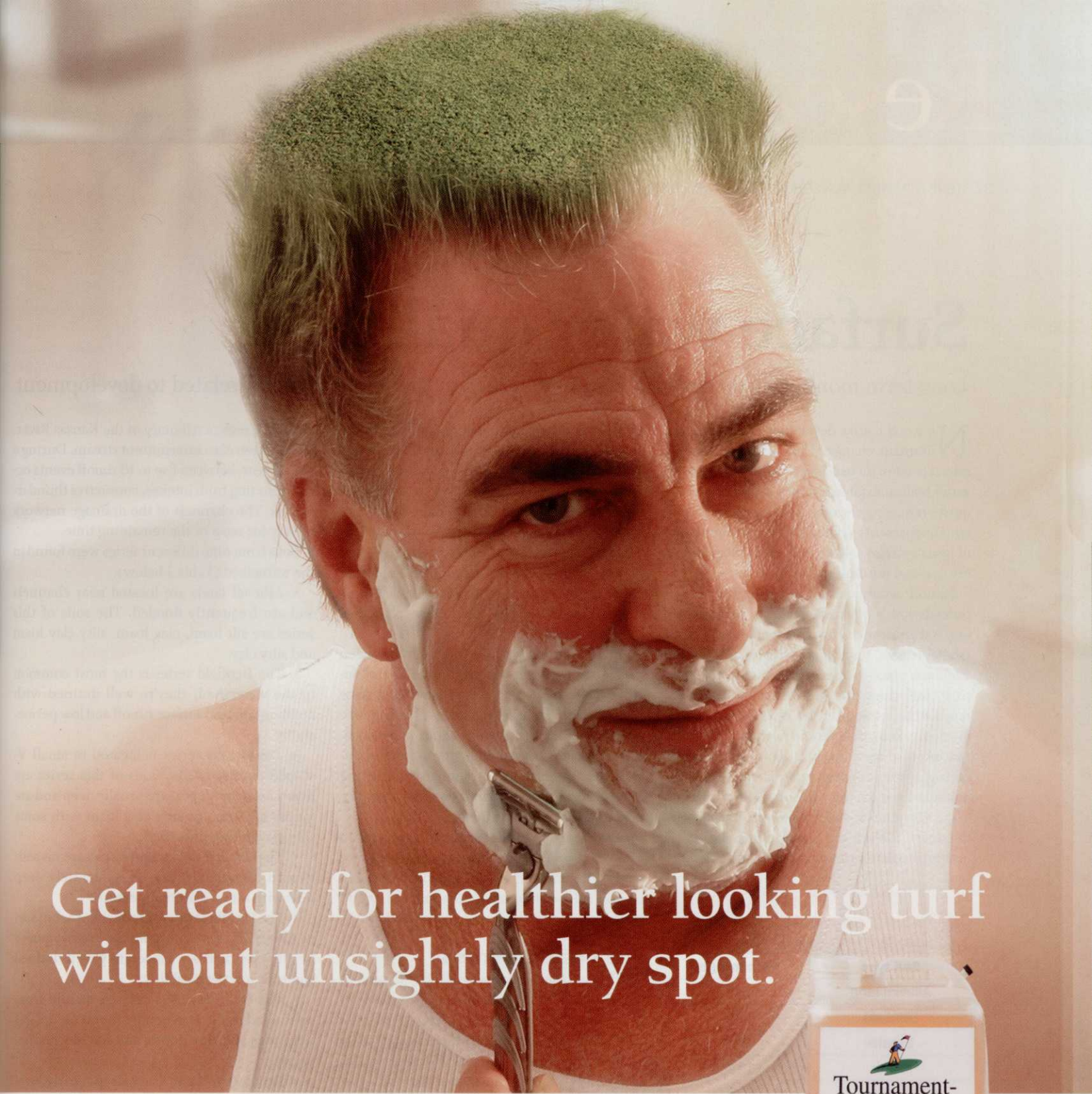
For Gardner, the battle to eliminate salt problems is an ongoing process.

"Unless you find a way to get rid of the salts, the plant doesn't thrive at all," Gardner says about Falcon Ridge's turf, which is a bermudagrass base overseeded with ryegrass in the fall.

Gardner augments the sulfur burning process with a twice yearly process in which he aerifies, applies gypsum at about 500 pounds per acre and then waters heavily to leach the salts down into the soil.

The real key, though, is keeping up with the soil's status through quarterly tests.

"We get the results, and then we do what we need to do when we need to do it," Gardner says. **GCI**



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BY STEVE STARRETT, YUNSHENG SU, TRAVIS HEIER, JAMIE KLEIN, JEFF HOLSTE AND MONICA PALOMA

Surface water quality

Long-term monitoring determines the magnitude of nutrient loss in runoff related to development

New golf course development represents a dramatic change of land use. Golf courses often are constructed close to natural streams or water bodies. Establishing a new golf course requires removing the original natural soil cover, which represents a potential for contamination of nearby streams, lakes and ponds through soil erosion and nutrient transport.

Runoff occurs when the precipitation rate exceeds soil infiltration capacity. Runoff creates soil erosion, causing transport of pollutants (soil nutrients, suspended particles, pesticides) from one place to another. Soil erosion at two to 40,000 times the preconstruction erosion rate has been reported by Wolman et al. Soil erosion, and particulate and nutrient transport, can increase the concentration of nutrients in surface water, consequently harming wildlife habitats by inducing uncontrolled growth of algae, depletion of dissolved oxygen available in the water, fish kill and pipeline clogging.

While construction could affect the natural stream condition significantly, golf course operations require inputs of fertilizers that contain plant nutrients (nitrogen and phosphorus) and irrigation to maintain turf in acceptable conditions. The potential of surface water contamination through soil erosion and nutrient transport from golf courses has been a subject of environmental concern. Studies have reported water quality of native grassland, while others evaluated water quality affected by golf course operations.

This long-term monitoring study has been developed to assess the magnitude of the nutrient loss effect on the surrounding surface water during the different stages of golf course development. To the extent of our knowledge, this is the most extensive long-term study evaluating the nutrient concentration in surrounding natural surface water before, during and after construction of a golf course.

Many research works have been conducted to establish baseline water quality of native grasslands. Other researchers have conducted studies on golf courses to evaluate the impacts of golf course operations on surface water quality.

Table 1. Soil series for Little Kitten Creek watershed

Soil type	Percentage
Alluvial land	5.1
Benfield	43.5
Breaks	9.9
Clime	16.4
Dwight	7.8
Irwin	3.6
Ivan	1.9
Reading	3.6
Tully	8.2

LITTLE KITTEN CREEK WATERSHED

The Little Kitten Creek watershed is located in southwestern Riley County on the west side of Manhattan, Kan. (photo on page 42), covers 1,063 acres and has a typical Midwest topography with elevations ranging from 1,378 feet to 1,115 feet, decreasing from north to south. Land surface slope ranges from 0.04 to 0.14 (m/m) with an average channel gradient of 0.032 (m/m).

Originating from the northwest of the watershed, Little Kitten Creek flows about two miles from north to south before it leaves the studied watershed. It continues to run until it joins Wildcat Creek, a tributary of the Kansas River. Little Kitten is an intermittent stream. During a typical year, between five to 10 runoff events occur, resulting from intense, convective thunderstorms. The channels of the drainage network are dry for most of the remaining time.

Soils from nine different series were found in the watershed (Table 1 below):

- Alluvial lands are located near channels and are frequently flooded. The soils of this series are silt loam, clay loam, silty clay loam and silty clay.
- The Benfield series is the most common in the watershed; they're well drained with medium-to-rapid surface runoff and low permeability.
- The Breaks series is located in small V-shaped drainage ways. Soils of this series are found on steep slopes, are usually deep and are mostly silt loam or silty clay loam with some silty clay in the subsurface.
- The Clime series comprises calcareous soils located on uplands; they're moderately deep soils with a silty clay loam texture.
- The Dwight series soils consist of a thin surface layer and dense subsoil; they're composed of silty clay, and are moderately well drained and have low permeability.
- The Irwin series is derived mainly from weathered shale, is generally found on upland ridge tops and side slopes, and has low permeability.
- Reading soils consist of deep, nearly level and gently sloping soils on stream terraces and foot slopes in creek valleys. They're formed in alluvial sediments and are composed of silt loams and silty clay loams.
- The Tully series are sloping soils located on foot slopes and are formed in thick colluvial and