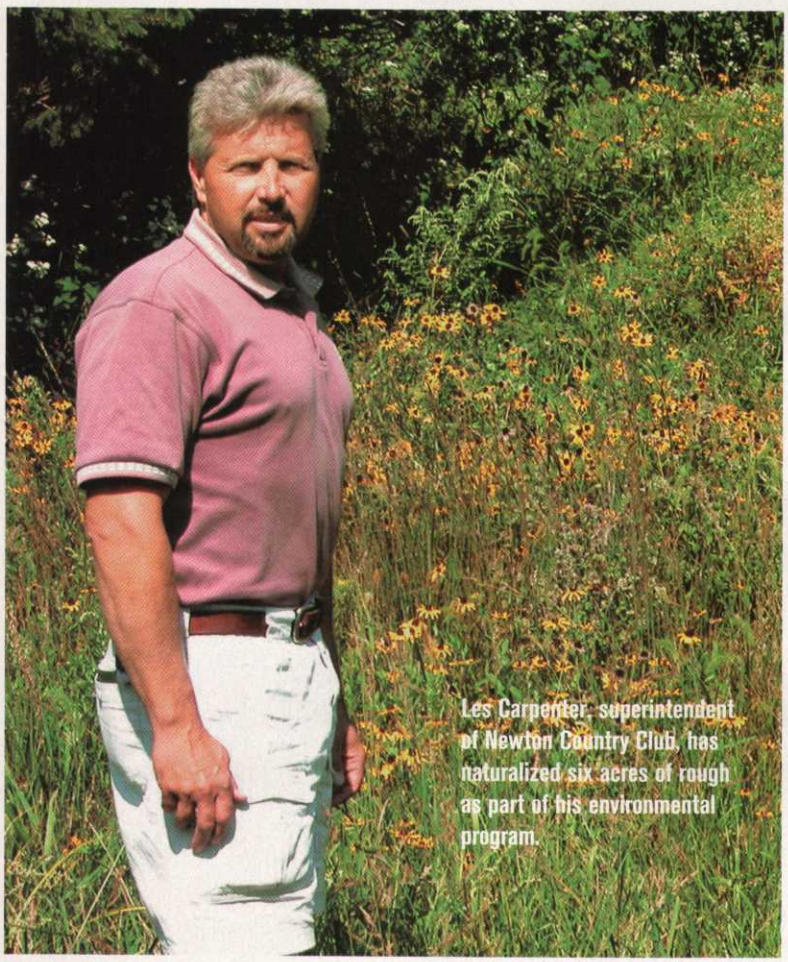
The Naturals

On the Environment

How two New Jersey superintendents convinced members that their environmental plans for golf course maintenance made sense

STORY AND PHOTOS BY LARRY AYLWARD, EDITOR



Les Carpenter, superintendent of Newton Country Club, has naturalized six acres of rough as part of his environmental program.

Paul Dotti cranes his neck and gazes up at the hideous-looking tree on the side of a fairway at Edgewood Country Club. The tree, struck by lightning a few years ago, has a stub for a canopy. It also has unsightly gnarls in its rotting upper trunk. The creepy-looking lumber would make a great prop in some Halloween haunted house.

But this dying and distorted tree has a special purpose — and that's why it still stands proudly on the golf course. Its partially empty trunk provides a haven for wildlife.

"We know this tree is dying," says Dotti, the 36-year-old superintendent of the 50-year-old course in River Vale, N.J. "But we know there are raccoons living in it, so we left it here for them. It's not a safety hazard, and nobody complains about it. It has a good purpose."

Wildlife is also welcomed at New Jersey's Newton Country Club, located about 50 miles north of Edgewood. Les Carpenter, superintendent of Newton, says natural areas on the course are used as nursing grounds for does and their fawns. Newton, located in the woody Andover Township, is also a base for bears, wild turkeys and several bird species.

"Early in the morning, all you hear are the

birds singing," the goateed and well-tanned Carpenter says. "It's like listening to one continuous song."

Since the late 1990s, Dotti and Carpenter have adhered to a sound ecological approach toward golf course maintenance in a state that's labeled more for toxic dumps than tree hugging. Dotti and Carpenter also managed to convince their long-time members, who were accustomed to wall-to-wall manicured turf, that their environmental strategies made sense on several fronts.

Edgewood and Newton are certified by Audubon International's Cooperative Sanctuary Program for Golf Courses. That means the courses have returned maintained areas to natural sections. It also means the courses have reduced pesticide, fertilizer and water use, and created more homes for wildlife, among other preservations.

Initially, it wasn't easy for Dotti and Carpenter to convince their clubs' members that more ecological plans toward golf course management were the right plans. Both superintendents had to stand their ground for their causes. They also had to explain in detail to members why the programs made sense. And they had to gain support of their green chairmen and green committees to proceed with their plans.

The skeptics

River Vale is an upscale area about 25 miles from Manhattan. Most of Edgewood's 300 members employ landscapers at their homes to groom their yards to near perfection. They expected the same conditions day in and out at Edgewood.

Newton, established in 1916, is located in a small town in northern New Jersey. Like Edgewood, many members have been at the club for many years and were accustomed to the entire 160 acres of the course being manicured. Carpenter describes Newton's roughly 305 members as more diverse, consisting of plumbers, teachers, doctors and lawyers.

In 1996, Carpenter decided to pursue Audubon International's certification at the suggestion of the club's former board president, who had a bachelor's degree in environmental science. Edgewood's environmental plan officially began in 1997 with a minor course renovation. Dotti and his crew shaved down a bank to generate fill dirt needed for the renovation. Instead of planting grass where the bank used to be, they planted wildflowers.

Initially, members at both clubs were skeptical of their superintendents' blueprints to return maintained areas to their natural states. Members were worried the "new" natural areas, including sections of native grasses and collections of wildflowers, would only lead to lost balls and cause slow play. Members were also concerned the natural areas would provide a home for deer ticks, which could lead to lyme disease.

"A vast majority of members thought it was going to be a fiasco," says Bob Malanga, chairman of Newton's environmental committee and a member of the course's green committee. Malanga says some members thought Carpenter was permitting the course to look sloppy and not doing his job.

Some of Edgewood's members grumbled, too, when they first noticed what they described as "unkempt" areas of unmowed fescue grass.

Dotti and Carpenter understood why members didn't jump high and kick up their heels over the course's new environmental practices.

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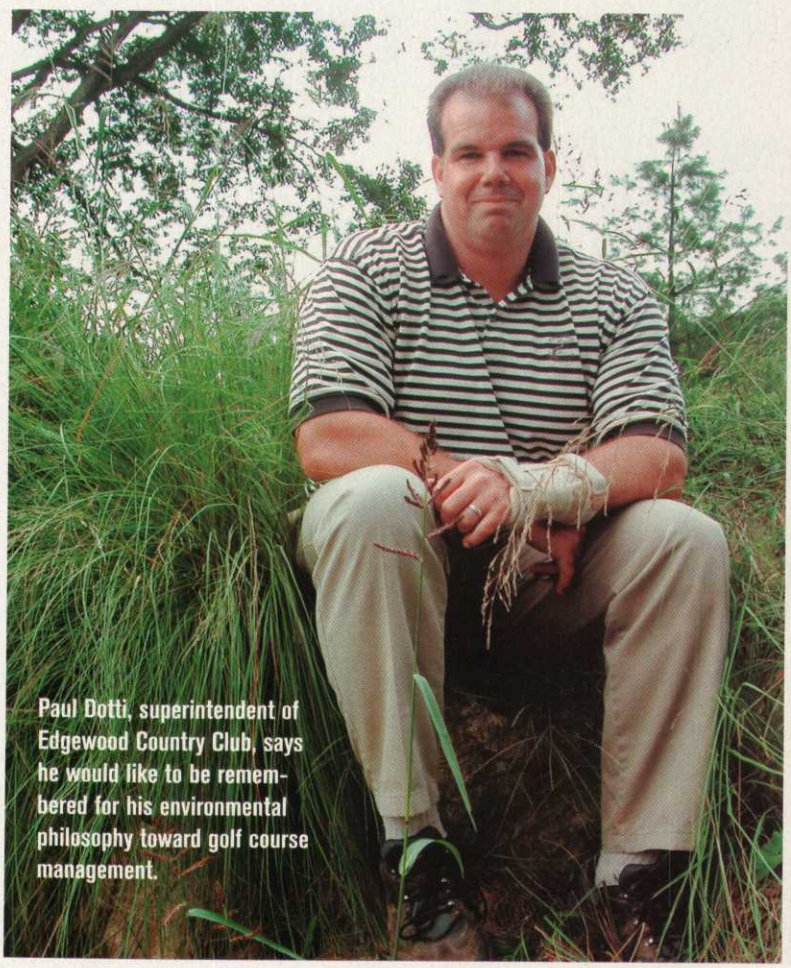
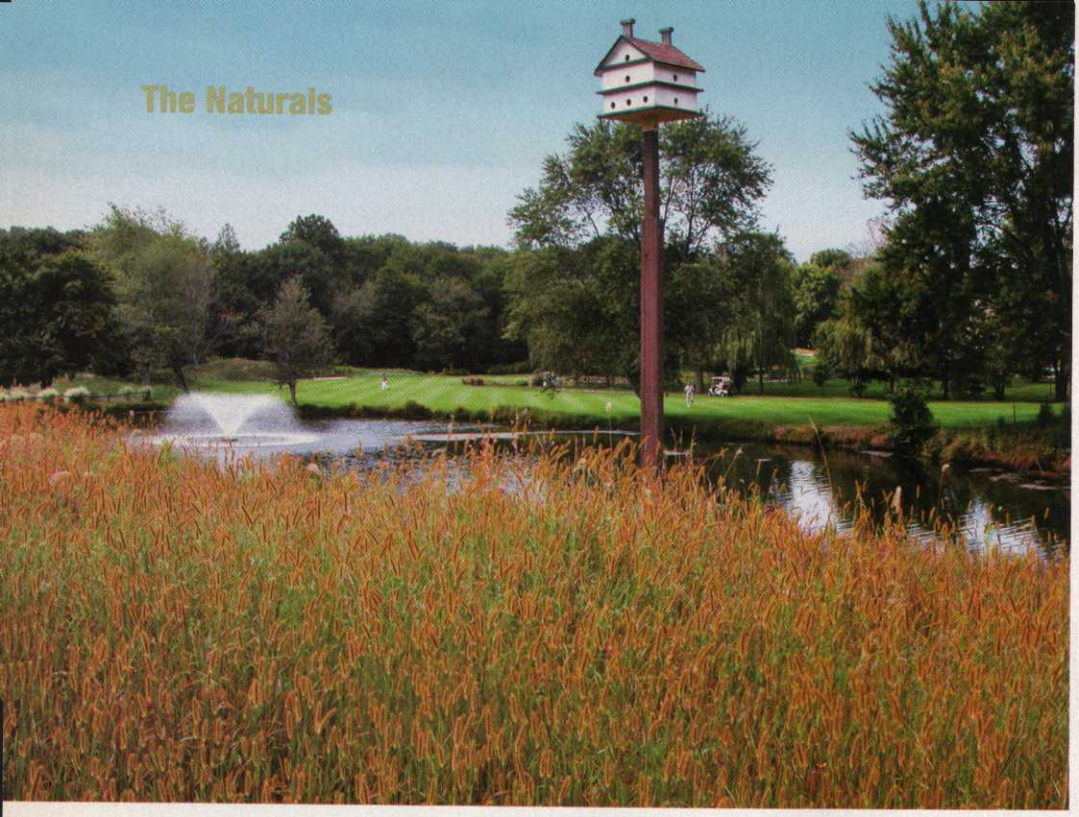
The Benefits of Going Natural

- Less maintained turf means less cost for overall maintenance.
- Wildflowers and other natural areas are aesthetically pleasing.
- More naturalized areas will attract more wildlife to courses.
- Reduced irrigation conserves water and saves money.
- Good public relations of a golf course and golf in general.



Paul Dotti, superintendent of Edgewood Country Club, says he would like to be remembered for his environmental philosophy toward golf course management.



Paul Dotti says members enjoy the natural look of the course, especially the wildflowers which are seen from many angles on the course.

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They knew the members were acclimated to the courses' well-groomed looks. They also knew that change in this case, as in many instances, was not going to be easy.

When a skeptical member questioned Carpenter for his decision to stop mowing roughs, he would politely tell the member to be patient.

"I just kept telling people to give the natural areas a season and let them mature," says the 46-year-old Carpenter, who has been at Newton for 17 years. "Most people were willing to do that."

Malanga backed Carpenter and lobbied members on his behalf. "It kind of looks like a bad haircut the first year," Malanga says, describing how a natural area appears at its beginning. "But it changes when it matures."

Convincing members

Returning areas of their golf courses to natural settings was a gamble, Dotti and Carpenter admit. Edgewood's and Newton's members could have dismissed their superintendents' environmental plans as nonsense. But Dotti and Carpenter held their ground and convinced them otherwise.

Dotti and Carpenter knew it was vital to communicate sufficiently to members what they were doing. Both superintendents took advantage of their clubs' newsletters to report their environmental plans.

Both superintendents also made themselves available to talk to members about their plans. More importantly, they empowered members to become part of the plans by soliciting them for their ideas and listening intently to their concerns.

"I told members, 'If you have any questions, I'm always on the course and more than happy to explain what we're doing or what flower that is or what bird that is,' " Dotti says.

Both superintendents also pointed out to members that the environmental changes were good for economics, which the members were happy to hear. Decreasing maintained acreage meant cutting back on water, pesticide and fertilizer use, fuel for mowers, and wear and tear on equipment.

"I told members we'd probably save about $10,000 in fertilizer, water and labor the first year," says Dotti, who has returned 30 acres of Edgewood's formerly maintained 180 acres to a natural setting of wildflowers and native grasses.

Today, Richard Bogen, Edgewood's green chairman, says members are more than aware of the cost savings.

"We don't have a budget that has a lot of frills in it," Bogen says. "That was one of the advantages of going to Paul's program."

Returning more acreage to natural areas also meant that both courses' crews could concentrate more intensely on the maintained areas. For instance, Carpenter had wanted to implement a first cut of rough at Newton, but he didn't have the manpower to do so. That changed when the course returned acreage to its natural state.

The bottom line: Members liked the idea of better-conditioned courses without an increase in labor costs.

In both courses' cases, the superintendents'

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(Top) This area of native grasses, to the right of the first tee at Newton Country Club, was formerly maintained turf. (Bottom) Some areas at Newton were naturalized because they were also dangerous to mow.

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overall stellar reputations helped their environmental causes. They were and remain well regarded by their boards of directors and green committees because of their prior performances.

After Dotti took over at Edgewood in 1996, the course improved dramatically, especially the greens, Bogen says. Hence, Dotti became well respected at the course.

"There was such a rapid improvement in the quality of the golf course from when he took over that pretty much anything he was doing was going to be well received," Bogen says. "He's a very capable superintendent."

Malanga says Carpenter is trusted and respected by Newton's green committee, board of directors and members.

Third parties also helped to sell the environmental strategies, both superintendents admit. Newton's members wanted to hear from Audubon International, not just Carpenter, that their course needed to cut back on maintained acres. When Carpenter showed them Audubon's stance on the matters in a report, the members were more at ease. "They wanted to hear it from Audubon that we were doing the right thing," Malanga adds.

At Edgewood, conventional wisdom for the course's environmental approach soared when USGA Green Section agronomist Dave Oatis commended Dotti and his staff for their ecological practices in a report, which was read by many members.

Good PR

Edgewood's and Newton's environmental ways have also led to excellent public relations. Both courses have attracted much media attention, including a story in *The New York Times* about Edgewood's program. The members like the attention the clubs receive, Dotti and Carpenter say.

"Golf courses are under the microscope," Dotti says. "The perception is that we water and spray all the time and are polluting the waterways."

Increased wildlife sightings have also created good PR. Because the courses have decreased their acreage of maintained turf, the wildlife has become more apparent — and golfers love seeing animals scurrying by.

"There has always been plenty of wildlife here," Carpenter says. "But what the natural areas do is provide a corridor for animals to get from one side to the other. So you're more likely to see them."

Before the native areas were implemented, little wildlife was seen at Edgewood. Now there are several families of foxes and other animals roaming the course.

"We've got birds and animals on the course that we never saw before." Bogen says. "You see some incredible bird species at different times of the year."

A balancing act

While members have accepted their courses' environmental directions, Dotti and Carpenter realize they must compromise with members on certain issues. For instance, Dotti says native areas will never occupy space in front of tees, where they could interfere with playability. "We don't force carries on any of the native areas, especially the ladies' tees."

Dotti must also play politician when it comes to pesticide use at Edgewood. As much as he would like to decrease chemical use even

more, Dotti knows it's his job to please the members, who desire the greenest golf course possible.

"We stick to the plan that we're going to do what's right for the environment," Dotti says. "But we're not going to do anything to upset the members. If we skip a spray or two, the members will never notice. But if we stop spraying all together, they're going to notice."

Upholding their reputations

Despite resistance to their programs early on, both superintendents say they're surprised at how fast members accepted them. Carpenter expected it to take three or four years to convince most members that Newton was doing the right thing. But members went from complaining about the program to making suggestions about how to improve it in less than two years.

Dotti admits he expected more resistance as he kept planting more wildflowers. When golfers summoned him over in the clubhouse after their rounds, Dotti was apprehensive and expected them to complain. But he breathed a sigh of relief when they told him they "liked the new wildflowers where the rough used to be."

In the end, most of Edgewood's and Newton's members discovered that the natural areas didn't slow their play and that lyme disease wouldn't run rampant. The members also gained more respect for their superintendents for standing by their environmental programs from the outset.

Like some superintendents are known for their knacks for getting golf courses in near-perfect condition for star-studded professional tournaments, Dotti and Carpenter have made names for themselves for their environmental prowess.

"When I leave here, the members will know that what I did here was the right thing," Dotti says in a humble tone. "I'd like to be remembered for giving a quality product to them with as little impact on the environment as possible." ■

"We've got birds and animals on the course that we never saw before."

RICHARD BOGEN
GREEN CHAIRMAN
EDGEWOOD COUNTRY CLUB

Go Native

It can satisfy environmentalists – and be good for the bottom line, too

AN ANALYSIS BY GEOFF SHACKELFORD, CONTRIBUTING EDITOR

Not long ago, most Americans didn't pay attention to food certified as "organic" by strict USDA guidelines. But now that more people are aware that an "organic" label means you are likely to be supporting local farmers and eating more wholesome, nonindustrialized food, the movement has taken hold. Large food product corporations are even trying to jump on the organic bandwagon.

The "native" plant movement took on a similar connotation for most Americans: It sounds nice, they said, but what does it really mean financially or aesthetically to use natives in landscaping?

"Only as far as the masters of the world have called in ***nature*** *to their aid, can they reach the height of magnificence."*

– RALPH WALDO EMERSON

But if there is any doubt that incorporating native plants can make a financial difference and create a more environmentally friendly image, note that business parks have been converting their landscapes to native plants. When big companies jump on the bandwagon, you can almost guarantee the movement is here to stay.

What does this revolution mean to the golf industry? Some would say nothing, but plenty of superintendents, architects and even a few golfers feel it's time for the industry to tell the nongolfing world that it embraces native looks and all practical means necessary to use less water. And making a pitch to convert out-of-play areas and clubhouse landscaping to native plants might be simpler than you think.

What does native mean?

Once established, some native revegetation — in the form of plant material, wildflowers and prairie grasses — can help sustain wildlife, require less water and less care, and appear healthy for many months of the year with occasional bursts of color. But it's important to match native plants to their appropriate sites according to soil, sun and water availability.

Slowly, sometimes reluctantly, a native golf movement has begun with movements like the GCSAA's push for courses to give an acre back to nature or Audubon International's for-profit, environmentally friendly certification program. However, the native golf trend will only expand into a revolution if golfers can be sold on the benefits to their local environments and, more selfishly, their pocketbooks.

With rising costs and water privatization looming (or already a deregulated disaster in some cities), golf courses must find ways to reduce water. It is *the* essential issue for the golf industry. Converting out-of-play areas, grassy hazards and clubhouse landscaping can make a difference.

Selling native

After the "rounds played" slowdown in 2003, the golf industry should be open to short-term

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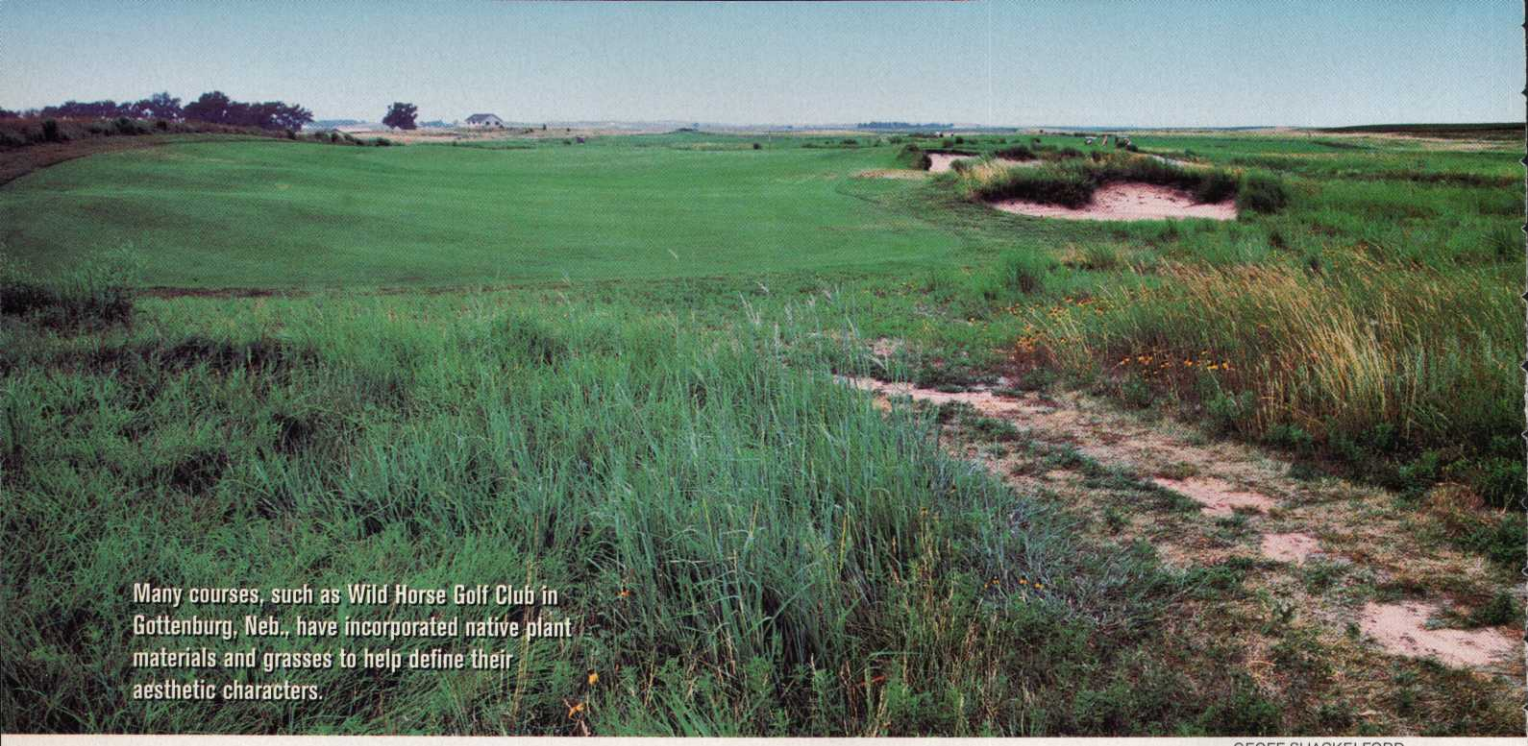

Many courses, such as Wild Horse Golf Club in Gottenburg, Neb., have incorporated native plant materials and grasses to help define their aesthetic characters.

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investments that reduce long-term water and maintenance costs. We've heard the warnings about water usage. But as many have already found out, bucking the modern American golf aesthetic will not be easy.

The average American golfer wants his or her golf course to be part Disneyland (vibrant, but sanitized), part cemetery (wall-to-wall turf and trees), part corporate statement (we're in control of our landscape) and part gameboard (precisely defined fairways and roughs). Golfers also expect their courses to be lauded as masterpieces that are unique to the world of golf, even though they look just like five other courses in the neighborhood.

The greatest designs in the world tend to avoid the characteristics that most golfers want in their home courses. These epic designs have vaulted their way to the top of rankings despite their close ties to a native, sometimes rugged environment.

By my count, 14 of *Golf* magazine's top 20 courses in the world for 2003 could be classified as "native" courses. They reflect a sense of place by playing through native surrounds. Many are highlighted by native shrubbery, accenting bunkers or neighboring prairie grasses.

A case could be made for other courses in the top 20 trying to soften some of their man-made edges. At Pebble Beach Golf Club, efforts have been made in recent years to restore native grass areas and a more rugged, indigenous look to the bunkers.

Native giants like Pine Valley, Cypress Point, Shinnecock Hills, Royal Melbourne, Pinehurst, Sand Hills, Pacific Dunes and every Scottish links have become unusual commodities because they incorporate native plant materials and grasses to help define their aesthetic characters. Golfers will travel long distances to experience these one-of-a-kind settings.

*"The prairie has a **beauty** of its own, and we should recognize and accentuate this natural beauty, its quiet level."*

– FRANK LLOYD WRIGHT

Sure, the holes would still be fun to play without the color and texture provided by indigenous plant material. But these designs are elevated to supreme status because they look like nothing else in the world. The smells, sights and even the sounds prove unforgettable because of the indigenous environment and the lack of intrusive, non-native touches.

Pointing to the best courses in the world may be the strongest selling point for those hoping to return out-of-play areas, grassy hazards, clubhouse landscaping and other portions of a course to native material.

Every region of the United States has its own native flavor, and golf has ignored this in favor of importing looks not inherent to the local environment. More often, the construction process clumsily plowed away all existing plant material, with the builders arrogantly insisting on starting over with the costly re-landscaping handed down to the customers.

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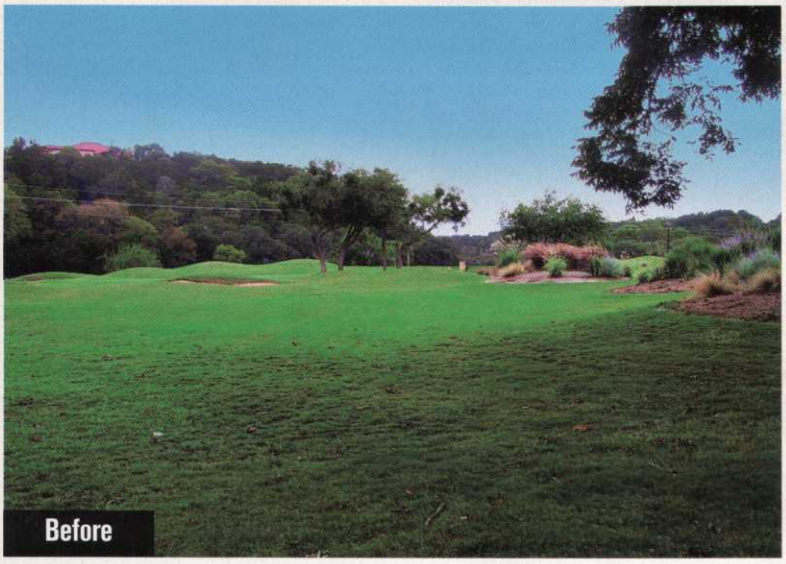
Golf's environmental hubris has led to an extreme economic impact where increased water usage and expensive maintenance is required to sustain areas that could just as easily be left alone or cared for in a limited way.

Only recently have architects and superintendents detected a backlash from environmentalists, many who view golf courses as chemical waste dumps — not because of any substantial data telling them so, but simply based on the aesthetics of golf. Even middle-of-the-road Americans who wouldn't call themselves hard-core environmentalists will point to wall-to-wall pinstriped green, offset by a fountain-adorned lake and blinding white bunkers, as just a little too unnatural.

Lost Creek Golf Club's No. 4 hole before and after the club returned a large area to native wildflowers.



LADY BIRD JOHNSON WILDFLOWER CENTER

The most extreme views we hear describing golf include "garish," "obnoxious," "excessive" and anything else that conjures up images of disproportionate water and chemical use. Sometimes the outside views are reasonable, but most times they are baseless — except when it comes to modern golf aesthetics. No, a golf course can never look as natural as a meadow or unfettered native area, but a little effort can take some of the edge off and earn a course more acceptance in its community.

Still, some golfers take pride in the way their courses stick out like sore thumbs. They like the front-lawn look of courses that appear to be in control of their environments. At the same time, the golfers don't like paying more for water, and they wonder why their courses aren't recognized in rankings. The thought never crosses their minds that the added expenses and sterilized settings fail to create experiences that differentiate their courses.

When selling the native look to members and golfers, superintendents shouldn't hesitate to point to the magazine lists and suggest that the best courses in the world attract people from all over because their environmental experiences are distinctive. They should cut out magazine photographs and put them in an album. They should do anything they can to show how a more revered design weaves its way along and through a native setting that one can't find anywhere else.

Assuming these ideas don't work, there's always the economic argument.

Saving water

Austin, Texas' Lost Creek Golf Club, operated by ClubCorp, recently joined forces with the Lady Bird Johnson Wildflower Center to return several acres to native wildflowers. The Austin Watershed Protection Agency has been creating buffer zones along the Barton Creek, on which the course borders.

A self-described "native nut," superintendent Steve Houser has seen architects take "existing properties and go backwards with them." Lost Creek was not unlike many other Texas courses when it was designed in the early 1970s. It provided playing pleasure, but it lacked color and texture.

Under Houser's supervision, the club started a three-year plan to create the required buffer

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The native look can be aesthetically pleasing.

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zone along Barton Creek while expanding the mandated 75-foot zone to 300 feet, with plans to eventually convert 11 acres of property to wildflowers, grasses and native trees.

Houser estimates that instead of 30,000 gallons a week devoted to irrigating roughs in the areas now or soon to be converted to natives, Lost Creek will use 2,500 gallons a week to establish the areas and then let them go.

Heather Venhaus, environmental designer at the Lady Bird Johnson Wildflower Center, worked with Houser and club officials on the Lost Creek project, the first for the Austin-based nonprofit organization that is the leading voice for the North American native plant movement. She said Lost Creek provides an educational opportunity to golfers not familiar with native plants.

Venhaus relied on Houser's input as well as case studies from Audubon International. She also recommends Donald Harker's *Landscape Restoration Handbook* for anyone taking on a native conversion project.

Touch, patience required

A deft touch is necessary when implementing native revegetation. Too often, the landscape architecture approach is used: plants are located in straight lines; coordinating colors look a little too well harmonized; and hydroseeded areas have so many varieties mixed in that the effect is dizzyingly unnatural.

Superintendents should tour local botanical gardens or native plant society-recommended sites to learn more about native plants. They will not only discover the quality of the indigenous plants, but they'll learn that the seasons for establishing various plants or grasses vary.

"We see this as an avenue to broaden golf's horizons," Houser says of Lost Creek's effort. Houser also says the club's environmental approach has allowed it to "relieve some of that stress we're under."

Golf is certainly going to be under stress for the next few years if predictions about water availability and prices come true — which is why now is the time to relieve some of the burden through native revegetation. ■

See Them to Believe Them

The best way to convince green committee members, general managers and golfers that natives are attractive plants and not weeds, is to see them in a landscaped or maintained environment. Virtually every state has a native plant society that can point you in the direction of native-friendly places. Botanical gardens are devoting sections to natives and some are exclusively native plants, making it easier than ever to see which plants, grasses or wildflowers might look best to establish at your course.

Here is a list of resources and Web sites:

Botanic gardens, including native:

Alabama: Birmingham Botanical Gardens
California: Strybing Arboretum and Botanical Garden (San Francisco), The Living Desert (Palm Desert)
Georgia: Callaway Gardens, Atlanta Botanic Garden
Illinois: Morton Arboretum (Chicago)
Iowa: Des Moines Botanical Garden
New York: Brooklyn Botanical Garden
New Jersey: Tourne County Park (Morristown)
New Mexico: Living Desert and Zoo (Carlsbad)
Tennessee: Cheekwood Gardens (Nashville)
Wisconsin: Wehr Nature Center (Franklin)

Native gardens, prairie grass research centers and reserves:

Arizona: Sonoran Desert Museum (Tucson)
California: Rancho Santa Ana Botanic Garden (Claremont), Theodore Payne Foundation (Sun Valley), Santa Barbara Botanical Garden (Santa Barbara)
Idaho: Idaho Botanical Garden (Boise)
Kansas: Cimarron National Grassland (Elkhart)
Massachusetts: Garden in the Woods (Framington)
Maine: Wild Gardens of Acadia (Acadia)
Missouri: Center for Plant Conservation (St. Louis)
Nebraska: Prairie/Plains Resource Institute (Aurora)
Nevada: Desert Demonstration Garden (Las Vegas)
Oklahoma: Oxley Nature Center (Tulsa)
Pennsylvania: Bowman's Hill Wildflower Preserve (New Hope), Brandwyne Conservancy Wildflower and Native Plant Gardens (Chadds Ford), Shenk's Ferry Wildflower Preserve (Holtwood)
Texas: Lady Bird Johnson Wildflower Center (Austin)
Washington: NatureScaping Wildlife Botanical Gardens (Vancouver)

Web sites

- Grand Prairie Friends (information on prairie grasses): *www.prairienet.org/gpf*
- California Native Plant Society: *www.cnps.org*
- Center for Plant Conservation: *www.centerforplantconservation.org*
- Lady Bird Johnson Wildflower Center: *www.wildflower.org*
- Native Plant Conservation Initiative: *www.nps.gov/plants/coop.htm*
- National Wildlife Federation: *www.nwf.org*
- Wild Ones-Natural Landscapers: *www.for-wild.org*
- Audubon International: *www.audubonintl.org*
- USGA Wildlife Links Program: *www.usga.org/green/research/reports/2002//wildlife/index.html*

How Effluent Is Changing the Industry

From maintenance practices to getting guarantees from local governments, the increased use of reclaimed water for irrigation is altering the way *you* do business

BY FRANK H. ANDORKA JR., MANAGING EDITOR

On the Environment

Alan Bakos, certified superintendent at The Moorings Country Club in Naples, Fla., says he can tell when his turf is taking a hit from the reclaimed water the water management district requires him to use. It usually starts in areas where there is short-rooted turf — often the result of nematode damage — and slowly spreads throughout the course. After a few short weeks, the course can look like it's been hit by a drought even though the irrigation system has been working overtime. The actual culprit is the high salt content of his irrigation water.

"If we go two or three weeks without rain to push those salts through the soil profile, you can tell," Bakos says. "Using reclaimed water is OK, but there are some costs involved, particularly on high-quality turf."

That's the refrain heard around the country as potable water becomes increasingly scarce, even in areas of the country where water problems wouldn't be expected. More and more communities are turning to reclaimed water as a potential source for golf course irrigation.

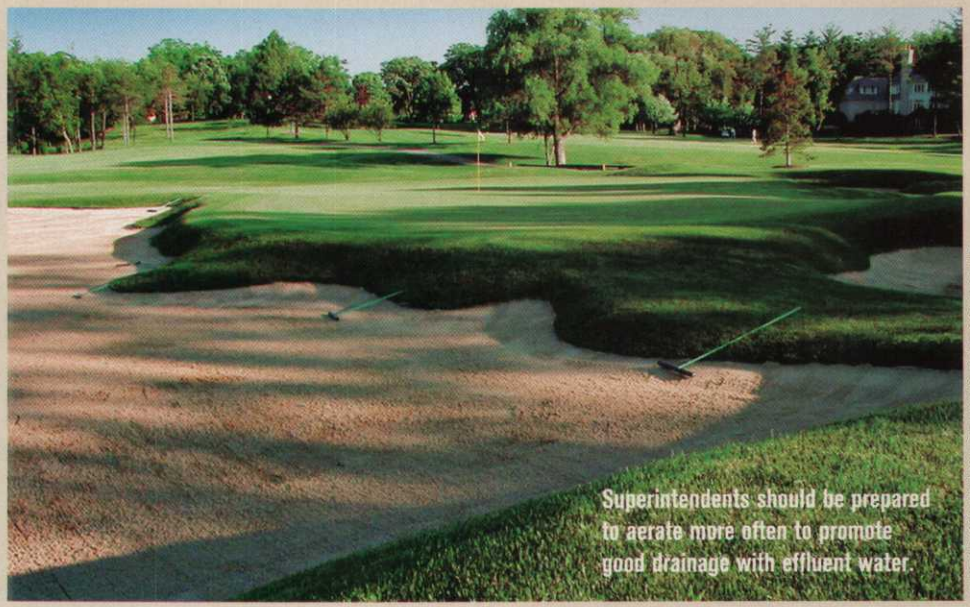
For the city or county, selling effluent water to golf courses serves a dual purpose: It allows a city to get rid of water from its water treatment plants that would have to be disposed of anyway — and it can charge the end-users for the privilege, meaning extra revenue for the city's coffers.

Problem

Effluent water can add additional salts, heavy metals and other contaminants to the soil, making it difficult to produce high-quality turfgrass.

Solution

Monitor levels of minerals in the soil profile, fertilize with materials that counteract effluent's harmful effects and lock the provider into a contract that limits levels of harmful minerals allowed in the irrigation water.



Superintendents should be prepared to aerate more often to promote good drainage with effluent water.

PHOTOS COURTESY OF WYNSTONE GOLF CLUB

For superintendents, the situation is more complicated. In most instances, effluent water is cheaper than potable water and comes with fewer restrictions on its use. But for that savings, superintendents must plan for more maintenance (aerification and nutrient treatments) and expect a build-up of salts and other minerals in the soil that make it harder to grow high-quality turf. It's a trade-off, but many superintendents in water-restricted areas are often having less input into whether they use it or not. So if you're considering using (or are being forced to use) effluent water, experienced superintendents say it's best to plan ahead.

Unless superintendents understand that effluent water brings challenges of its own that they will have to combat, those considering making the switch could be in for rude surprises.

Growing trend

Larry Stowell, founder of PACE Consulting, a turfgrass consulting firm, says he first encountered effluent water in 1992. He worked with a course that asked him to monitor a stream where runoff flowed to see how effluent affected it. Stowell says he found no problems with the runoff into the stream. But that's not to say that effluent water doesn't present superintendents with problems they wouldn't see with traditional water.

"It's hard to make broad statements about effluent because it really depends on individual situations," Stowell says. "The quality of the water coming from treatment plants varies greatly. If your source is providing you with low-quality water, it can cause problems.

"It can be a tough call," he adds. "In some municipalities, particularly in the West, it's a choice between effluent water or no water."

Ted Fist, superintendent of Wynstone Golf Club, was one of those superintendents who didn't have a choice of what type of water to use. Wynstone is a gated community nearly 40 miles northwest of Chicago and three miles away from Lake Zurich, Ill., — too far away for either city's water and sewer lines to reach it, Fist says. So he needed to use the water provided from the community's water treatment plant.

"We have a contract that obligates us to use the water from the community," Fist says. "When I was an assistant here for three years, I saw it was problematic because the cool-season grasses we grow don't like excessive salts. But we were locked in by contract, so we had to make it work."

Tim Daniel, superintendent of Crown Colony Golf & Country Club in Fort Myers, Fla., says he takes what the county gives him because he has no choice. Located across the street from an inlet of the Gulf of Mexico, his other water sources are limited.

"We're pretty much at their mercy," Daniel says. "We have well water backup, but they've limited our take from the wells to 20 million gallons annually. That output wouldn't last long in this climate. Our lakes aren't much better than

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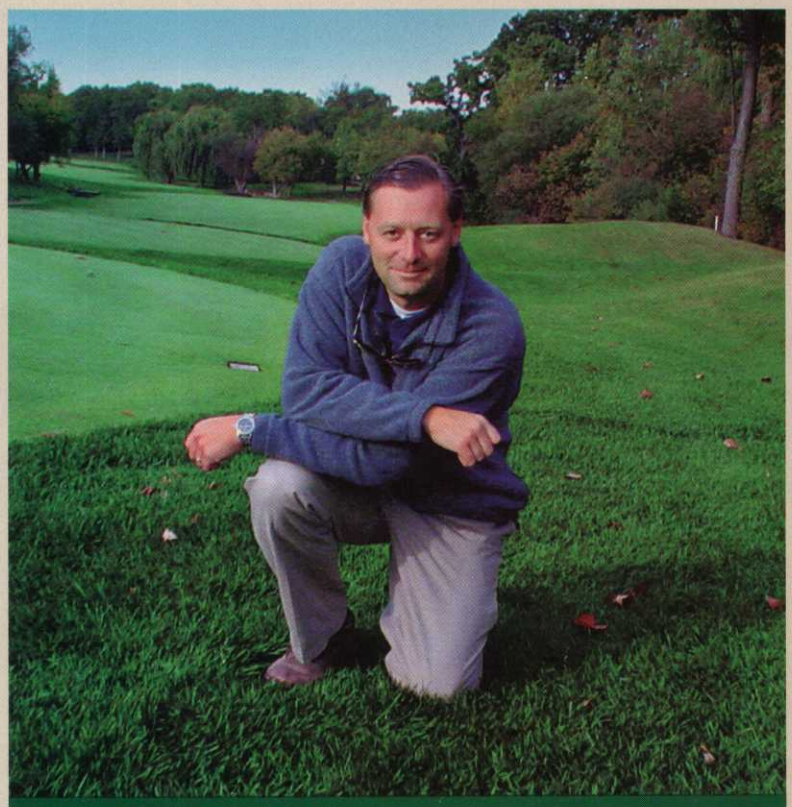

Numbers Don't Lie

Since Ted Fist, superintendent of Wynstone Golf Club, convinced homeowners at his club to switch from sodium chloride to potassium chloride in their water softeners, the resulting changes to the chemical composition of his soil are startling. Consider:

- The overall levels of the damaging sodium ions dropped from 300 parts per million (ppm) to 106 ppm this year.
- The overall levels of beneficial potassium rose from 14 ppm to 238 ppm.
- In 1998, the saturated soil extracts contained 3.2 percent potassium and 49 percent sodium. This year, those numbers were 36 percent potassium and 24 percent sodium.

"There's no doubt in my mind that we've improved the overall soil structure," Fist says. "The turf doesn't wilt as fast and the plugs we pull are darker and break apart more easily. It's starting to be good soil again."

– F.H.A. Jr.

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the water they give us, so we make due — but it isn't always easy."

Get an iron-clad contract

Planning on the front-end can help alleviate the feeling of helplessness when dealing with a municipality, says Jeff Beardsley, superintendent at Big Canyon Country Club in Newport Beach, Calif. Before he accepted a contract from the city to accept reclaimed water in 1996, he negotiated a few points with city officials. Beardsley currently uses 60 percent reclaimed water and 40 percent potable water on his 120-acre course.

"We wanted to make sure the water the city sent us wouldn't damage our golf course," Beardsley says. "We asked the city to guarantee that the water wouldn't exceed certain levels of minerals like salts. Then the levels were written in black and white, along with the recourse we had should those limits be exceeded."

Beardsley also negotiated a study paid for by the club, city and county of his fairways to see what the soil structure was in 1996. The object was to develop baselines so progress — or problems — could be measured accurately. The contract also stipulated that the city pick up the tab for some of the infrastructure improvements that had to be made to use reclaimed water. No detail is too small to be included, Beardsley says.

But the situation isn't perfect, and the golf course recently reopened negotiations in the hopes of bringing the city's water back into line with the contract requirements. In September, the salt ratio was too high and damaged the grass severely during the summer, angering members and making Beardsley uneasy. The salts aren't as much of a problem during the winter, when the area gets enough rain to push the salt through the soil profile, so Beardsley says he's considering switching back to 100 percent potable water during summers and reclaimed water in the winter.

"That's not set in stone," Beardsley says. "We're sitting down with the city right now to see if we can resolve some of these issues before it gets to that point. [City officials] have been receptive to hearing us out."

One possible solution is the process of blending, which some wastewater treatment plants offer. It's the process of mixing the treated water with potable water to bring down some of the problem mineral levels, Stowell says.

"Originally, the treatment plant told us it couldn't blend — then we went out to visit and discovered they could," Beardsley says. "It's one of the solutions we're exploring with them."

Sodium solutions

Universally, superintendents who use effluent water complain about the sodium levels in it. In Wynstone, the naturally occurring problem of effluent was aggravated by the sodium chloride water softeners the residents used. Salts alter the soil's structure in a way that reduces water penetration to turf roots because sodium replaces calcium in the soil profile.

"When you have too many salts in the soil, fairways start to dry out quickly and trees defoliate at temperatures where that shouldn't happen," Fist says. "We struggled to keep everything together until we could figure out a solution. It creates more work because you must stay on top of your soil profile to keep it balanced."

During the first year as head superintendent,

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Terms You Need To Know

Larry Stowell, founder of PACE Consulting, a turfgrass consulting firm, says superintendents need to know the following terms if they're planning on using effluent water:

Distribution Uniformity (DU) – A measurement of the uniformity of irrigation water application. This value should be near or exceed 80 percent, but many systems are well below the 80 percent value, leading to wet and dry areas that are difficult to manage.

Saturated hydraulic conductivity (Ksat) – A measurement of how fast water moves through the soil. The Ksat should exceed or match the irrigation precipitation rate or problems with wet spots will occur. Generally speaking, Ksats above .6 inches per hour are manageable.

Total dissolved salts (TDS) – A measure of salt content of the water. TDS levels above 770 parts per million (ppm) become increasingly difficult to manage because of potential for accumulation of salts in the soil.

Sodium absorption ratio (SAR) – A measure of the sodium hazard that can result in loss of soil structure. Water levels that have a SAR of 3 are characteristic of good quality irrigation waters.

Bicarbonate (HCO_3) – A water component that can also result in loss of soil structure and plugging of the soil surface. Bicarbonate levels below 90 ppm are characteristic of a good quality irrigation water.

Nitrate (NO_3) – A component of recycled water that can be beneficial at low levels, but can cause overfertilization and nitrogen toxicity problems if the levels are too high. Nitrate levels below 6 ppm are a characteristic of good quality irrigation water.

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Fist aerified and limed the fairways more often and increased his usage of potassium sulfate to help get the soil in balance. In the spring of 1999, however, Fist tried a new approach. He worked with the Wynstone Property Owner's Association to wean homeowners off the sodium chloride they were using in their water softeners. Together, they began providing potassium chloride pellets to the homeowners to use in their water softeners. This alleviated some of the salt going into the water before treatment and reduced the overall sodium levels afterward.

By the fall of 1999, the amount of sodium in the irrigation water had dropped from 300 parts per million to 150 parts per million. The transition created a little more work for Fist and his crew because they had to deliver six bags of potassium chloride water softeners to each house three times a year. But three years later, they've streamlined the system so it's become a call-on-demand system, where homeowners are responsible to call the maintenance facility on an as-needed basis. The results of the program are visible, Fist says.

"It's far more manageable than it was before," Fist says. "It's still not perfect, but the difference is visible."

Maintenance matters

Joe Traficano, senior agronomist for Desert Mountain Golf Club, says the labor costs of maintaining turfgrass with effluent water can reach hundreds of thousands of dollars, particularly in Scottsdale, Ariz. Like Beardsley in California, the rain of Arizona's winters keeps the salts and other damaging minerals from staying in the soil. But come summer, the salts can sit in the soil profile and destroy the turf.

That's one reason why the course spent $1 million recently on one of the six courses Traficano oversees to renovate the fairways to add 4 inches of sand to the 30 acres of fairways to provide better drainage.

"It's a Band-aid that we'll probably try with our other courses and certainly will require with other new courses we build," Traficano says.

All the superintendents who use effluent water say adequate drainage is paramount to success. To aid in drainage, superintendents must aerify more often.

"You must open up pore spaces more often," Traificano says. "Otherwise, the salt buildup will be intolerable."

Superintendents should also monitor their micronutrient levels and be prepared to add whatever nutrients the effluent water takes out. Gypsum is a common addition to nutrient rotations on courses that use effluent water because it returns calcium to the soil that has been replaced by the sodium in the water, Fist says. He adds that superintendents should also be prepared to use more potassium-based fertilizers.

"I look at the turfgrass plant as a neg-

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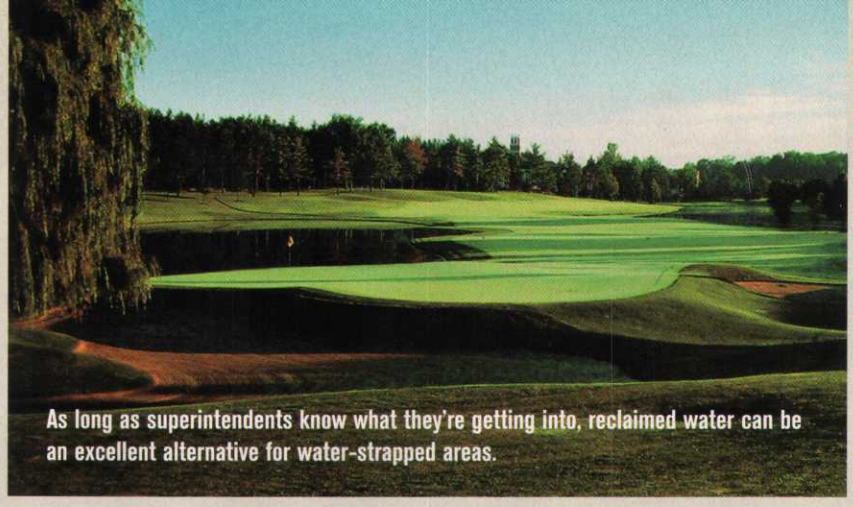

As long as superintendents know what they're getting into, reclaimed water can be an excellent alternative for water-strapped areas.

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atively charged magnet," Fist says. "Calcium, magnesium, potassium and sodium are all elements that are attracted to the plant, and they compete with each other. If there are more sodium ions in the soil than the others, they're the ones that will take the place of the other more beneficial nutrients. That's why you have to pay attention and adjust your fertilization schedules accordingly."

Beardsley says superintendents should visit potential water providers and educate them about what they do and why they need water to remain at specific quality levels. Don't be afraid to ask to take a sample of their water home, he adds.

"Get a sample of the water they'll be sending you ahead of time and send it off to your own lab," he says. "Set up protocols to test the water on your end. You can't be too careful. After all, it's *your* job that could be on the line if the turf dies — not the people at your local water authority."

There's another factor superintendents need to plan for — the fact that they may need to water about 15 percent more than they otherwise would to push the salts through the soil. The practice is called the leaching fraction, and Beardsley says it's vital to keeping the salts from remaining on the surface if the course doesn't receive enough rainfall to do the job naturally.

PACE Consulting's Stowell says an unexpected consequence with some effluent programs is an unwanted influx of nitrogen, which causes excessive turf growth. "Researchers haven't figured out how to handle that yet," he adds.

Even with its problems, however, the trend toward using more effluent water is a good thing for the industry as long as superintendents prepare for what they're getting into, Mooring's Bakos says.

"It's a good way to protect a disappearing natural resource like water, but there are some challenges associated with it. If you're prepared and if you educate your members, however, it is a workable alternative." ■

Slowly But Surely

The change toward more eco-friendly oils is coming – and mower companies are preparing for it

BY FRANK H. ANDORKA JR., MANAGING EDITOR

On the Environment

It's not exactly a revolution. It's more like a building movement that may eventually engulf the industry. Eventually, eco-friendly oils will be standard on most mowing equipment, experts say.

Joe Wilson, senior engineer for John Deere, says he wouldn't describe the movement as robust, but he does believe it exists.

"The decision to produce these products has been spurred in part by municipal legislation and competition for contract bids where such oils are required," Wilson says. "There's clearly a movement in that direction."

"It's common sense," says Shawn Daly, product manager for Jacobsen. "Biodegradable oils cause less damage on the greens if they leak, and they're easier to clean up. Superintendents understand the advantages they offer."

Still, experts say there hasn't been a significant increase in requests for the oils despite their advantages. Biodegradable oils often cost more for end-users. In addition, not all equipment is designed to handle the oils.

In the end, the decision about whether to switch to biofriendly oils will depend on how important it is to superintendents to have these eco-friendly allies in their arsenals.

Why make the change

The first and foremost reason to make the change is that bio oils do less damage than traditional petroleum-based products after a leak. The issue is particularly important for greens, Daly says.

"Greens are the most important asset a golf course has," Daly says. "Mineral-based hydraulic fluid leaks on greens can be devastating. They leave scars that can last for months."

Jody Hinkle, marketing communications manager for The Toro Co.'s golf and grounds division, says the inquiries her company receives about using bio oils usually center on the fairways because superintendents have the option of walk-mowing greens, which eliminates the risk of having pressurized oils in the equipment at all.

"The concern about larger burns and the destruction of grass is one reason courses consider moving to biodegradable oils," Hinkle says. "Local regulations governing contamination of soil and ground water that can result from oil leaks are another."

Daly says the ease of cleanup is the most compelling reason to make the change over to biodegradable oils.

"In certain areas of the country, petroleum-based products are considered toxic waste," Daly says. "That can make the cleanup expensive, and the damage to the grass can be enormous. Biodegradable oils don't pose those challenges.

"Ask any local oil-change center about the hoops they have to jump through to dispose of the oil," Daly adds. "Superintendents don't want to have to deal with that kind of hassle."

Hinkle says the disposal costs for both are similar. "Frequently, the bio oils are mixed with standard oils for disposal, so there's no savings."

Daly says the latest information he's seen places the costs of recycling biogdegradable oils at between 10 cents and 30 cents per gallon, and motor oil costs 50 cents to $1 per gallon to dispose. He adds that prices vary throughout the United States by market.

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The case against change

Hinkle says the two barriers to bio oils' success are price and accelerated deterioration of it.

"Bio oils have to be changed much more frequently than standard oils," Hinkle says. "The cost to use a bio oils is roughly three to five times more expense than standard oils."

Hinkle says most Toro equipment can be converted to handle biodegradable oils, but the company hasn't seen a sharp rise in interest for this type of equipment.

"We're shipping a couple dozen pieces of equipment or less from the factory with these oils to meet customer requests," Hinkle says. "There are some field conversions as well, but they're not in any great volume."

Daly admits that bio oils are slightly more expensive, but that superintendents are getting more interested in them. "There's a safety issue there for superintendents, and they're becoming more comfortable with the biodegradable products every day."

Jacobsen's mindset is that biodegradable oils will be their preferred oil in the future, Daly says.

Wilson says if superintendents want to change the type of oils they are using in Deere machines, they should flush the machines completely. Then the machines should be drained, refilled with bio oil and run until reaching normal operating temperatures. Then the oil can be drained and replaced with fresh bio oil.

Some machines do not drain completely. If flushing is not done, some mixing of the mineral oil and bio oil will occur. The resulting mixture will be less biodegradable than the unmixed fluid.

Wilson says that care should be exercised when selecting a bio oil as brands are not created equal.

The challenges superintendents face with using eco-friendly oils will eventually be overcome, and the movement will continue to swell, Jacobsen's Daly predicts.

"It's an overall mindset — a strong commitment to the environment — that will eventually make this a permanent fixture in our industry," Daly says. "And that day may be coming soon." ■

Bio-products

Check out these organic and biological products for turf management:

New turf protectors

Becker Underwood's BioGain and Canteen work in tandem to treat newly seeded or established turf, according to the company. BioGain is designed for use in spray application programs to reduce stress and stimulate root growth through enhanced water and nutrient uptake and to correct iron deficiencies in turf. Canteen, a performance-enhanced spreader and soil penetrant, delivers pesticides and fertilizers to the root zone. *For more information, contact 800-232-5907 or www.beckerunderwood.com.*

Foliar nutrition program

Milliken Turf Products says its Emerald Isle CPR-True Foliar Nutrition Program is successful in defending against basal rot anthracnose.The CPR-True Foliar Nutrition Program provides small, efficient amounts of foliar-absorbed nutrition along with a generous amount of high-quality seaplant extract. *For more information, contact 800-845-8502 or www.milliken.com.*

Organic fertilizer

Earthworks offers Replenish 5-4-5 Natural Organic Fertilizer, a "formulated" granular organic. The Replenish line also includes an ammonium sulfate-based organic, 10-2-5; a potassium sulfate product, 5-1-10; and a straight and inexpensive compost topdressing, 3-4-3. These are formulated natural organics, incorporating rich egg-layer compost, sugars, rock minerals and humic acids to allow for better microbial stimulation and soil conditioning. *For more information, contact 800-732-8873 or www.soilfirst.com.*

Organic fertilizer

Milorganite's organic fertilizer is versatile and can be used anywhere a superintendent or groundskeeper deems necessary. Milorganite is ideal for a variety of applications: greens; fairways and roughs; tee boxes; trees; planting beds; and flowering shrubs. *For more information, contact 414-221-6810 or www.milorganite.com.*

Nutrients

Floratine offers a variety of foliar auxiliary nutrients designed to address the photosynthetic & chlorophyll requirements of turfgrasses. The products include Astron, Per "4" Max, ProteSyn, Knife - Fortified iron supplement, Renaissance and others. *For more information, contact 901-853-2898 or www.floratine.com.*

Bio-fertilizer

Nutramax offers MACRO-SORB foliar, a biofertilizer based on amino acids. It allows for greater absorption and transport of nutrients through the leaves into the plant. The action of L- amino acids and substances with phytohormonal effect in MACRO-SORB foliar helps to regulate the opening of the stomata, increase water potential and other factors. *For more information, contact 800-925-5187 or www.nutramaxlabs.com.*

Organic fertilizer

Nature Safe Natural and Organic Fertilizers are formulated by **Griffin Industries**, a producer of animal proteins for the feed industry. The organic feed compounds needed by animals are also required by plants for their growth, protection, reproduction and survival. Nature Safe has taken the same approach used to maximize animal nutrition to create products that emphasize soil and plant health. *For more information, contact www.naturesafe.com.*

Microbial-based products

Novozymes Biologicals offers microbial-based products, including EcoGuard biofungicide, which provides natural, effective dollar spot control. EcoGuard combines a patented microorganism and other natural ingredients for robust control of dollar spot, faster recovery from turf disease and protection from future infestations. It helps superintendents reduce the cumulative chemical exposure on their courses and meet integrated pest management (IPM) objectives when used in a recommended rotation program with standard chemical fungicides. *For more information, contact 800-788-9886 or www.novozymes.com.*