



Up close and from a distance, the long-stemmed dandelions resemble wildflowers, not weeds.

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when Vargas first told him of the practice, but he eventually bought into it.

“[The process] knocks the dew off the greens, which means we get a better quality cut because the mowers aren’t picking up all that water,” Carlson says. “It has cut down on dollar spot activity. [Rolling] also gives us more green speed, which the members love.”

On a foggy morning, a few workers are removing dew from approaches with squeegees. Another team is dragging fairways with a hose to remove dew. Carlson admits his dew-removal program is more intense than the norm, but it’s a vital cultural practice to manage turf disease.

“We get rid of dew any way we can,” he says. “Dew is full of sugar and creates a nice environment for disease.”

Dollar spot is the top disease threat on the course. Pythium also poses problems. Carlson almost lost two greens a few years ago because of a pythium outbreak. Brown patch and copper spot also make annual appearances.

“We get a lot of diseases,” Carlson says. “We just have to manage them day-to-day.”

Carlson uses biofungicides, including Rhapsody from AgraQuest, EcoGuard from Lebanon-Turf and Civitas from Petro Canada, to control disease weekly. “There are several organic fungicides that work well,” Carlson says. “There’s real progress being made for managing fungus disease organically.”

Scott Houston, business manager for AgraQuest, says biological fungicides have come a long way even from 10 years ago when many of them were perceived as snake oil. “Their credibility is growing,” he adds.

Carlson has also relied on improving airflow as a cultural practice to combat turf disease. For instance, Carlson had trees removed around the 17th green.

“We removed the trees and got better air circulation around the green and knocked the disease out just by managing the microclimate,” he says.

Being a newer course, Carlson says the Vineyard benefits from having newer grass varieties bred to resist disease better than older types. Carlson says he’s impressed with the way Penn A-1 bentgrass fights off disease on the greens.

“We also don’t have a lot of annual bluegrass, which is a real vector for disease,” Carlson says, adding there’s little *Poa annua* on the course’s greens partly because it can’t sprout amid the dense A-1 bentgrass. The fairways are comprised of fescue and colonial bentgrass, two varieties also known to thwart disease.

It took Carlson a few years to imple-

ment a reliable insect-control program. Early in his tenure, Carlson battled turf-root-eating Oriental beetle grubs that caused damage throughout the course. Matters were made worse when skunks and crows dug up the turf to eat the grubs. “It was really discouraging,” Carlson says.

Carlson consulted entomology professor Pat Vittum from the University of Massachusetts on what to do to control the grubs. Vittum recommended nematodes, which Carlson introduced to 40 acres of the course in 2007. “We sprayed all the fairway areas, tees and greens — everything,” Carlson says, adding the nematodes have worked splendidly.

Carlson has taken notice of a few new environmentally friendly synthetic insecticides released recently, including DuPont’s Acelapryn for grub control. Carlson says Vineyard formed a committee to study the feasibility of using Acelapryn, which received a reduced-risk classification from the Environmental Protection Agency.

“Pesticides are much more benign than they used to be,” Carlson says.

Mark Coffelt, DuPont’s global development manager, says Carlson probably likes Acelapryn because of its low water solubility, which is one part per million.

“You want that around water, especially on Martha’s Vineyard,” says Coffelt, who predicts golf courses in 10 years will use a mix of synthetic and organic products.

Weeds are Carlson’s toughest challenge. There are no reliable bio-herbicides to kill broadleaf weeds. The course makes good use of dandelions, which inhabit designated areas along maintained turf. Some dandelions are seeding, which isn’t a pretty sight, but most of the long-stemmed weeds resemble wildflowers in bunches.

Carlson uses what he calls “organic Roundup” to control weeds. It’s actually a machine called the Waipuna,

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Thinking Man

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made by a New Zealand manufacturer, which wipes out weeds with hot foam. It operates much like a carpet cleaner, with a device that spews hot foam on the weeds and wilts them. Carlson admits it's labor intensive to operate and leaves behind a large carbon footprint because of its diesel engine.

Carlson's best tool to control weeds is the four-member crew he employs to remove weeds manually. The team members work together in sections with large fork-like tools in hands. They remove the weeds from the turf with precision and fill the barren areas left behind with a soil and seed mix. They perform the task 40 to 50 hours a week during the golf season and never complain, Carlson says.

Kwame Kankam, one of the weeders from Ghana, will be the first to tell you it's a thankless job but an important one.

"We don't have to go too deep," he says of the plucking procedure. "It just depends on how big the weeds are."

Carlson uses mostly organic fertilizer. He has received permission from local regulators to use some inorganic fertilizer on greens because lysimeters — devices used for collecting water from the pore spaces of soils and for determining the soluble constituents removed in the drainage — have revealed no nitrate nitrogen leaching.

"My contention has always been



Carlson's best tool to control weeds is the crew he employs to remove them manually.

it's not the type of nitrogen source you use as much as it is how you use it," Carlson says.

Carlson believes the turfgrass has come to a point where it's fighting off pests on its own. "I believe there's microbial activity going on in the soil that over time begins to have natural ability to fight disease," he adds.

One thing Carlson has learned is he must use all the tools in his toolbox to manage the course. "There's no silver bullet for organic management; it's a combination of products and cultural practices and grass species," he says.

Carlson says his maintenance budget is a little above average for an 18-hole course in New England. It's not cheaper to maintain a course by not using synthetic pesticides, but it's also not more expensive.

"We pay more for labor than a lot of clubs," he says. "But we use fewer products."

Carlson will not hesitate to tell other superintendents his maintenance program will not work in certain regions, like the transition zone, where it can get very cold in the winter and very hot and humid in the summer.

"Martha's Vineyard has a more temperate climate," he says. "You can't just take this program and convert it in another place."

The last thing Carlson wants is to get another superintendent in trouble with his or her club's members by recommending cultural practices or products that might not work in certain conditions. In fact, Carlson says he reminds Vineyard's members often that he's not allowed to use pesticides, especially when disease hits the greens. The mandate provides him job security.

"I've found our members will tolerate some disease as long as the putting surfaces are totally smooth and the putts roll well," Carlson says.

Carlson says Vineyard is one of two U.S. golf courses that don't use conventional pesticides. The other is Applewood Golf Course in Golden, Colo. But Carlson says there's a distinct difference between maintaining a golf course in the Northeast and maintaining a course in the mountains: disease pressure. Colorado's higher elevation equates to low disease pressure.

"We get most all of the diseases here," Carlson says.

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Thinking Man

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A learning experience

A tree swallow darts in front of Carlson's golf car as he cruises down a fairway. It and other species nest in bird boxes, some of which double as 150-yard markers on the course.

Carlson enjoys seeing the wildlife on his course. He believes most superintendents feel the same way and are environmentalists at heart. Carlson also believes most superintendents are responsible with their pesticide use.

But even though most are responsible, Carlson says they may be able to reduce their pesticide use. For instance, if dollar spot breaks out on two greens, a superintendent is usually inclined to spray all 18 greens to prevent the disease from spreading. But Carlson says if the superintendent really wants to cut back on pesticide use, he or she should spray only the greens that are infected. Carlson realizes that's not easy for a superintendent to do, especially if it's indicative dollar spot will break out on the other greens.

"What you learn in a project like ours is it's possible to have a reduction in pesticide use," Carlson says.

Carlson realizes a total pesticide ban on U.S. golf courses would be foolish and unreasonable. That said, he expects superintendents will be forced to cut back their usage if certain government policies are put in place.

Carlson also says a reduction in pesticide use may only happen if golfers are willing to make concessions with visual perfection. For instance, golfers would have to put up with a little bit of dollar spot on tees and some weeds in out-of-play areas.

If a course decides it wants to use fewer pesticides, which equates to less than perfect conditions, then that message must be delivered not just by the superintendent but by others, including the general manager and pro.

"It's a trickle-down effect," says Carlson, who won the President's Award for

Carlson believes most superintendents are environmentalists at heart and are responsible with their pesticide use.

Environmental Stewardship from the Golf Course Superintendents Association of America in 2008.

The education process should also include professional golfers and televised PGA Tour events. But Carlson believes most PGA Tour players don't want to take any chances of lowering the standards on golf courses because they're playing for so much money.

"They don't want to risk having bumpy greens or bad lies on fairways," Carlson says. "They don't even want bad lies in rough."

About that book ...

Michael Willard, one of Carlson's three assistant superintendents, says the course has changed dramatically for the better since he began working at the Vineyard five years ago.

"This is the best it has ever looked," he says. "It has changed 180 degrees."

People, including Carlson's peers, are surprised the course looks as good as it does. Some expect to see dirt and weeds comprising the fairways. Their eyes widen when they see green turf rolling into the horizon.

"I'm really proud of the golf course," Carlson says. "It's a culmination of hard work."

Carlson should write a book about it. With that English degree, he could. ■

PART TWO The Course And Conservation

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About This Series

Welcome to the second year of "Water Wise," our special series sponsored by Rain Bird and Aquatrols. As it was last year, our goal in this three-part series is to examine the world water crisis while educating golf course superintendents and other industry personnel on several aspects of irrigation.

Part two of the series examines the future of golf course design and renovation as it relates to water management. It also features a story written by golf course superintendent Christopher S. Gray Sr., who offers his peers the 10 things they can do *now* to conserve water on their golf courses.

Part three will examine the water situations in four U.S. regions. It will also feature results of a survey we've conducted with superintendents across the country on water issues.

Part one, titled "Irrigation Abroad," reported on golf course irrigation in other world regions, specifically Australia, the world's driest inhabited continent.

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Using Water **Intelligently** on the Course

Today, more people around the world are aware of the urgent need to use water wisely. It's true that we still have a long road ahead of us, but the efforts of many businesses, organizations and individuals have significantly heightened our society's overall level of consciousness about the importance of water conservation.

Each of us can make our own individual efforts to use less water — turning off the faucet while we brush our teeth, using more efficient appliances or installing a low-flow shower head, just to name a few. These types of choices are typically personal in nature; we may be the only ones who know we're making them. But for the people who manage the day-to-day operations of a golf course, their choices are very public ones, out there for all to see.

In the worldwide quest to conserve water, the lush, emerald-green fairways of golf courses are often easy targets for criticism. The truth of the matter is that many golf course superintendents and managers are leading the charge toward developing water-use strategies that keep courses in beautiful condition with less water than ever before. In fact, an author contributing to this installment of *Golfdom's* Water Wise Series is a prime example of a superintendent who's truly taken the challenge of using water wisely to heart — Christopher S. Gray Sr.

Gray, golf course superintendent and general manager of



Marvel Golf Club in Benton, Ky., was the recipient of Rain Bird's 2008 Intelligent Use of Water Award. Gray's efforts to find innovative ways to keep his course in top condition while using as little fresh water as possible are truly setting a new standard for other golf course managers and superintendents worldwide.

Under Gray's direction, Marvel Golf Club collects wastewater from houses in a nearby subdivision and uses it to water the golf course. The club also harvests rainwater during storm events and collects it for use in the irrigation system as well. In addition to saving water, Gray's course saves countless dollars in energy costs by not having to pump water from its ponds for irrigation purposes.

Gray has said that above all else, he considers himself a steward of the environment. He doesn't use water wisely just for the purposes of his golf course, but because he believes it's the right thing to do

— for his children's future and for the future of his community. Gray is providing an example for others to follow, and superintendents from courses across America have contacted him for suggestions on how to make their courses more water-efficient.

Gray has shown those of us who work in the golf industry how some hard work and dedication can make a huge difference. And that's what The Intelligent Use of Water is all about — each of us making choices at home, at school or at work that can have a cumulative, positive impact on our environment. As a provider of irrigation systems around the world, Rain Bird applauds Gray and others like him who have taken on this challenge, providing an inspiration for others to do the same. ■

RAIN BIRD.

The Future – Ours to Influence

BY DEMIE MOORE

The future. What it will look like is impossible to tell because it depends so much on what happens between now and then, including what we do as individuals and as groups. The good news in this is while there are some things about the future that won't change and many factors affecting it that we can't control, we can still influence the future by our actions here in the present.

This applies as much to water and golf as it does to anything – and can be seen as both sobering and inspiring. There are some things that are not likely to change, at least in our futures.

For example, more people and improved standards of living will mean increased demand for limited supplies of fresh water and more policies regulating water use. Another example is continued rising costs for water, energy, labor and other materials.

There are many factors we can't control – the weather being one, how others use water being another, people's perceptions and the aforementioned policies being yet other examples.

However, there are quite a few things that we as an industry – and as individual members of the industry – can influence and even control by our actions now. Here, examples also include people's



perceptions and policies, which we can influence by our actions; and how much water we need and use, which is actually something we can control to a certain degree.

The sobering facts are the golf industry will increasingly be challenged to use less water more efficiently for a variety of reasons. The inspiring aspect of this is opportunities exist to meet those challenges. And those opportunities have economic and agronomic as well as environmental value to them.

In this issue, you'll get to read about some examples of how these challenges can be met in golf course design and day-to-day golf course maintenance. What is also key for the golf industry in meeting these challenges and favorably influencing the future is collaboration among all golf-related parties around the topic of sustainable water use on golf courses.

All together, from owners and architects, to superintendents and suppliers, to researchers and educators, to golfers and the industry of the game of golf – we represent many millions of people, acres and dollars.

If we work together to find ways – through design, technologies, management practices and public engagement – to show policy makers the value of golf and how efficiently water is man-

aged, we'll be able to reduce golf's overall water use and significantly influence the future of not only water availability for golf, but golf as a whole.

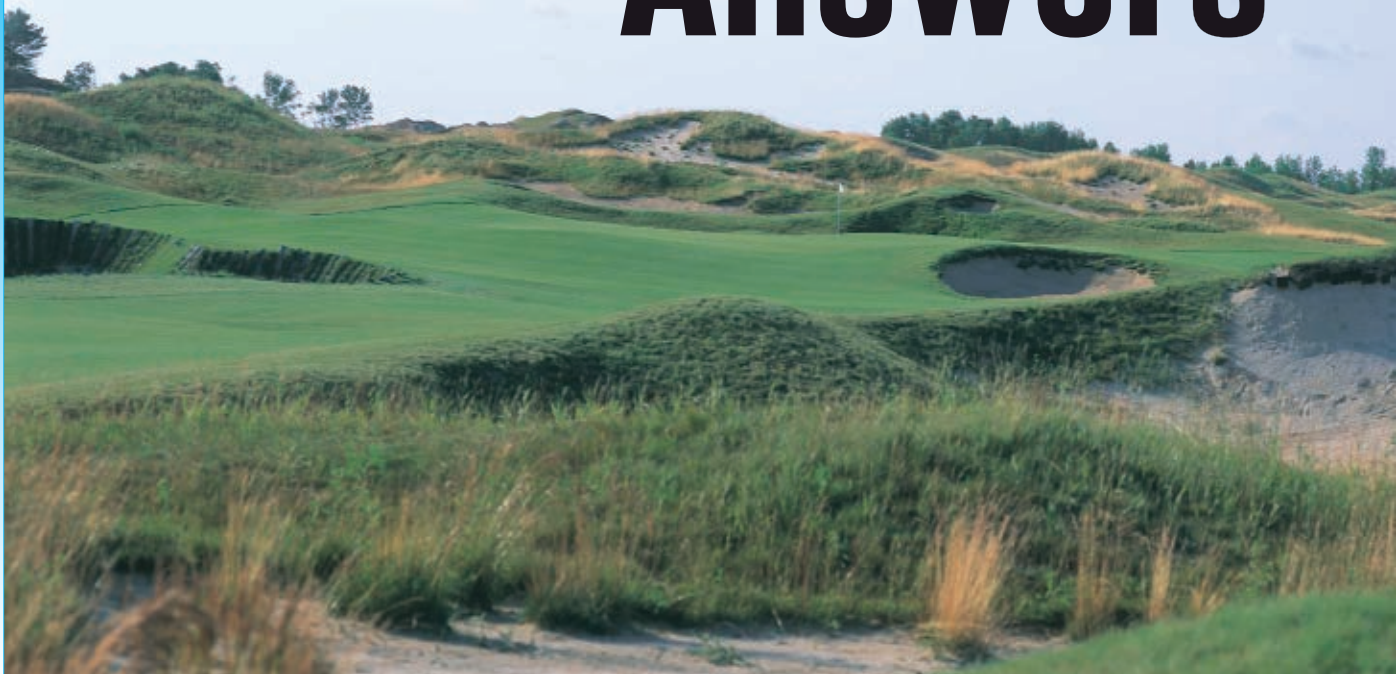
Aquatrols is proud to be part of this important process in a number of ways through research and product development on more efficient use of water in soils, and active involvement with initiatives of organizations like the Environmental Institute for Golf, Golf Environment Europe, the Irrigation Association and the Water Impact Alliance.

The future will be shaped by all of us. We look forward to working with more of you to have golf be, and be seen as, a good steward of water resources. ■

Moore is an Aquatrols Director, involved with Corporate Relations, Education and Training.



Architects Have Answers



**ENVIRONMENTALLY
MINDED GOLF COURSE
DESIGNERS KNOW HOW
TO CONSERVE WATER**

**BY ANTHONY PIOPPi,
CONTRIBUTING EDITOR**

WELL BEFORE AN IRRIGATION SYSTEM is powered up and the first head is close to popping up and turning, important decisions on how a golf course will maintain its turfgrass have been made. This dictum usually comes from the golf course's owner or members, but they don't reach the decision on their own.

Often times, it's the golf course architect who has the ear of the decision makers and is the one who can convince them that conserving water is the right road to follow, which does not diverge with the ability to create a great design.

"To me, it comes down to management expectations and that's an education process that begins early in the development process," says Michael Hurdzan of Hurdzan/Fry Environmental Golf Design in Columbus, Ohio, whose layouts include Erin Hills Golf Course in Erin, Wis., and Shelter Harbor Golf Club in Westerly, R.I.

PHOTO BY: MIKE KLEIMME



Whistling Straits (above) in Kohler, Wis., was designed by Pete Dye, regarded as the first environmentally conscious architect. Mike Hurdzan (right), taking a soil sample, says the trend is toward environmentally friendly golf courses.

PHOTO COURTESY: HURDZAN/FRY

It's then the architect can explain why grassing a layout with certain varieties is better for the environment and why irrigation heads from tree line to tree line are unnecessary.

"About every developer would like to build Augusta National Golf Club because it's the best-maintained golf course on the planet," says Hurdzan, who holds a doctorate degree in environmental plant physiology from the University of Vermont. "You can do that, but the trend is toward environmentally friendly golf courses."

Scottsdale, Ariz.-based architect John Fought has encountered the same sort of developers who equate lush and green with good.

"[It's] a little over the top," says Fought, whose designs include the Sand Hollow Golf Resort in St. George, Utah. "When I see a golf course that's perfectly manicured and green, I think, 'What's wrong?'"

The move to conserve water by irrigating smaller portions on a course

and maintaining conditions that are firm and fast is not new. Yet, developers and golfers still love green and soft, with water playing a big role in the process.

Hurdzan blames this in part on "celebrity golf pros with status," the ones who dabble in design at best but in reality merely attach their names to golf courses.

"They don't see the bigger issues," Hurdzan says, adding these golf professionals don't care or know how to push for ways to save water.

The celebrity designers are hired in an effort to have new designs noticed by the golf magazines that rank golf courses.

"They want to be rated in the top 100," Hurdzan says. "There are other ways to get in the top 100 other than the Augusta National look."

The drive to attain green and lush has sometimes reached ludicrous proportions.

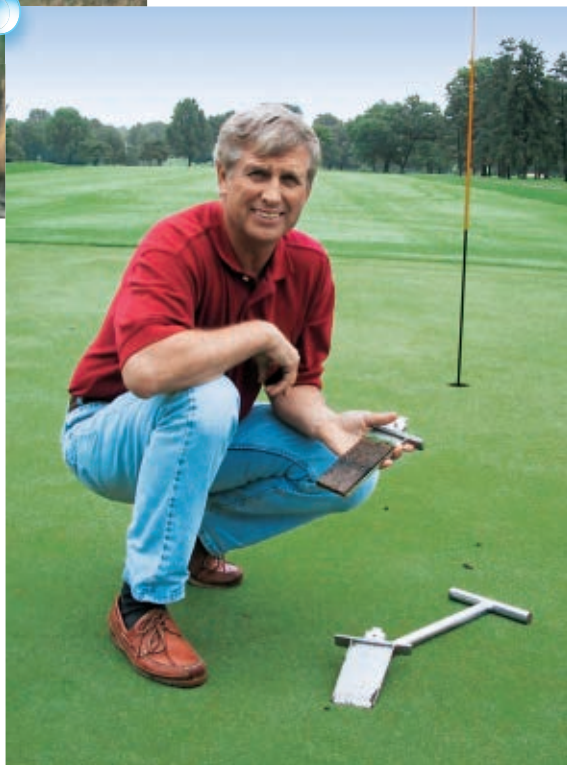
"I've had members take me into the deep rough and under a tree and ask me why the grass isn't perfect," says architect Brian Silva, whose designs include The Black Creek Club in Chattanooga, Tenn., and the Renaissance Golf Club in Haverhill, Mass.

As another example, Fought points to the trend of courses in the warmest areas of the country grassing their greens with cool-season varieties that require a ridiculous amount of water and maintenance to keep them alive. This is one opportunity for architects to enlighten clients.

"We want the owners to trust us, and we want to help educate them," Fought says. "Education is a beautiful thing."

That can mean explaining why not irrigating the entire golf course makes sense as does utilizing grasses that require less water to survive but might go slightly off color.

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Hurdzan says there can be trouble getting permits for a design requiring copious amounts of water because of water restrictions and shortages in many regions of the country. This creates a chance for an architect to enlighten a developer.

"[The architect] can manage the developer and manage his expectations," Hurdzan says.

At Naples National Golf Club, Hurdzan and partner Dana Fry produced a layout with only 50 acres of irrigated turf, implementing pine straw, native grasses and sandy waste areas. "You have to try and set obtainable goals," Hurdzan says.

Still, there are those who don't grasp the concept of firmer and faster and why turfgrass that isn't a deep emerald hue is a better playing surface.

"I get questioned on a daily basis, 'Why isn't this grass green? Why does my ball land on the green and bounce over?'" Silva says.

Fought says what's considered the "perfect" maintenance conditions are, in fact, just the opposite.

"We have to start to get people away from the idea that we have to have perfectly manicured greens all the time," says Fought, a former pro who was a two-time winner on the PGA Tour. "If it's 95 degrees every day and you don't have a little brown . . . my goodness."

Perhaps the first environmentally conscience architect is the legendary Pete Dye. Dye designed the Old Marsh Golf Club in Palm Beach Gardens, Fla., which opened in 1987, with a drainage and pump system that took all the runoff, including irrigation water, from the layout and directed it back to holding ponds.

Dye says he was not forced by regulators to recycle the water, but did it of his own volition to keep runoff out of the swamps that surround the layout.

"The Environmental Protection Agency thought it was the greatest thing since sliced bread," Dye says.

Dye continues

World-Traveling Architect Aims to Educate About Water Use

As director of design for IMG Golf Design in Cleveland, the majority of Brit Stenson's work takes place in the Far East, where water usage, quality and conservation are viewed in a much different light.

According to Stenson, because golf is so new to many of these regions, his goals are the most basic when it comes to irrigation.

"We try to do education, but more often we're solving a problem," he says. "How are we going to get it? How are we going to store it? How are we going to conserve it?"

"A lot of time, there's too much water," Stenson says. "In places like Singapore, drainage is the issue."

In other locations, there are extreme opposites. India, for example, has a well-defined, three-month monsoon season and nine months of drought. There, drainage, storage and conservation are all important facets of golf course irrigation.

In countries like the Philippines, Vietnam and Thailand, untreated water is often sent right back into streams, rivers and lakes. Stenson says golf courses could help with purification.

"One thing they should be doing is have developers build a package treatment plant," Stenson says. "The effluent water could then be used to irrigate the new courses, many that are capped with sand. It's a great way to be a final filter for treated effluent."

Stenson says he also regularly encounters owners and developers who want to landscape the courses with exotic veg-



Brit Stenson sees improved irrigation solutions overseas.

etation and an abundance of color that requires increased maintenance and lots of water, rather than having an environmentally friendly design. Stenson says he is seeing improvement in environmental endeavors, such as in northern China, where a massive reforestation project is under way. According to the United Nations Environment Program, South Korea and China lead the world's 20 largest economies in the percentage of economic stimulus money they invest in environmental projects.

Golf courses throughout the world need to look at alternate ways to acquire irrigation water, Stenson says. He points to the Ile-Aux-Cerfs Golf Course built on one of the smaller islands that make up the country of Mauritius off the southwest coast of Africa. For the Bernard Langer design, effluent water from a sugar cane plantation on another island is piped across the ocean floor to the course. "There's a lot of solutions besides putting a well in the ground and pumping it dry," Stenson says. ■

— Anthony Pioppi