
HOW
GREEN IS
GOLF?

BY JOHN BARTON

In January 1995, 81 people got together in a conference room at Pebble Beach for three days to discuss what could be done to make golf more eco-friendly. Present were representatives from all the major golfing bodies, and all the leading national and local environmental groups, too. There had never been such a meeting before. “It was really difficult getting some people to come,” recalls Paul Parker, executive vice president of the Center for Resource Management, which orchestrated the meeting. “Particularly from the golf-community side, there was a lot of suspicion about who these environmental people were, and why they kept criticizing golf. They felt that the environmentalists didn’t understand the game and had not made much of an effort to understand it. They saw these guys as the enemy.”

"We really expected an explosive atmosphere," says Ted Horton, who at the time was vice president of resource management for Pebble Beach, with responsibility for the whole property, including all the golf courses and 17 Mile Drive. "I had the job of welcoming the group on that first morning. My heart was in my throat. I thought, *We could have some real fireworks here.*"

But the attendees talked. And talked. And today, 13 years later, after five national conferences and dozens of smaller meetings and workshops, they're still talking. Improvements have been made, reports, guidebooks and educational videos have been published, and the effort—which has become known as the Golf & the Environment Initiative—has allowed the game to claim that it's cleaning up its act.

Wait, you say, hasn't golf always been green? Golf courses have trees and grass, critters; all kinds of nature and stuff, right? What's not to like? Better than a strip mall or a parking lot, surely. Yes, yes, of course. But the fact is that before the 1995 meeting, there were serious issues surrounding golf and its impact on the environment. And—despite much self-congratulatory hyperbole from the golf industry about environmental sensitivity, sustainability and stewardship, and the obligatory eco-claims of every new golf resort—there are still plenty of serious problems today. There are issues about where golf courses are built, about how they're built, and especially about how they're maintained. Golf could do more. As Parker says: "There's a terrific opportunity for golf and golf courses to demonstrate real environmental leadership. The attitude generally is, yeah, we need to do some things to avoid getting criticized. That's where the vision ends."

To find out more about these issues, and how serious they are, and what's being done about them, I interviewed a variety of the leading thinkers who reside at the intersection of golf and the environment: a golf-course architect, an anti-pesticide activist, an organic golf-course superintendent, a government regulator, a golf-course inspector, a turfgrass expert, an environmentalist. We talked about golf, where it has been and where it's headed. The conversations were long and at times contradictory, complicated and confusing. We spoke of water tables, endocrine function, genetically engineered grass. Salamanders. The American chestnut. President Bush. From the many hours of transcribed tapes, plus plenty of other conversations, visits to obscure corners of various libraries, and late-night sessions with Google, here are some of my conclusions about golf and the environment:

Golf in America will face a crisis over water.

There simply won't be enough to go around for golf courses to continue to do what they've been doing (one report says U.S. courses each use on average 300,000 gallons a day). Water is going to have to be increasingly carefully managed by everyone—some have even described it as "the new oil." By 2025, according to the United Nations Environmental Programme's 2007 report, about 1.8 billion people in the world will be living in conditions of absolute water scarcity, and two-thirds of the planet will be subject to water stress. In America, demand for water grows while global warming has meant shrinking glaciers and mountain snow levels (and thus less snowmelt to fill our streams and rivers and reservoirs), more evaporation of freshwater reserves and lower rainfall in some areas and even unexpected droughts (not to mention rising sea levels threatening some coastal courses—see page 207). There will be increasing financial and regulatory pressures on golf courses' use of water, especially in high-population desert areas where shortages are acute, such as Las Vegas, one of the fastest growing cities in America (the population has tripled to 1.7 million in the last 20 years, and by one estimate that figure might double by 2015). Recently the U.S. Geological Survey announced that demands on the aquifer beneath the Coachella Valley in California—including from 126 area golf courses—are so great that in the past nine years, large parts of the valley have sunk more than a foot.

In the short term, golf has already proved to be innovative in adapting to the challenge of conserving water. Some golf courses are using treated effluent water or wastewater instead of drinkable water, irrigating smaller areas of the property, irrigating more efficiently and with better equipment, raising mowing heights, and using new strains of grass that require dramatically less water. All of these things will continue. New courses in the desert will become rarer. The practice of overseeding fairways in the South with cool-season grasses in the winter will become harder to justify, and less common. A lot of golf courses might disappear.

The pesticides that golf courses use, and the ones that people throw on their lawns, perhaps are not as

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NEW GOLF COURSES IN THE DESERT WILL BECOME RARER. MANY COURSES MIGHT DISAPPEAR.

safe as we blithely assume them to be.

To coin a phrase, there are known knowns when it comes to pesticides, but there are also an awful lot of unknown unknowns. Even if the superintendents at every one of America's 16,000 courses are rigorous in applying pesticides sparingly and with extreme caution—and given the pressure they're often under to deliver unblemished, Augusta-like grass year-round, that's unlikely—can we be sure these chemicals aren't harmful? There are many unanswered questions. Why are various diseases like autism, asthma and all kinds of cancers on the rise? Why are Western men and women increasingly infertile? Why did my friend's girlfriend's dog get tongue cancer and die? It's not unreasonable to think that exposure to synthetic chemicals—some of whose residues are found in high concentrations as far away as the Arctic—are to blame. There's a reason that, for instance, Connecticut recently banned pesticides from all school grounds (grades K through 8), and why more than 30 states have some kind of pesticide restriction on school property. There's a reason golf-course superintendents dress like Power Rangers when they spray the golf course. There's a reason the organic movement is growing.

Environmentalism isn't going away.

As global warming increases, and common sense prevails, and the leaders of commerce and industry realize there's a buck to be made by being green-minded (or, more often, pretending to be), environmentalism is going to have large, growing and profound effects on all of our lives. What does this mean for golf? Like the fur coat and the SUV, the "Augusta look"— freakishly green wall-to-wall grass on a life-support system of too much water and toxic chemicals, greens running at virtually unplayable speeds, ornamental flowers all over the place—will become less admired, and even stigmatized. It works for the Masters, but that's just one week a year at an extremely wealthy private club that gets very little play (there are only 300 members, and the course is closed all summer). It doesn't work—and isn't desirable—at most other places. The aspiration—obsession—to be like Augusta has probably always had less to do with the needs and wants of golfers, who know that the game is all about taking the rough with the smooth, and more to do with the egos of golf-course owners, tournament directors and people who sit on greens committees.

As water becomes scarcer, as organic-management practices increase, as environmentalism and environmental legislation start to bite more than they have, as the economy struggles, and as we come to appreciate the aesthetics of golf courses in all their many natural, beautiful hues, the way the game looks will change. And the way it plays will change too, with firmer and faster turf demanding a return to shotmaking, creativity, the bump-and-run. It's starting to happen already: The hot courses are not dutiful apostles of Augusta; they are unique, wild and woolly-looking layouts like Bandon Dunes, Sand Hills, Chambers Bay. Americans increasingly love to visit the rugged, natural links of the British Isles, where the game began. That's where we're headed: back to the future.

But don't take my word for any of this stuff. Read what these guys have to say—unfortunately they are all guys—and make up your own mind. Then log onto golfdigest.com/magazine/environment and join the conversation.

THE RESIDUES OF SYNTHETIC CHEMICALS ARE FOUND IN HIGH CONCENTRATIONS AS FAR AWAY AS THE ARCTIC.

THE 'AUGUSTA LOOK' WILL INCREASINGLY BECOME LESS ADMIRED, AND EVEN STIGMATIZED.

THE SURVEY SAYS . . .

We wanted to know what America thinks about golf and the environment. After conducting attitude surveys in 1994 and 2002, in late 2007 Golf Digest did two pieces of research, one with a sample of 350 golfers, and another with a sample of 650 golfers and nongolfers. The surveys were carried out via 12-minute telephone interviews—1,000 of them in all. The highlights follow. The complete survey results can be found at golfdigest.com/magazine/environment.

? GOLF IS AN ENVIRONMENTALLY FRIENDLY/COMPATIBLE SPORT:

91%

GOLFERS AGREE

This figure has risen from 82% in a 1994 survey

66%

NONGOLFERS AGREE

THE GOLF-COURSE ARCHITECT

MIKE HURDZAN, 64, is riding a cart along the edge of the third fairway at a deserted, wintry Scioto Golf Club in Columbus, Ohio, close to the house where Jack Nicklaus grew up. "When Jack played here as a kid, in the 1950s," says Hurdzan, "the greens would have been at about a quarter of an inch; today they're a tenth of an inch. The fairways would have been three-quarters of an inch; now they're less than half an inch. Back then there would have been fewer than 10 maintenance staff; now there's more like 40." The course has been closed since July and won't open again until May, after a full-blown modernization by Hurdzan, with an assist from Jack.

Like Jack, Hurdzan went to Ohio State University. He studied turf management, then earned a master's degree in landscape architecture and a doctorate in plant physiology. Today he is one of the world's pre-eminent golf-course architects with an extraordinary and varied portfolio of golf courses to his name (see hurdzanfry.com), such as Widow's Walk, where he took an abandoned sand and gravel quarry and garbage landfill south of Boston and, working with environmentalists, transformed it into a thriving, environmentally friendly public golf course. At Scioto, and later in his nearby office—which is a shrine to his love of the game with a vast collection of books, clubs and golfing ephemera—Hurdzan spoke at length about his favorite topic: golf and the environment.

Golf Digest: What is the case against golf, environmentally speaking?
Mike Hurdzan: Opponents of golf believe it's an unnatural environment, and that we use too much water, fertilizer, pesticides and fossil fuels to maintain a plant material in an unnatural state.
How valid are those claims?
Unfortunately golf has become something of a symbol of development, so when people make the case against golf, often what they're really against is development. But maybe 60 percent of the criticism that we use too much water is probably valid—we could do with a lot less water. The criticism regarding pesticides and fertilizer is almost a nonissue now, because the amount of real contaminant that we put into the environment is really small. The fossil-fuel issue, that's still a 60-percent or 70-percent valid criticism. We're using too much energy. But golf courses sequester a lot of carbon that reduces global warming; they provide oxygen and open space and wildlife habitat. If you think a golf course is bad for the environment, ask yourself, compared to what?
What environmental hoops do you have to jump through to get a golf course built in America today?
All politics are local. And all environmental issues are local. What's important to a community on this side of the river might not be important to a community on the other side of the river. Each site has its parameters. Before we even consider a golf course we usually do a site analysis, looking at all the pluses and minuses. There are some sites, when you do the analysis, you realize that it's simply not worth the impact or cost of proceeding. Along certain seashores, for example.

The permitting process occurs at three or four levels. Usually there's a local agency that has control—sometimes it's a county or a state, sometimes it's a city. There's at least one state agency, which is generally the Department of Natural Resources, and then the federal government has two agencies that are concerned with this. One is the Environmental Protection Agency, the other is the Army Corps of Engineers. You start with the most local agency, and then when you get approvals from them it goes to the next-higher agency, and it goes through that process until everyone is satisfied up and down the line.

> 'IF YOU THINK A GOLF COURSE IS BAD FOR THE ENVIRONMENT, ASK YOURSELF, COMPARED TO WHAT?'

It must be a very time- and money-consuming process.
Fifteen years ago we could go through that process in about two to three months. Now it takes two to three years. You used to spend a matter of $10,000 or $20,000. Now it's not uncommon to spend $500,000.
With no guarantee it will be approved.
With no guarantee.
When there's local opposition, what are the typical objections?
Eight out of 10 times when I go to an environmental hearing, most of the people there are lay people who don't have a scientific background. So they're very easily swayed by someone who says we're going to put down chemicals that will poison the water and the air and your children. There's a lot of misinformation. Ninety percent of the U.S. population doesn't play golf and is easily influenced by all of the scare tactics. But when you boil it down to the hard scientific evidence, there just

is not a problem. I'll refute anybody who is not willing to accept that a golf course is a good environment if it's properly designed, constructed and maintained.

Golf can sometimes have a positive impact—on degraded land, for instance.

Very positive. Right now we're doing a little project on a landfill right at the end of the airport runway [in Columbus]. When you came in today, you flew right over it. It was an abandoned landfill. We're going to cap the landfill and put a golf facility on it. It's going to be a big driving range, a nine-hole par-3 course and a pitch-and-putt. We're building this facility on a piece of ground that couldn't have any other use for the next 40, 60, 80 years. All it would have done is to grow weeds and be a dumping ground for junk. It would have become an eyesore. Now it's going to become the central focus for the recreation of that community. We can do that also with floodplain lands that have previously been used for farming, industrial sites that have had a lot of petroleum products put onto the ground, old mines or quarries.

Do you think the pesticides used on golf courses today are safe?

I do. They've got to be properly used. It's a very fine line between a medicine and a poison—we're trying to walk that line, to treat a pesticide as a medicine to get rid of these pests that are causing us a problem, but if we abuse them, then they can be poisons. The proper use of pesticides presents no problems at all. I started as a greenkeeper in 1957, at Beacon Light, a little golf course where I grew up. My dad was a teaching pro. Back in the mid-'50s we were using cadmium, lead, arsenic, mercury; we were using all these heavy metals. We were using farm-grade fertilizers. Well, those things are gone. We didn't know any better back then. Science has showed us a better way to do things. When I went to school, Ohio State, Rachel Carson had just written *Silent Spring*, and that started me thinking.

[Note: Silent Spring, published in 1962, documented the effect of pesticides on the environment, especially birds. It was one

A CALL TO ACTION: WHAT CAN YOU DO?

Sometimes the enormity of environmental problems can induce a feeling of helplessness. We shrug and sigh and say, What possible difference can I make? Well, there are plenty of things that can be done. Even one small step in the right direction can lead to other steps that can start a stampede that can indeed change the world. "Individuals make a difference," says Friends of the Earth's Brent Blackwelder. Here's how:

Get involved at the golf course where you play. "It starts with asking questions," says the EPA's Robert Wood. Ask the owners or managers of the course if they have an environmental plan or an environmental committee. If they don't, create one. Be an activist. Find out how much pesticide and water are being used, and whether steps can be taken to reduce them. Insist that signs be posted when chemical spraying is taking place. Be a voice for protecting and extending wildlife habitats. Look into the economics of more efficient energy use and alternate sources such as solar power. "Get a little committee together at your golf course," says the USGA's James Snow. "When someone takes charge it's amazing what can happen. It affects the whole club."

Support your golf course superintendent, who too often is treated as a second-class citizen, sequestered somewhere out of sight in "the shed." These people are experts. Get to know them. Not only can they help you to understand better the environmental challenges that your golf course presents, but you can learn lessons from them that you can then apply to your own lawn, home or business.

Get online and do your homework. A good starting point is the first set of principles agreed upon by the Golf & the Environment Initiative, a booklet titled *Environmental Principles for Golf Courses in the United States*. They are fairly bland and generic but serve as a decent primer to the subject. The booklet can be downloaded from the USGA or Golf Course Superintendents of America websites (usga.org or gcsaa.org). Also check out the USGA's Green Section (usga.org/turf); the GCSAA's Environmental Institute for Golf (eifg.org); and Audubon International's "Green Golfer" pledge program (golfandenvironment.org).

Look after the golf course. Fix ball marks and replace divots. Don't litter. Keep out of environmentally sensitive areas. Use biodegradable tees.

Walk, don't ride, when you play golf—unless you have to. Says Blackwelder: "Walking is so much better for you. And if you're using a cart that is gas-powered, it's probably a two-stroke engine which is significantly polluting. We know this from other vehicles, such as a jet ski—an afternoon's jet skiing with a two-stroke engine produces the same amount of pollution as a car driven 100,000 miles."

Change your mind about what good conditioning really means. Cosmetic conditioning is largely unnecessary. Overconditioning is not the same as good conditioning. Maximum is not the same as optimum. Greens that are so fast that putts roll off them into bunkers or lakes aren't clever or cool, they're stupid. Nobody likes a bad lie, but that doesn't mean the entire property has to be intensively groomed, treated, overwatered and sprayed with toxic chemicals. Courses should be natural, not sanitized, uniform, shorn of character. If you want uniformity, go play tennis. "Conditioning is not about the color green," says course superintendent Jeff Carlson. "It's about playing surfaces."

Do the right things in your own life, beyond the golf course. "Do you have a low-maintenance lawn, for instance, with large areas for bushes and shrubs that are native?" asks Blackwelder. Adds Beyond Pesticides' Jay Feldman: "Get involved in decisions in your community, too, its schools, public parks, public buildings. Identify the local decision-making bodies and go talk to them." Put pressure on politicians. Consider your contribution to global warming: Try some of the carbon calculators online (go to a search engine and type in "carbon calculator"). Recycle. Eat locally grown food. Walk, don't drive. Video conference, don't fly. Buy energy-efficient appliances and eco-friendly consumer products. Biodegradable diapers for the kids. Insulate your home. Turn off the lights. Plant a tree. Consume less. **J.B.**

? PESTICIDES USED ON GOLF COURSES CAN BE A HEALTH HAZARD:

40%

GOLFERS AGREE

66%

NONGOLFERS AGREE

of the most powerful books of the 20th century and is widely credited with kick-starting the environmental movement in America.] And then I went to the University of Vermont, which was even more environmentally oriented. So when I started in golf architecture in the early '70s, I was like, why don't we try to do this in a more eco-friendly way? And honestly, no one cared until the 1990s. It was the environmentalists in the 1990s who really woke us up and said, come on, guys, you've got to do better. So we started to do it better. They deserve a lot of credit.

There's a great shortage of clean water, worldwide. There are droughts in Australia, Spain and here in the United States in Georgia, South Florida, Alabama, the Southwest. How do you reconcile that with the massive amounts of water golf courses use for irrigation?

Back in the '50s we had much less sophisticated irrigation. Then in the '70s and '80s we started putting automatic irrigation systems in, which had the capacity to deliver a lot of water, and so we really started to overwater and waste water. What's happened now is that the technology in irrigation has improved. We can irrigate a bigger area with less water. At Scioto, we have sensors in the soil that measure the moisture, temperature and salinity at the four-inch level and the eight-inch level. That information feeds back to a computer, and at any given time the superintendent can pull up those readings and base his irrigation on them rather than simply guessing. It's important to choose a grass that's well-adapted to that site. There are new, high-tech grasses that require less water. We can use treated gray water or effluent water that isn't fit for human consumption, rather than freshwater. But probably less than 20 percent of the golf courses in the United States are doing that. There's a lot of room for improvement. We need to find ways to more judiciously use our water, to do more with less. We don't need to maintain all of the golf course to the same extent. We need to change the perception that golf must be played on green grass. When that grass goes brown it's not dead, it's dormant. It's a natural cycle—there are times of the year when the grass is going to be green, and other times when it's going to be brown, and if we allow that to happen, we won't need to use as much water. If there's some brown grass, it's not so bad; it's still a fun game. Nowhere does it say in the rules that golf has to be played on green grass.

What about the practice of overseeding in winter in the South? Is it necessary?

No. That's a prime example of changing golfers' attitudes. If people went to play golf in the South in the winter and found dormant Bermuda or zoysia or paspalum instead of green grass, it's a perfectly good playing surface. You need to irrigate the greens, yes, but that's a small amount of water. So I think overseeding is going away.

You do?

Oh, yeah, absolutely. It's costly, it's time-consuming and it uses too many resources. We're seeing it happen.

There's no argument that dormant grass that gets a lot of traffic could be damaged or killed?

No. It's dormant. It'll heal. And dormant grass that is not overseeded

GOLF DIGEST CHANGES ITS VIEW ON CONDITIONING

Experts tell us a smart first step for any golf course is to cut back on water usage. Drier turf is usually healthier, less susceptible to diseases and provides more roll to tee shots and smoother surfaces for putting. Less water means lower electric bills for high-volume pumps and less fuel for mowers used less often. Granted, the shade of turfgrass might be less intense.

To do our part, at the urging of some members of the American Society of Golf Course Architects, Golf Digest has redefined the Conditioning category used in our various course rankings.

The old definition asked panelists, "How would you rate the playing quality of tees, fairways and greens when you last played the course?" The new definition reads, "How fast, firm and rolling were the fairways, and how firm yet receptive were the greens on the date you played the course?"

This definition has nothing to do with the color of the grass or the perfection of a lie. It rewards courses that water less (but sensibly) and makes it easy for panelists to evaluate conditions on the basis of golf shots. It takes into account all types of turfgrasses. Non-overseeded Bermuda fairways will be more firm and rolling than overseeded Bermuda, for example, and lean, off-green bent-grass fairways offer much more roll than saturated bent.

Clearly, we don't look kindly on greens that are thatchy or squishy, but we're not in favor of concrete-hard greens. They must be firm yet still receptive to earn high points.

What about situations of inclement weather? Because the first rule of good golf architecture is drainage, drainage, drainage, this definition rewards that. Courses whose fairways and greens don't easily drain after a normal rain (or after routine irrigation) deserve lower conditioning scores than courses with excellent drainage.

Great conditioning is not striped mowing patterns in the rough or uniform lies in bunkers. That's overindulgent cosmetics. We think every club would benefit by adopting our definition as a standard for course conditioning. **THE EDITORS**

will come back to life in the spring faster than grass that has been overseeded—overseeding retards the re-establishment of the natural grasses.

A lot of course owners in places like Las Vegas would say that if they didn't overseed, their revenue would take a massive nose dive.

I concur that that's what most operators would say. If you asked golfers 20 years ago if they would consider playing on a golf course that's not all green, they would probably have said no. But if you asked golfers today, and explained that it's saving millions of gallons of water, they'd probably say, "Yeah, I would do that." They'd say, "Well, you know it might not be as green as I'd like, but it's good enough, and the game is still fun, and we saved all that water." You know, I've heard sociologists talk about the effect the color green has on people. Some say that we're just hardwired to appreciate green, back to the days of the savanna when we were learning to walk on two legs. But I think that the American golfer is becoming more sophisticated and recognizing that golf on firm, fast playing conditions is probably more enjoyable than playing on lush, green conditions. It becomes a much more cerebral game—it isn't just yard darts where you hit it out there and the ball stops. Now you have to land the ball and think, *OK, the ball's going to release and run 30 yards; where do I want the ball to land?*

So you think golfers' tastes are changing a little bit and getting away from the Augusta look?

I definitely think that. The USGA, for example, has taken such an interest in Erin Hills, a fescue course with bentgrass greens that will have the playing conditions that you find in Great Britain. *[Note: It was designed by the Hurdzan-Dana Fry partnership and Golf Digest's Ron Whitten.]* Previously USGA events were always played on very highly manicured courses. Now they're more inclined to go to a Shinnecock or a Newport or an Erin Hills, because they recognize that golf in those kinds of conditions is a better brand of golf. I think that's helping to shift the emphasis. When we gussy up a course too much, we lose some of its natural beauty. Take the natural beauty of a lovely Irish lass, for instance—if she puts too much makeup and jewelry on, some of the real beauty is masked. When we make a golf course all one continuous sea of green, we lose some of that natural variety. The best photographs of golf courses always have lots of changes in color and texture and elevation; those are the things that make courses visually interesting. When we water them and mow them and make them verdant green all over, they lose that texture.

What about the practice of painting the dormant turf green instead of overseeding?

It's an old technique that's coming back. It's a very good practice, very intelligent. You use a dye that goes down into the leaf structure of the plant itself. Sometimes you have to apply it twice or three times over the winter, but it's relatively inexpensive, and the impact is minimal.

Any other innovations?

We're going to keep developing better grasses that require less water, pesticide, fertilizer; that's the trend. Seashore paspalum is the biggest miracle in the last 10 or 15 years. You can irrigate it with seawater, and it will do perfectly well in some climates. People are going to figure out how to take this grass and start to grow it farther and farther north, so pretty soon we might have paspalum growing in Maine. We've really just begun with this stuff. We're going to develop better non-synthetic pesticides that have a more natural base. We're going to see all sorts of other technological innovations. GPS-controlled mowers, for instance, so golf courses can be mowed at night, without an operator. There are going to be a lot of changes.

You've said that you hope to see American golf courses achieve the same lack of environmental impact as they had in 1920. What was the impact in those days, and is it possible to go back to that?

Yes, it is possible. We had very few or no synthetic chemicals back then. The golfers' perception of the golf courses was much different. I think we can achieve the same playing conditions we have now but with the environmental impact of the 1920s, and we'll do it with technology. Let's say that golf in Old Tom Morris' day was about as natural as could possibly be. There was no environmental impact. So we'll give that a score of 100 out of 100. In the 1920s it might have been at 80. In the 1950s and the 1960s, it might have been at about the 40 level. Now we're heading back up again. We're at the 70 or 75 level now, and I think we'll get back up to that 80 or 90.

'IT WAS THE ENVIRONMENTALISTS IN THE 1990S WHO REALLY WOKE US UP AND SAID, COME ON GUYS, YOU'VE GOT TO DO BETTER.'

? GOLF COURSES SHOULD USE ONLY ENOUGH WATER TO KEEP THE GRASS ALIVE, NOT MAKE IT LUSH AND GREEN:

44%
GOLFERS AGREE

56%
NONGOLFERS AGREE

THE ACTIVIST

JAY FELDMAN, 54, is a co-founder and the director of Beyond Pesticides (beyondpesticides.org), a nonprofit membership organization started in 1981 that "works with allies in protecting public health and the environment to lead the transition to a world free of toxic pesticides." Feldman has been involved in the Golf & the Environment Initiative from the beginning, attending that first meeting at Pebble Beach and every summit since then. I interviewed him in his office in Washington, D.C., a few blocks southeast of the U.S. Capitol. We drank bottled water. Feldman never drinks water from the tap.

Golf Digest: Would you say that golf-course pesticide use in the United States today is not safe?

Jay Feldman: I would say that, yes.

What in simple terms are the dangers?

Pesticides pose health risks, both acute and chronic, from common coldlike symptoms, nausea, dizziness, headaches, rashes, to birth defects, learning disabilities, infertility, leukemia, various cancers including brain cancer, breast cancer, non-Hodgkin's lymphoma. Asthma rates in the U.S. have skyrocketed, and there are studies linking asthma to pesticides that are widely used on golf courses. In all cases there are studies that link pesticides to these effects.

And these things can happen to golfers who are exposed directly and to people who live near golf courses?

Right. Through runoff and airborne drift. The problem is, when you spray pesticides, they tend to move off the target site. The U.S. Geological Survey put out a report in 2006 that looked at waters and streams and lakes in the U.S. and found pesticides everywhere they looked. The typical response you get from superintendents is that they're using registered pesticide products, they're using them in compliance with the label, their pesticide applicators are trained and certified, so what's the problem? But there are clear deficiencies in the regulatory process in evaluating the full body of health outcomes that we're concerned about. Endocrine disruption, for instance. We ought to have information on the impact of pesticides on the endocrine system, and yet we don't in the U.S.

What are the consequences of endocrine disruption?

It changes the hormonal balance in the body and can affect disease outcomes later in life, it can affect development, it can affect a range of organ development, developmental systems that have an impact on illness, cancer, reproductive effects, developmental effects, sexual development.

And that's not tested for?

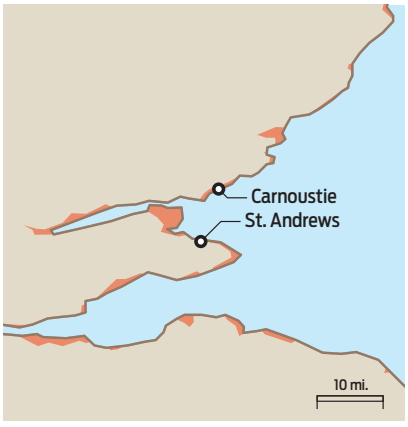
Not tested for. The next generation of chemicals defy classical toxicological models, which say that the dose makes the poison. You'll hear golf-course superintendents say, "We're using such minuscule amounts of these chemicals." But endocrine disruption can happen at really low exposures. We don't even have the testing protocol to assess this low dose. *[Note: For more on endocrine disruption, try the chilling, classic book, Our Stolen Future—details at ourstolenfuture.org.]* With pesticides, we're not just dealing with what we do know, but also what we don't know. The risk-assessment protocol is filled with wrong assumptions. One example is the story of chlorpyrifos, whose trade name is Dursban, which was banned from household use in 2000 because of neurological effects. It had been widely used for insect control indoors and outdoors. But it's still used in golf. And when you as an individual look at the EPA's risk assessment, you might say, "Well, I don't fit in with their assumptions because I golf a lot," for example, or "I'm a kid who plays golf." In its Dursban risk assessment, the EPA assumes that children do not play golf.

Really?

It's written right into the risk assessment. It defies logic, and it defies reality. Risk assessment is filled with these assumptions that are just inaccurate and incomplete. It wasn't until the 1996 Food Quality Protection Act that EPA was required to look at exposure to pesticides in combination. Dursban, for instance, has food uses, in agriculture, and non-food uses such as on golf courses, so you have dietary and nondietary exposure. Prior to the adoption of this act, believe it or not, the agency did not add up exposures from different sources. So if a kid was drinking a lot of juice, say, which kids do, and playing a lot of golf, at the end of the day that kid is getting a high toxic load. So OK, now we're adding up exposures to a chemical, but we're still not looking at the synergistic effects of different chemicals in combination. And we know that combinations of chemicals can cause greater risk. We know, for instance, that if you're taking Tagamet, and you're exposed to an organophosphate pesticide, the potency of that organophosphate is going to be higher. And the same thing happens between certain pesticides. And the EPA knows this. We also know that pesticides can break down to other toxic components, and the EPA doesn't evaluate those breakdown products. There are huge, unanswered questions. The bottom line is, the EPA should be the biggest proponent of the precautionary principle. They should be saying, "We're doing the best we can with the resources we have, but there are a lot of deficiencies in our process."

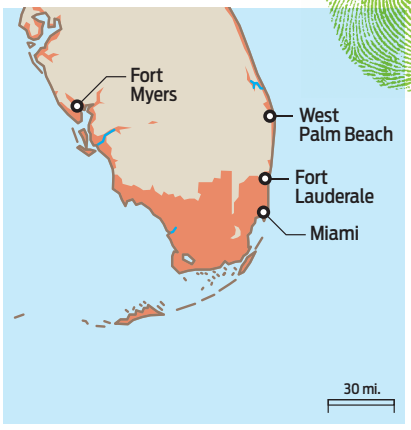
The Golf Course Superintendents Association of America website (gcsaa.org) says that pesticides are safe when used correctly, and that on average there are 120 studies at a $50 million cost before approval for a pesticide is granted by the EPA.

SCOTLAND



SOUTH CAROLINA

FLORIDA



MAP SOURCE: WEISS AND OVERPECK/UNIVERSITY OF ARIZONA

That's an outdated statement, and it wasn't even correct at the time it was made. I think the golf-course superintendents feel at some risk—they're the ones delivering the toxic chemical to the site and are therefore at risk of litigation. They're saying, "Look, we're doing what's legal; we can't be subject to litigation here." Well, there's a Supreme Court case from 2005 called Bates v. Dow, where a bunch of peanut growers in Texas sued Dow Chemical for crop failure. Dow maintained that the farmers were pre-empted by federal and state law that registered pesticides as acceptable. The Supreme Court basically said to Dow Chemical, "Sorry, guys, you don't have protection from the federal regulatory system in the U.S." There's nothing in the world that should preclude litigation against the users or manufacturers of pesticides, because we know full well that the regulatory system can be deficient in so many ways.

So could you ever imagine a golfer developing, say, cancer, and suing the GCSAA, or the golf course where he or she plays?

Oh, yeah, I think any corporate entity is opening itself up to liability when it uses these chemicals. We're exposed from a lot of different sources, however, so it would be difficult to prove. But yes, I think there will be cases in the future. The Bates decision really opens up the liability issue. *[Note: Feldman goes on to detail the case of Liza Prior's action against a pesticide manufacturer. Her husband, 30-year-old Naval Flight*

GLOBAL WARMING: OUR COAST IS UNDER ATTACK

There are more than a thousand golf courses in the United States that can be considered "coastal." More than half of them could be gone by the end of this century because of global warming.

Research that Golf Digest commissioned from the Longitudes Group, which provides geographical research focused on recreational activities, suggests that of the 1,168 coastal courses less than two meters above sea level, 645 would in part or in total be submerged if sea levels were to rise in the next century. Courses like those at Kiawah Island Golf Resort in South Carolina, the TPC Sawgrass Stadium Course in Florida and Newport Country Club in Rhode Island all could be severely affected by a sea-level rise of two meters.

Though the conservative projection from the Intergovernmental Panel on Climate Change predicts about a half-meter rise in sea level before the turn of the century, this is a generalization. Others have suggested more alarming projections. A National Science Foundation-funded study two years ago predicted that if warming continues at its current pace, a six-meter rise in sea level by 2100 is possible. That kind of impact would eliminate the bottom third of Florida, and very likely would submerge much of the golf course property in coastal New Jersey, Maryland, Virginia and the Carolinas. (Of course, if that happens, there'll be much bigger issues than golf.)

"What happens is what we call inundation," says Robert Corell, global-change director at the H. John Heinz III Center for Science, Economics and the Environment in Washington, D.C. Inundation is the idea that low-lying areas will suffer much greater damage because of soft-soil erosion. "If you draw a line from Miami straight west, everything south of there is basically gone with one meter of sea-level rise," says Corell. "And a third to half of that is caused by this inundation where the storms come along and basically erode and erode. It's because the hard place that used to protect the land is gone."

The areas in orange above show land that would be affected by a sea-level rise of two meters.

It might be happening already. The Links Course at Wild Dunes in Isle of Palms, S.C., lost more than half of its 18th hole last fall. The one-time 501-yard par 5 is now a 190-yard par 3. Wild Dunes' 18th fell victim to high tides, higher winds and tropical storms.

Some scientists believe the warming of the Earth means an increase in the intensity of the kinds of storms that can damage shorelines.

"I call climate change the cathedral problem," says Corell. "It took almost 200 years to build Notre Dame, and it's going to take that kind of time scale for all of us on Planet Earth to get our heads together and figure out how we're going to slow down the warming of our planet." **MIKE STACHURA**

Want to know if your course is in jeopardy? A complete list and our study is online at golfdigest.com/magazine/environment. There's also a link to a National Science Foundation interactive map.

? GOLFERS SHOULD BE WILLING TO PLAY ON BROWN GRASS DURING PERIODS OF LOW RAINFALL:

74%

GOLFERS AGREE

69%

NONGOLFERS AGREE

Officer Lt. George Prior, played golf for three straight days in August 1982, developed flu-like symptoms soon afterward, then suffered a nightmarish rash across his body that essentially stripped away his skin. He suffered kidney failure and, after two weeks of intense pain, slipped into a coma and died. The case was settled out of court.]

I don't want to blame the GCSAA. But one of the problems we've had with them is in fully disclosing that they take money from the chemical companies. The chemical companies always have their hand in the trade associations. So there tends to be this alliance. They walk together in lock step. And because of this, it becomes a pro-pesticide industry. It's because of the money, the flow of funds. Ask them how much money they get from the chemical companies. It's an eye-opener to golfers who just assume that they're representing the interests of golf.

Follow the money?

Follow the money.

[Note: The GCSAA, which partners with Golf Digest in the annual Environmental Leaders in Golf awards program, was given the opportunity to respond to Feldman's comments. Greg Lyman, GCSAA director of environmental programs, provided the following statement: "According to a study by University of Florida researchers regarding exposure, they concluded that when used according to the label directions, pesticides approved for use on golf-course turf are believed to NOT post a real health risk to either the workers who apply the chemicals or to others who may come into contact with the chemicals after application, including golfers. One of those Florida researchers, Dr. Chris Borgert, a toxicologist, said, 'Exposure to chemicals on the golf course under normal circumstances is certainly not something I would worry about.'

"GCSAA has never shied away from communicating its relationship with industry partners who produce golf-course-management products. These companies provide funds that help enable us to deliver programs and services to our members and the golf industry. Many of these programs are focused on environmental management. It behooves us to work cooperatively with these manufacturers so that we can gather and distribute reliable and accurate information to our members. We believe we have a healthy and appropriate relationship that does not impact the impartiality or objectivity of our efforts to distribute accurate information about pesticides to our members.

"GCSAA, through its philanthropic arm, The Environmental Institute for Golf, is focused on ensuring golf's compatibility with the environment. Whether it is through funding scientific research, delivering environmentally based education, communicating best-management practices, conducting environmental studies or developing environmentally directed programs and services, the association is a leader in the golf industry. In addition, GCSAA has developed strong relationships with state and federal environmental agencies to ensure that golf courses are operated as community assets, especially from an environmental perspective."]

But golfers want to play courses in good condition. What alternatives do superintendents have to pesticides? What should they be doing?

The easy answer is, organic practices. Organic is still evolving in terms of lawns and landscapes. In agriculture, it's far ahead. The growth of the organic agricultural sector in the last 10 years has been phenomenal. You're looking at a $20 billion-plus industry, and we could see the same transition in non-agricultural land management such as home lawn and garden and golf-course management.

Pesticides have come a long way, however.

Chemicals on the surface have gotten less toxic as a general rule. We've gone to fewer bioaccumulative materials. When pesticides were first introduced, the presumption was that there would be no secondary effects. The theory was that we could eliminate pests, increase food production, fight diseases, and that after they had performed their positive function the pesticides would dissipate and degrade in the environment. But these assumptions proved false. It became obvious that the chemicals could bioaccumulate. They showed up in the food supply, they can be responsible for long-term chronic disease, they impact endangered species, and so on. The chemicals were not tested for these effects prior to their marketing. And that's been the pattern ever since. Every time a new chemical is introduced, we say, "Oh my God, we're finding residues of this stuff in the environment; it's showing up in mothers' milk—we didn't expect that." And then we move on to the next

'THERE'S NOTHING IN THE WORLD THAT SHOULD PRECLUDE LITIGATION AGAINST THE USERS OR MANUFACTURERS OF PESTICIDES.'

chemical family. So the heavy metals were replaced by the organochlorines, which were replaced by the organophosphates, and every time the same claim is made: These are even better, they won't show up anywhere, they don't bioaccumulate in the environment. But lo and behold, these chemicals are showing up in water. All the assumptions once again turn out not to be true. We're constantly playing catch-up. So here we are now in this realm of having newer and newer chemicals, and as new studies come out, we realize that we've introduced new levels of danger, new complexities, and a whole host of effects that the EPA isn't even looking for.

If you don't know what the danger is, you can't test for it before you approve it.

Right.

You have no confidence in the EPA's regulation of pesticide use?

None at all. You can go to the Government Accountability Office website (gao.gov) and type in "pesticides," and you can see the history of the failure of the EPA. It's all very well documented. Their program is poorly thought through, and it's also politicized. The agency might be told, for instance, "We need an outcome that allows Dursban to be used on golf courses, so work backward from that." Even William Ruckelshaus, the first head of the EPA, said risk assessment is like a captured spy: You can get it to say whatever you want it to say.

Has it become worse under the current administration?

Yes. The EPA could use its discretion to improve protection, but at every turn, under this administration, it has used its discretion to implement the minimum amount of protection.

Why is that?

Because there's tremendous pressure from chemical companies to maintain the registrations of these products. It's a very costly proposition to develop these chemicals. After a company has invested in the development of a product, it's going to invest a tremendous amount of money in lobbying for the allowance of that product. A while back we tracked the number of former EPA officials now working for the industry and its consulting firms in this town, and it's fascinating. If you look at any chemical that's being used on a golf course, and you look back to see who's lobbying that chemical for its registration and its re-registration, you'll find it's some former EPA official. It's so lucrative—it's like the brain drain where people leave Third World countries to go to work in the West. The EPA's pesticide program is like a Third World country. They all jump to the chemical companies. And when a chemical company sits across the table from the EPA, it's a body of knowledge that so far surpasses what is known within the agency that there is a fear on the part of the agency that it will be sued and will be incapable of defending itself against a lawsuit. So there's a tremendous avoidance behavior going on here, and in so doing the agency is compromising public health and safety. It's a horrible phenomenon. It's just set up for failure.

[Note: Debra Edwards, Ph.D., director of the EPA's Office of Pesticide Programs, wrote in an e-mail to say that after reading Feldman's comments, she was "dismayed to find so many inaccuracies and misleading statements." She provided a lengthy rebuttal to his various criticisms, which can be found in the online version of this article at golfdigest.com/magazine/environment.]

If the status quo is as dire as you portray it, how will things change?

What we're seeing now, what's driving decision-making, is public concern. People are concerned about the environment, public health, global warming. They're saying, "Look, we don't want just strict compliance with the law. We want to go beyond that." And that's what they're doing with their homes and their lawns, that's what's happening in school buildings and playing fields where their children are going to school. People are going down to their golf course and saying, "Hey, what are we doing here?" If we're asking golf-course superintendents to drive this process in golf, we're putting them in an unfair position. I find a lot of golf-course superintendents are extremely receptive to these issues and want to be creative in solving these problems and want to adopt better practices. But if the greens committee is putting a lot of pressure on the superintendent to create an Augusta-like look, what's he going to do? He's an employee. His job is always on the line. Until we get the golfers themselves to engage on this issue, we cannot expect the right thing to happen. We have to start talking about this. We have to start realizing what the trade-offs are. Do people want to eliminate this unknown hazard, for their health, their kids, their family,

'DO PEOPLE WANT TO ELIMINATE THIS UNKNOWN HAZARD, FOR THEIR HEALTH, THEIR KIDS . . . THEIR COMMUNITY? THE ANSWER IS YES.'

? GOVERNMENT REGULATION IS A NECESSARY APPROACH IN ADDRESSING ENVIRONMENTAL ISSUES:

68%
GOLFERS AGREE

71%
NONGOLFERS AGREE

their community? The answer is yes. The general organic movement is very large and growing, and it's going to be more and more consumer-driven. The marketplace is shifting so much more quickly than the regulatory side. This is where the optimism comes in.

THE GOLF-COURSE SUPERINTENDENT

On a bright, sharp December day, I am standing with **JEFF CARLSON**, 59, on the 17th green at the Vineyard Golf Club on Martha's Vineyard, Mass. The six-year-old course, designed by British architects Donald Steel and Tom Mackenzie, is absolutely gorgeous, a natural, fast-running, heathland layout that looks like the handiwork of Donald Ross, or possibly Old Tom Morris. What is truly remarkable about it, however, is that it's America's only truly organic golf course. By decree from the Martha's Vineyard County Commission, no pesticides or synthetic chemical treatments are allowed. (Visitors, in fact, must have their golf shoes cleansed before a round to ensure that no weeds are tracked onto the course.) Carlson, the superintendent, is the man who has to make that work. "Our mantra is, 'We strive for excellent playability,' " he says as we inspect the putting surface. "But that doesn't necessarily mean visual perfection." The rolling 17th green, by the way, looks perfect.

Before joining the Vineyard, Carlson worked with Mike Hurdzan in building and managing Widow's Walk *(see "The golf-course architect").* He was a recipient of a 2003 GCSAA/Golf Digest Environmental Leaders in Golf Award and is the 2008 winner of the President's Award for Environmental Stewardship from the Golf Course Superintendents Association of America. During a tour of the course, in the clubhouse afterward, and over lunch at the restaurant inside the tiny Martha's Vineyard airport, Carlson explained how he does it.

? IS GLOBAL WARMING A THREAT, OR A MYTH?

59%
THREAT / GOLFERS AGREE

41%
MYTH / GOLFERS AGREE

73%
THREAT / NONGOLFERS AGREE

27%
MYTH / NONGOLFERS AGREE

(Note: Women are much more likely to take the threat of global warming seriously than men—the golf population is 85 percent male whereas the nongolf population is roughly 50-50.)

Golf Digest: So what's the story of the Vineyard Golf Club—what was the local opposition, and how was it overcome?
Jeff Carlson: It was very controversial to build a new golf course here. It was the first new one on the island for 30 years. The opposition was very strong, and it was for primarily environmental reasons. Water quality is the big issue here. There's a single-source aquifer for the whole island. They felt that any pesticides would poison the water.
Was that a legitimate concern?
You know, it's very hard with pesticides to say it isn't. It's like trying to prove a negative. It's a difficult thing to say. Pesticides have chemicals in them, and if the chemicals get into the water in certain concentrations, they can cause problems. Do they? No. They haven't been shown to do that. Golf-course superintendents use very small amounts of pesticides. So generally, properly used, it's virtually impossible to affect the groundwater, but "virtually" is not a 100-percent guarantee. And that's where the opponents were coming from. We had trouble with that argument because we could never say categorically that a pesticide would never get in the groundwater in quantities that would cause a problem. We couldn't absolutely guarantee that, so they didn't want it. Period. There wasn't going to be a lot of discussion about it. The opposition was so strong that they even wrote folk songs in opposition to the golf course. Even more outrageous, they were allowed to sing them to the kids in the schools on the island.
Have you heard the songs?
No, I haven't. I would give anything to hear a recording of them. But they were basically, you know, "The new Vineyard Golf Club is going to ruin the world." The opposition was very

strong, emotional and passionate. Someone told us that we were deader than a snake in a wagon-wheel rut.

The course was eventually given the go-ahead by the Martha's Vineyard County Commission, but only with several stringent conditions.

Right. One of the biggest reasons that we were successful was that this land was permitted to be a 148-lot subdivision. And I think they just weighed the two things—148 houses and all that that brings and demands of the town, versus a 100-percent organic golf course. There was a condition that we had to have 125 low-cost memberships for islanders. We have our local high school golf team play here. We do charity events. We support the community. The golf club has done a lot to overcome the fears that this was going to be a very cloistered, private, stay-away place. It's very inclusive. And Martha's Vineyard is a very inclusive kind of place. *[Note: Vineyard Golf Club is private. The initiation fee for the club's 290 members is $350,000 with annual dues of $12,000; the additional 125 island members pay just $400 a year.]*

How do you define an organic course?

We need to get a set of guidelines and criteria for what organic golf really means, and we're working on it, but basically it means no pesticides or fertilizers or other products can be used whose active ingredient was synthetically produced.

Did you have doubts that it could be done?

When the decision was made, I remember having a meeting with the owners, and I said, "You know, nobody does this, organically, without pesticides. And I don't want to lead you astray." And they were like, "Oh, that's OK, we know you can do it." And I said, "No, you've got to understand what I'm saying here: Nobody does it this way." But they would not be swayed. To be honest, I was worried that I was setting myself up to fail. I had my doubts.

What do you have to do to keep the turf in such good condition?

For me it's been a lot of trial and error and a lot of experimentation. I decided I was going to limit the number of people I was going to listen to, because I found out very rapidly there are an awful lot of people who want to sell you their magic potion. All the products are new. And there's a lot of stuff that hasn't hit the market, because the demand isn't there yet. For instance, we have a white grub here, an oriental beetle that gives us a lot of trouble. There are nematodes—almost microscopic worms—that are very effective against the white grub. They attack them from the inside and kill them. But not that many people are relying on nematode applications to control white grubs—most would just use a synthetic insecticide. So we get products at really early stages; we beg for stuff to use on a trial basis, a lot of times before it's been released.

I imagined you were boiling up some big organic-compost soup to put on the golf course, but you're buying products. Are they made by the same people who make the traditional pesticides?

Yes. Everybody seems to be moving in that direction. Since 2002, when we opened, the number of products available has greatly increased. There's a lot of movement toward lower use of pesticides. I think the chemical companies are just looking ahead.

What else do you have to do?

The products are a big part of it. The second part is cultural practices. For fungal diseases, for example, the big issue is leaf wetness. I do whatever I can to minimize the duration of leaf wetness. We don't use that much irrigation. We use wetting agents to remove dew, sand top-dressing on greens; we whip greens and fairways [whisking away dew]. And the third piece of the puzzle, as important as the other two, is communication, working with our members and explaining this idea of great playability versus visual perfection. We take the focus away from having every piece of fairway and rough perfectly green. The members have to be on board, or the superintendent wouldn't last too long.

Have the members been positive, or have there been some grumblings?

Oh, you have grumblings. That comes with the territory. But that's where the communication comes in. Generally speaking, the club is hugely supportive. I give these people a lot of credit.

What is your biggest challenge?

It's evolved over six years. When I started, it was the fungus diseases that were the most problematic. With our cultural practices and the organic fungicides that we use, the disease severity is a lot less than it was. We also think—not proven, totally anecdotal—that there's some natural selection going on. We think the grasses are beginning to adapt. It's survival of the fittest—disease-resistant grasses occurring naturally. We've seen some areas over the years that have got really hit hard with dollar-spot fungus one year, then in subsequent years we don't see it at all. We've seen it even in greens. Kind of interesting.

By not spraying with traditional synthetic fungicides, you're saying that perhaps you're allowing the grass the chance to heal itself. An analogy would be using penicillin constantly and compromising your body's natural immune system.

It's an interesting thought. Ten years ago or so I remember hearing a story about some bent-grass research plots where they were testing for various fungal diseases and different fungicides. Then the research ended, and they closed the field down and just let the plots go. They didn't do anything to them for a year. And when they came back, all the plots where they had been spraying fungicides had dollar spot all over them like you can't

'THE OPPOSITION WAS VERY STRONG. . . . SOMEONE TOLD US THAT WE WERE DEADER THAN A SNAKE IN A WAGON-WHEEL RUT.'

? WILLINGNESS TO PLAY GOLF UNDER LESS-MANICURED CONDITIONS TO MINIMIZE THE USE OF PESTICIDES ON THE COURSE:

64%

GOLFERS AGREE

believe. But there was a control plot that during the research they didn't do anything to. And when they came back, the control plot was fine.

The ramifications of that would be huge.

Yes, they would.

OK, so you have grubs like the oriental beetle, you have fungal diseases like dollar spot. What else?

And then you have weeds. Weeds are a problem. Weeds are tough. Today, there is not a lot of organic product out there that can kill plants. An organic selective herbicide that really works, I haven't come across. We're using one product that's developed out of New Zealand called Waipuna. It's an environmentally friendly way to kill plants. It's a machine that heats water to 5 degrees below boiling point and then adds a wetting agent to create a foam. You put this hot foam out on the weed with a machine that looks like a carpet cleaner. The foam holds the heat longer, and the heat kills the plant. It's time-consuming, it's labor-intensive, but it works. It kills a pretty high percentage of the weeds on first application, in excess of 75 percent. The benefit of it is that an hour after you've put it down, you can overseed, which you can't do with herbicides. We'll have grass in there within five to seven days. The only other way we handle weeds is to hand-pick them, which is very time-consuming.

How much easier would it make your life if you could use some synthetic products, even sparingly?

Ah, well you know, if I could just use a couple of things once in a while. What do I miss? I terribly miss the opportunity to be able to use an insecticide occasionally. Right now I would sell my soul for a one-time application of a pre-emergent weed control. You could do it and not have to use it again for three or four years, and combine that with spot treatment using organic products. I really believe the future of golf is in a combination of organic approaches and very limited synthetic pesticide use.

Do you know of any other golf courses in America that are organic?

There are some that appear to be really close. But using only one pesticide occasionally isn't organic.

Like claiming to be a vegetarian even though you have the occasional cheeseburger.

Right. So there don't appear to be very many. Maybe less than 25 who subscribe to a really stiff regimen.

You couldn't do it in the South, right?

No. Or in the transition zone. But you can find a balance between organic and synthetic approaches. In general we could use a lot less synthetic pesticide. A whole lot less. We put down too much, too often, in too many areas.

Do you expect to see more organic golf courses in the future, for the number to grow from one?

Well, I guess it could only go up. No, I guess it could go down. *[Laughs.]* Yeah, I think there'll be more. There'll be a lot of courses that will start using combinations of much lower amounts of synthetic pesticides coupled with more organic products and practices. That's definitely going to come.

Where is the impetus coming from in America toward more organic practices? Is it the golf-course owners, the superintendents or the golfers?

Interestingly enough, women members are beginning to become a bit of a driving force. The women members here are hugely supportive. They like the idea that there are no pesticides. I don't mean to generalize, but you hear it enough here to make you think it's a driving force. I think superintendents would like to use less pesticide if they could. They would be more than willing to do it if they wouldn't lose their jobs from doing it.

The synthetic pesticides and fertilizers that golf courses conventionally use today, do you consider them to be safe?

Yeah, I do. With any pesticide, you can run into trouble if it's misused. You've got to be a licensed applicator, know what you're doing. There are some products out there where the test results are of some concern. There could be something out there that we're using that's really bad. It doesn't appear that that's the case. The testing is very elaborate. But a lot of people take the same stance that our county did, and that is, if there's any possibility of any danger, they don't want to use it. I can see why there's some concern about some of this stuff.

This is a true story. Back when I first started we still had some heavy-metal-based fungicides. Cadmium-based, mercury-based fungicides. I was at a little golf club, 1979, no longer exists. This was a small operation, no pesticide shed. I was mixing pesticides, a mercury-based powder, out back of the clubhouse and right next to the house that I lived in. It was just my wife, Kathy, and I; we'd just gotten married. My wife is a redhead, and she has a beautiful, thick head of hair. And in the middle of the summer, her hair started to fall out. Large pieces of it. And this had never happened before. And she was flipping out. So she went to the doctor, and they did a bunch of blood tests, and they told her she had

'RIGHT NOW I WOULD SELL MY SOUL FOR A ONE-TIME APPLICATION OF A PRE-EMERGENT WEED CONTROL.'

‘HER HAIR STARTED TO FALL OUT. LARGE PIECES OF IT. . . . AND SHE WAS FLIPPING OUT.’

heavy-metal poisoning. So I stopped using that stuff. But most pesticides today are really quite safe.

If they’re safe, why is there this move toward using less of them?

I guess because of that absolute—because we don’t know they’re absolutely OK. Because I was told in the 1970s that mercury-based fungicides were safe. So, they were wrong. And maybe there are some pesticides out there that aren’t good. Insecticides do kill fish. Anything that kills something, in the wrong concentration, can be a problem. You never know. So if you can use less, it’s got to be better. The reality is, that’s the way things are going. Plus I’m just so surprised that so much of our golf course is unaffected by not using pesticides. To see a course without any at all is something I’m really proud of.

What kind of pressure do superintendents experience?

The pressure is to produce Augusta-like conditions no matter where you are. When we first started getting insect damage and disease, we measured the extent of the problem on one tee and found that 98.8 percent of the tee was perfect. But if you looked at this tee, you’d fire the superintendent. So this is what we’re working with. The level of expectation is extraordinary now.

Does that work against the organic movement? The superintendent thinks, *You know what, my job’s on the line, I don’t care, I’m going to use as much pesticide as I can.*

Absolutely. The movement gains momentum only if the golfers support it. Superintendents would be totally supportive of it. I’ve noticed a tremendous interest in managing golf courses more organically, especially among younger superintendents. They’d do a great job. The golf courses would be terrific, but they’d have some visual blemishes. Well, right now they’d all be unemployed. Unless the golfer begins to have a change of perception and begins to accept those blemishes, and has that same mentality as when he goes to St. Andrews or Hoylake, and accepts those conditions and finds them charming and has a great round of golf. Then you can do it. The professionals and the tours and golf’s hierarchy have to embrace that, too. The guys who are driving the bus.

THE REGULATOR

Since 1970, the Environmental Protection Agency (epa.gov) has been responsible for the health of Americans and the land, air and waters that surround us, by developing and enforcing regulations, performing and funding research, and conducting education and other outreach programs. Among the agency’s 17,000 employees is **ROBERT WOOD**, 45, the deputy director of the Wetlands Division, the EPA’s representative in the Golf & the Environment Initiative, and an 18-handicap golfer. We met in his office in the vast EPA building on Constitution Avenue in Washington, D.C. Above us, on the wall, was a photograph of the snowcapped peak of the Matterhorn, taken by Wood on a long-ago vacation, before he started his career at the EPA, before anyone had heard of global warming.

Golf Digest: The EPA’s Wetlands Division—can you explain what it does?

Robert Wood: We have a regulatory program that’s co-administered with the Army Corps of Engineers, under the Clean Water Act. In essence, what it says is that if you’re going to be pushing dirt around, doing excavation, or putting fill material into any water—streams, ponds, rivers, wetlands, bays and so on—you have to get a permit. We have regulations that require avoidance and minimization of impact to water. Where the impact can’t be avoided, you still have a right to develop that piece of property through what is called compensatory mitigation: In simple terms, if you’re going to eliminate an acre of wetlands, you’ll have to create maybe two or three acres of new wetlands, depending on the circumstances. The overall goal under this regulatory program is to have no net loss of wetlands and aquatic resources in the U.S.

Suppose I’m an evil developer. I’ve got a piece of land and want to build a golf course on it, but there’s a wetland area right in the middle. And I decide, you know what, it’s my land, I’m going to fill it in. What happens next?

There are several avenues for

? WILLINGNESS TO SACRIFICE SOME LEVEL OF GOLF-COURSE LANDSCAPE “PERFECTION” TO SAVE WATER/PREVENT GROUNDWATER POLLUTION:

85%

GOLFERS AGREE

enforcement. Typically the first line of inquiry is going to be at the local level—the county or the city. Somebody might see that this has happened and call their local EPA. It would not be uncommon for an EPA inspector to go out and have a look and make a determination about whether to pursue a case. Then there's a series of steps that could result in civil penalties or criminal prosecution. It's not real common, but it does happen, and there have been a few examples where folks have done jail time.

So there have been cases of golf developers going to jail for this?

I've never heard of a golf developer doing jail time, but I have heard of land developers, housing developers, so it is possible. But it's not the norm, and not the goal. The system is not designed to throw people in jail, it's designed to achieve compliance.

Would the same thing apply to pesticide use? If I'm a superintendent under a lot of pressure, and my golf course has got some insect problem, and I decide to use more pesticide than what is allowed, or I get some stronger stuff from the farmer down the road, who's to know?

Undoubtedly that happens from time to time. One obvious way that's going to be discovered is when something bad happens. A worker health-and-safety issue emerges, or something happens to a local waterway.

Three-headed frogs start appearing.

Right. Or there might be somebody who is paying attention and sees that a practice that's not permissible is going on. There might be a referral from somebody observing it. But the EPA's pesticide program is not my area.

OK, back to the wetlands. Why does it matter? Why shouldn't I be able to fill in the wetland on my golf-course project?

Wetlands are a vital part of any aquatic ecosystem. They provide habitat to a wide range of wildlife from fish, shellfish, all the way down to insect communities. Wetlands are the unique habitat for something like 30 percent of all endangered species, and 50 percent of endangered species spend at least part of their life cycle in wetlands. They're very ecologically rich.

To most people, endangered species are things like snow leopards and elephants, but there are more than 1,000 endangered species in the U.S. alone.

That's right. People are not thinking about salamanders or vegetation in a wetland. They're critically important as a habitat. And they're critically important as a filter: We build all this infrastructure to keep water clean, and wetlands provide very much that same kind of cleansing capacity in a natural way. And they provide a buffering capacity for storm events. We saw this very much with the Katrina and Rita storms in the Gulf of Mexico.

Is there a figure for the size of America's wetlands? A lot of the wetlands have disappeared.

The first statistical wetlands status-and-trends report in 1983 estimated the rate of wetland loss from the mid-1950s to the mid-1970s at 458,000 acres per year. Wetlands then were largely thought of as a hindrance to development. In the 1991 report, which covered the mid-1970s to the mid-1980s, we were still losing wetlands, but the rate had declined to 290,000 acres a year. The third report, from '86 to '97, indicated that the rate of loss was down to 58,500 acres per year. Now the 2006 report, which covers 1998 to 2004, shows that the wetland area actually increased by an average of 32,000 acres per year. This was the first report to show that we were in a period of increasing wetlands. There was, however, some issue with this report over how wetlands were defined.

[Note: The report states that the total area of wetlands in the U.S. in 2004 was 107.7 million acres. Wood goes on to explain that the claim of wetlands growth has been contested. A New York Times story, for instance, explains that over the study period, 523,500 acres of true wetlands, swamps and tidal marshes were lost, but this was offset in the report by gains of 715,300 acres of ponds, including man-made ornamental ponds—hardly a fair trade.]

? FOR THOSE WHO ACCEPT GLOBAL WARMING, IS IT MAN-MADE, OR NATURAL?

52%
MAN-MADE / GOLFERS AGREE

48%
NATURAL / GOLFERS AGREE

66%
MAN-MADE / NONGOLFERS AGREE

34%
NATURAL / NONGOLFERS AGREE

'WETLANDS ARE THE UNIQUE HABITAT FOR SOMETHING LIKE 30 PERCENT OF ALL ENDANGERED SPECIES.'

To some golfers, wetlands and wild areas are just a nuisance, places where you're going to lose your ball. They'd rather see the golf course mowed from fence line to fence line. What do you say to them?
When you provide a bit of education, you can get a very different answer. You can say, for example, that not mowing certain areas is better for wildlife, better for water quality and allows native vegetation to thrive and maybe prevents an invasive species from moving in. It might change the look of the course a little bit and the way it plays a little bit, maybe not. I'm a golfer, and to me what's intrinsically attractive about the game is that you are essentially in a natural setting. And it's the restrictions and unique features of that natural setting that make a particular course challenging, one that you like and remember and want to go back to. That's been a design principle of golf courses from the beginning. It's part of the game.

The best golf courses look as if they've emerged from the landscape rather than having been imposed upon it, like those wall-to-wall bright-green courses in the middle of the desert.
Exactly. You go to the southern Arizona desert—which is truly a unique landscape; there's nothing else like it on earth—and I've seen courses there where they've tried to maintain much of that, and really work with it, and to me that's a far more interesting course. One of the influential landscape architects of the last century was Ian McHarg, who was a professor at the University of Pennsylvania. He came out with a book in 1969 called *Design with Nature*. The audience was really urban planners and landscape architects, but it applies to golf courses, too. It's the tradition of the game, and we're rediscovering that tradition.

THE ADVOCATE

RONALD G. DODSON has been president of Audubon International (audubonintenational.org) since he founded it in 1987. The organization has nothing to do with birds, nor the prestigious National Audubon Society, which Dodson worked for in the 1980s as a regional vice president. (Dodson now has harsh words for his former employer—as you will see, his criticisms are strenuously denied by National Audubon.) Dodson says that roughly 75 percent of Audubon International's work is golf-related: It's best known for its Audubon Cooperative Sanctuary program, which certifies golf courses for their eco-friendly practices, and its more involved Audubon Signature Program for new developments. Dodson, a former schoolteacher, has worked in the environmental field for more than 30 years. (He has also, according to his website's bio, amassed "a huge number of frequent-flier miles"—an odd boast for the leader of an environmental organization.) A former scratch golfer who earned a golf scholarship to Oakland City University in Indiana, Dodson now plays to a 10-handicap.

The first meeting with Dodson, at the organization's headquarters in upstate New York, had to be canceled because of a snowstorm. The rescheduled meeting had to be canceled, too, because Dodson, 59, went for a physical and was told he had to have a quadruple-bypass operation. Eventually, six weeks later, the interview was conducted over the phone, with Dodson speaking from his home in Albany, N.Y., where he was recuperating from the operation.

Golf Digest: So how are you feeling?
Ronald Dodson: I'm great. I felt great before the operation, and I feel great now. Everything's fine.

That's good. OK, let's talk about Audubon International. What do clubs have to do to get certified? What is the process?
When a golf course joins our program, if it starts the certification process, it usually takes two to three years for it to go through all the paperwork, get everything in place and get to the final audit. Essentially there are six categories that we try to focus people's attention on. It starts with the course developing an environmental plan, and the first step of that process is doing an inventory—what kind of golf course is it, how many acres of turf, what kind of turf, water features and so on. The other categories are water conservation; water quality management; wildlife and habitat enhancement; chemical use, reduction and safety; outreach and education. Golf courses can get certificates for each of those six categories, and then they can become a certified Audubon Cooperative Sanctuary. They have to get recertified every two years.

How much does it cost?
It's $200 per year for a course in the U.S. and $250 for anywhere else in the world to join the program. There's no additional cost for getting certified. We don't want people to use money as an excuse not to do this. *[Note: The Audubon Signature Program, where the organization gets heavily involved in the*

'FROM WHAT I KNOW ABOUT AUGUSTA NATIONAL, IT'S REALLY A TELEVISION STUDIO, NOT A GOLF COURSE.'

planning and development of new golf-course projects, is more expensive, with fees starting at $9,500.]

Would Augusta National pass the test?

Well, I don't know. I've never been there, and I'd like to go sometime. From what I know about Augusta National, it's really a television studio, not a golf course. It's open only about six months of the year. So I don't know that they're really doing that bad environmentally when you look at the course for a whole year.

How many have signed up to the Sanctuary Program?

We've got more than 2,300 courses in the program, and 755 of those are certified worldwide—622 in the U.S. The vast majority of the members that we have join the program and either start the certification process and then stop or just never start. They pay their membership fee and they get our newsletters. Some of them we happen to know are doing really good things, but they just don't fill out all the paperwork and documentation that you need to do to get certified.

Are you disappointed in those numbers?

Well you know, I asked the USGA guys several years ago how they felt we were doing since they've always been a sponsor of our program; they support what we do. And they kind of said, no, you know, we think you're doing pretty well. They thought that we were where we ought to be. Now, of course, we think we ought to have all the courses in America. We're certainly not satisfied. We'd like to have more.

Because part of your funding comes from the USGA and golf companies, there's a perception that you're largely just performing a PR function for the golf industry. How do you respond to that?

The USGA is the governing body of golf, and to have their support, to have them promoting the idea of golf courses getting involved and joining with us, is very important. We know—at least we believe—that our program is credible. We know that the EPA thinks it's credible—they've given us awards and recognition for what we do. We're not ashamed of what we do. And if golf courses practice what we would like them to practice, and they get some good PR out of that, then that's great. We want to motivate other people. The PR part, I'm fine with that.

Your organization carries the name Audubon. *[Note: John James Audubon, the famous ornithologist, naturalist, painter, was born in Haiti in 1785.]* But it has nothing to do with the National Audubon Society, the environmental organization that has been around since 1905. Doesn't that mislead the public?

The public is confused over that whole movement anyway. You know, there are 550 Audubon Societies in the United States. They're all separate from one another; they all have their own boards and directors. *[Note: National Audubon says that 491 of these Audubon organizations are in fact National Audubon Society chapters.]* The history of the Audubon movement from the very beginning has always been separate local, state and regional groups. Our group was incorporated in 1987, but it was originally founded in 1897 as the Audubon Society of New York State. That's our real name. So we were created originally before National Audubon was. A lot of people think that the National Audubon Society is kind of the parent Audubon group, and everybody else is somehow subservient to them, but that's not true. National Audubon in the past has used that to belittle what we do and our approach. And the reason they do it is they have to raise about $40 million a year to keep their bureaucracy funded. We don't try to raise $40 million a year to keep a bureaucracy going. It basically comes down to that. It's money.

But they're not just a bureaucracy. They obviously do some good work as well.

Well, I think they used to, when I worked for them.

But not anymore?

They put out a magazine. They used to have one of the oldest and largest sanctuary systems in the world, but over the last several years they've given off their sanctuaries to a lot of the other Audubon groups. *[Note: National Audubon says: "Since Mr. Dodson's departure in 1987, Audubon sanctuaries, centers or other conservation properties have increased from 87,900 acres in 70 different locations to 101,300 acres in 114 locations."]* So in my opinion, mostly National Audubon takes credit for work that other Audubon groups are doing. And they put out a magazine.

But it is nevertheless the most well-known Audubon organization, right?

Yeah. They put a lot of their $40 million into PR.

How can there be 550 Audubon organizations? Is there no trademark protection of the Audubon name? Could anybody use that name?

Yeah. It's public domain. *[Note: National Audubon disputes this.]*

So I could set up the Audubon Pesticide Company, for example, if I wanted to.

Oh, yeah. And there probably is one. I lived in Henderson, Ky., for several years before I moved up here, and there were I think 30 different companies named Audubon there. And Henderson is only a 20,000-person place. *[Note: John James Audubon lived in Henderson during his 20s and 30s.]* There was an Audubon Chrysler automobile dealership. There was a company there that made women's panties, pantyhose, Audubon Hosiery.

[Note: Philip Kavits, the National Audubon Society's vice president and chief communications & marketing officer, was given the opportunity to respond to what he called Dodson's "very misleading statements," which he said unfairly characterized National Audubon. He offered a statement about the work of National Audubon—whose mission for more than a century has been "to conserve and restore natural

> 'IT'S NO LONGER SOME CUTE, NICE THING TO BE ENVIRONMENTALLY FRIENDLY. . . . IT BECOMES PART OF THE WAY WE DO BUSINESS.'

ecosystems, focusing on birds, other wildlife and their habitats"—including many examples of recent achievements, and a rebuttal of Dodson's claims, point by point. This can all be found in the online version of this story at golfdigest.com/magazine/environment. Kavits added that a visit to the organization's website, audubon.org, "will give your readers a much more complete picture of our activities and successes."]

You often hear of ski resorts with their own wind turbines, solar panels that power the chairlifts, energy-efficient trail-grooming machines. The Aspen Skiing Company was the first resort of any kind to join the Chicago Climate Exchange [a leading carbon-trading organization—chicagoclimatex.com]. Why do you never hear of these things in golf?

There are a lot of golf courses that are doing things with maintenance equipment, golf carts, energy efficiency. But for some reason they don't talk about it very much.

Are you aware of any golf courses that have their own wind turbine?

I don't know of any.

What about solar panels on the clubhouse roof?

Yep, I think there are several of them in the Southwest that have solar units on the roof, and they actually sell power back to the utility. *[Note: Any golf courses with wind turbines or solar panels are invited to e-mail john.barton@golfdigest.com and tell us about it.]* Maybe the ski-industry people have come together, and they're talking about things that they can do at their individual operations that collectively make a difference. I don't know that the golf-course industry has done that yet. The only way we're all going to make a difference, long term, is if this becomes part of the free enterprise system. So it's no longer some cute, nice thing to be environmentally friendly, or something that we do every once in a while. It becomes part of the way we do business. The golf-course industry has an opportunity to be the leader. If they do it the right way, they could be motivators for people who build shopping malls and parking lots and subdivisions.

THE GRASS EXPERT

The Green Section is the least-loved resident of the U.S. Golf Association's headquarters at Golf House in Far Hills, N.J. "Everyone's much more interested in equipment, or the rules, or the U.S. Open," says the department's national director, **JAMES T. SNOW**, 56. "But what's more important than the surface that we play the game on?" The Green Section, founded in 1920, is designed to make sure that surface is as good as possible. According to the USGA website (usga.org), the Green Section "remains the nation's chief authority regarding impartial, authoritative information for turfgrass management." Among its activities is the funding of all kinds of turfgrass-related research, including the creation of better, more eco-friendly golf-course grasses and maintenance practices. Since 1983, more than 370 projects have been supported at a cost to the USGA of $27 million. (You can find summaries of all the projects online, including such headliners as "Interpreting and forecasting phenology of the annual bluegrass weevil in golf-course landscapes.") Such matters were discussed at length in a meeting room in the Green Section, whose walls were lined with tomes about grass. Through the window, we could see the real thing.

Golf Digest: Let's start with a basic primer on the grasses used on golf courses.

James Snow: The United States is a huge geographic area with all kinds of climatic conditions. In the northern parts of the country, golf courses use cool-season grass, mostly creeping bent grass for their fairways and greens. You also end up with annual bluegrass just about everywhere, with Kentucky bluegrass, perennial ryegrass and fine fescues in the roughs. In the South, you get the warm-season grasses—it's going to be Bermuda, primarily, but people do use zoysia as well. These are very good for that part of the country, but in the winter they go dormant and look deader than a doornail, and people don't like that. And then in the middle of the country is what we call the transition zone, where warm-season grasses don't do that great, and the northern grasses don't do that great, either, so you have to work hard to make it work. So let's say overall, 40 percent of America's fairways might be bent grass, 40 percent Bermuda grass, with the rest being various other grasses. Greens, more like 70 percent might be bent grass. You'll find a lot of courses with bent-grass greens as you go farther South into that transition zone, but it can be a difficult grass to grow in the summer in those areas. Augusta has bent-grass greens.

Why do courses in the British Isles, even the best, big-name famous ones, have

'IN THE U.K., THE PROBLEMS ARE MINOR. THEY HAVE THE RIGHT CLIMATE. . . . WELL, GEEZ! GOSH. WE'RE JEALOUS.'

tiny maintenance budgets and staffs compared to America?
It's climate. It's about having weather that's conducive to growing grass. I spent some time in the U.K. in 1992, when the Open was at Muirfield. The greens were spectacular, and the fairways were just as tight as they could be. And I said, "Well, where's the irrigation system?" And they said, "Oh, we don't have an irrigation system." And I said, "For crying out loud!" In the U.K. the problems are minor. They have the right climate, they don't have the problems we have with weeds, with insects, with disease, and they don't even have to irrigate their fairways. Well, geez! Gosh. We're jealous. The British guys were always telling us that we use too much water and too much pesticide, and I always felt kind of guilty until I saw Muirfield. I don't feel guilty anymore. Give me a break! You guys complaining about us? If we didn't have irrigation, we'd have nothing; we'd be playing on crabgrass and goosegrass. Nobody would play golf in the southern United States—all those aggressive warm-season weeds are just horrible; if you didn't spray, you'd have nothing but junk. There are a lot of low-budget golf courses in the northern United States, but even there we have pest problems that you don't have in the U.K., all kinds of grubs: Japanese beetle grubs, oriental beetles, a host of them that'll eat the roots of the grass and can kill the fairways.

How controversial is the practice of golf courses in the South overseeding their fairways and greens with cool-season grasses in the winter? Is it done just for aesthetics?
It's not controversial to the golfers. They wouldn't play much golf if it wasn't done, and there wouldn't be 1,200 golf courses in the state of Florida without it. If you don't do it, people won't play golf. The majority of courses in the South would overseed. It's not purely an aesthetic thing. If you have three or four or five months of play on dormant grass, the traffic from golfers can really do a lot of damage and can even kill it. If you had a lot of play, it could be a disaster without overseeding. Overseeding has evolved this way for a reason. If you don't give people what they want, they're not going to buy it.

What about the practice of painting the Bermuda grass instead of overseeding?
It's gaining momentum. It doesn't solve the problem, but as long as you don't have a huge amount of play, you can get by with it without damaging the Bermuda grass. A public course that has 80,000 or 90,000 rounds a year couldn't do it. But a private club that gets 20,000 or 30,000 rounds a year, you could do it. It's a lot cheaper.

How have golf-course grasses changed over time? How are they changing now?
Well, 100 years ago, golf was all in the North. There was almost nothing in the South. Then Dr. Glenn Burton in Georgia developed the first really good Bermuda grasses for fairways and roughs and even greens, in the '50s. When I joined the USGA in 1976, everyone was talking about Penncross. It was the only bent grass anyone was using. But by 1980 there were new grasses that were better than Penncross. So every decade has its innovations. Today there are a lot of new strains and new species that are being used. Seashore paspalum is making a huge change. It has extreme salt tolerance, so you can irrigate it with sea water. It looks nice and it plays very well, so it's really catching on in the Southeast, primarily, and the Caribbean islands and Mexico—anyplace that's coastal where it doesn't ever get too cold.

There's a huge number of new, improved grasses, but you really need to spend money to have good results. Through our research program we've developed cold-tolerant Bermuda grasses, and you can use them all the way up into Kansas and Iowa, which is remarkable. That saves 50 percent of the water that you would otherwise have to use in those areas, and you hardly have to use any pesticides. That's pretty good. When the time comes, when water truly becomes a major issue—and it is in some parts of the country already—that's when we'll switch to these new grasses. There are constant incremental improvements. Salt tolerance, heat tolerance, cold tolerance, disease, insect tolerance—they're working on these all the time. They're producing a lot of great new grass products. And there are new turfgrass diseases every single year. You've got to keep on it or you'll fall behind, and if you fall behind you'll have a lot of dead grass.

Mostly fungal diseases?
Yeah. And the other thing is, as soon as you get an improvement, golfers demand more. They want faster, more uniform, darker green. It never ends. Courses used to mow at a quarter of an inch; now we're down to a tenth of inch. Every time you take it down, the poor grass gets weaker and weaker and weaker, and more susceptible to disease—probably a lot of the new diseases have come about because of that. It's like people—you wear yourself out, and that's when you get sick.

So the more technology advances, the more people's demands advance, and the more diseases advance. It becomes like a crazy arms race.
It does, that's right.

What about low-mow grass—wouldn't it be a benefit not to have to mow as often?
It's a farce. For a golf course, it's all about traffic. If you can't regenerate the leaves of the grass fast enough when people are playing, you're going to end up with no grass. With a home-lawn situation, if you don't have dogs and kids running all over the place, you could have a low-mow type of grass and not have to mow it as often. But—

'ALL YOU HAD TO DO BACK IN THE 1960S WAS PUT CHLORDANE ON THE GREENS AND YOU WOULDN'T HAVE AN INSECT PROBLEM FOR 25 YEARS.'

here's the "but"—if it gets diseased, the grass can't outgrow it, and the disease will kill it right down to the ground. So low-mow stuff doesn't work very well. Grass needs to grow.

How about the genetically engineered so-called "Roundup Ready" grasses, which haven't been approved—could they help?

Roundup Ready grass could be very useful on a golf course. You would just have one application of Roundup and take out the annual bluegrass, crabgrass, clover; you could get rid of the Poa annua, and the bent grass would be unaffected. It would save a huge amount of pesticide use. And Roundup is a product that, once it dries on the leaf, is not going to go anywhere, and it degrades fairly quickly. It wouldn't solve everything, though. You're still going to have new diseases develop. It's like if you use the same antibiotic time after time, eventually it becomes worthless. But overall, if you look at the potential problems, they aren't there. There's a big potential benefit.

But the genetically modified grasses are hugely controversial. There have been cases of protestors doing damage to research facilities, and Scotts was recently ordered to pay a fine of $500,000 after some Roundup Ready grass escaped from a research facility in Oregon.

It's a political issue, not a scientific issue. From our perspective, it's like anything that's new: People are worried about it until they see it. It's just like when they came out with Roundup Ready corn. It was a huge thing; there was worldwide screaming and hollering. Well, people have been eating Roundup Ready crops now for decades, and there's no apparent issue with it. Not to say you shouldn't be careful, but if you look at the rationale with creeping bent grass, it's just not a threat to the environment. If it spreads, we already know that there are five other herbicides that can kill it. So what's the problem?

Will it be approved?

It's going to take a long time.

What about artificial surfaces? Any future for golf? They're low-maintenance, don't need pesticides, chemicals, water.

It certainly is possible to do this. But installing and maintaining artificial surfaces can be very expensive. Plastic can get very hot, and for a whole fairway that would be unbearable. So now you have to install a cooling system. They have algae problems, so you're out there spraying anyway. They have wear problems. For golf it's not going to happen soon.

Do you think pesticides are OK if they're used correctly?

Well, you'd rather not have any if you had a choice, but you're not going to have a golf course if you don't use some. We've done all this research on pesticides and nutrients, and we've found that if you do it the right way, the effect is really minimal, benign. If you do it the wrong way, it can be disastrous. And everything in between. So the key is to get people educated to do it the right way. We're working with the GCSAA and others to come up with a characterization of the pesticides that we use. Because some are benign, they degrade quickly; they don't really have any impact on anything. And then there are some that are really nasty. We just pick the one that we think works the best, without necessarily knowing that one could be better for the environment than another. Pesticides today certainly are a lot better than they were 10 or 20 or 30 or 40 years ago. Oh my gosh, back in the '20s they literally cured dollar spot. They eliminated dollar spot from golf courses. But they used mercury, cadmium and lead arsenic to do it. How do you like that? All you had to do back in the 1960s was put chlordane on the greens and you wouldn't have an insect problem for 25 years. *[Note: All uses of chlordane were banned by the EPA in 1988.]*

How about water use—how do you justify the massive amounts needed for irrigation when there's such a shortage of clean water?

Well, you know, golf is a $65 billion industry in this country. Now there are plants that make little plastic toys for kids. And they use a huge amount of water to do that. Is there any difference? They make cars—that uses huge amounts of water. We're sitting on furniture that required water to be made. Think about it: Industries are industries, and they all use water, and they all use fuel. Golf just happens to be apparent. Visible. You can't dismiss a $65 billion industry.

Right. But water shortages are a huge problem.

Sure it's a problem. It's a problem anyplace you have drought. Georgia typically has a lot of rain, but the last two years they've had a severe drought. And it can be that way in any part of the country. I was visiting golf courses in California one summer in the late '70s when a horrible drought occurred. They cut off the watering of golf courses except for a little bit on greens and fairways. The roughs were totally gone, literally no grass, not even weeds. Nothing would grow. They had had six months with no rain at all. Drinking water was declining badly. So it really got us to start thinking about it, and in 1983 we decided to take a look at these environmental issues, and we established the Turfgrass Research Committee. And we've guided the research since that time. We've developed all these grasses that can be tolerant of drought and heat and salt and require far less fresh water.

There's a lot that can be done to improve water use. In the Southwest, I'd say they're doing a really good job.

'PEOPLE ARE CONTINUING TO LIVE IN PLACES LIKE LAS VEGAS. . . . PEOPLE WILL HAVE TO LEAVE THOSE AREAS. THERE WILL BE NO WATER.'

They do the best they can. They're increasingly using effluent water. Irrigating less and irrigating smarter. Switching to better grasses. But it's a problem. People are continuing to live in places like Las Vegas. How many million people live in the desert today? And more every day. And with the water, it's just going to implode. It can't go on. The aquifer is declining. Unless some miracle happens, people will have to leave those areas. There will be no water.

And when that happens, golf will be the least of anybody's concern.

That's right. It's going to happen in Phoenix and Tucson and Las Vegas and all those places, because people aren't going to have water. It's just going to get worse and worse. Water will be the key issue for most of our country for a long time.

THE ENVIRONMENTALIST

In 1970, **BRENT BLACKWELDER** started doing volunteer work for the U.S. branch of Friends of the Earth, which describes itself as the world's largest grassroots environmental network (foe.org). Now president of the organization, Blackwelder, 65, is one of America's most prominent environmental advocates and has testified before Congress on environmental issues more than 100 times. He has also been a golfer for more than half a century—and used to be the proud owner of a 2-handicap. "Now it's more like 5 or 6," says the former golf team member of Duke University (the start of an academic journey in which Blackwelder earned a master's in mathematics from Yale and a doctorate in philosophy from the University of Maryland). "I play nine holes probably twice a week in the summer, except when I'm on vacation. Then I'll play most of the time." We met at the Friends of the Earth headquarters in the nation's capital, not far from Dupont Circle. Blackwelder's sixth-floor office afforded a terrific view of the city. Snow was falling. After the interview, he headed to Capitol Hill to do what he does best: "an afternoon of hardball lobbying."

'THE NATURE OF GOLF COURSES TODAY IS THAT TOO OFTEN YOU'RE PLAYING THE GAME ON A CHEMICAL STEW.'

Golf Digest: Is golf a friend or a foe of the earth?

Brent Blackwelder: I've been asked whether, in my position, I should even play golf. My brother said to me, "Isn't environmentally sound golf an oxymoron?" And I said, "Well, it doesn't have to be." There have been some courses that have done some very good things, and there have been other courses that have caused some fairly serious environmental problems: contaminating water, ruining pristine streams, destroying habitats, producing landslides. There are some really bad examples. The nature of golf courses today is that too often you're playing the game on a chemical stew. The Golf & the Environment Initiative established very good principles to manage golf courses in as environmentally sound a manner as possible, covering things like where golf courses should and shouldn't be located, habitat creation, pesticides, water and energy use. Where we have not done a good job is in the outreach, in getting these principles used by the 16,000 golf courses in the United States. We haven't been able to instill an ethic of all golf courses looking at their daily management practices and trying to be compliant with good standards. I've been to a resort where they were spraying in high winds. You could actually smell it. That's violating all principles of good application. I've seen courses spraying when young children are present. Things like that should not happen. So overall, it's an uneven situation.

Let's talk about some of those principles. What land should be used for golf courses, and what shouldn't?

There are certain places where you don't want golf courses. I fought to keep a course off of the Crystal River in Northern Michigan, where we taught our kids to canoe, Sleeping Bear Dunes National Lakeshore. A prime, sensitive area with pristine water, very rare plants and so forth—a golf course would be compromising the environmental integrity of that land. We were successful in keeping that one away. On the other hand, I grew up playing a course that was reseeded over farm fields and has very little chemical usage, Silver Lake Country Club in western New York state. I still play it when I'm there every summer. Any conversion of farmland to a golf course does not present very many problems. In fact, you might even be able to restore the land to some degree. Also, golf courses restoring quarries or mines or other degraded land. But if you're going into a forest and cutting down trees to put in a golf course, losing biological diversity, reducing the species that are present, and compromising the water quality, that's at the other end of the spectrum.

How about habitat creation—what can golf courses do?

Part of the appeal of golf is, you're

getting out with the elements, in nature. The more non-use portions of the golf course can be returned to native species, the better it is. You don't want a lot of ornamentals. If you don't have the right native shrubs, you won't get the insects, butterflies and different kinds of birds that you want. About 6,000 of the 9,000 bird species on earth are in decline. That's not good news. It's very serious. There are possibilities on every course to alter that. Take a look at how Augusta does the banks of its creeks. It's not natural to grow grass right down a bank and into a stream. I'd prefer to see native vegetation, aquatic plants, growing along those banks. It's much more attractive. One of the worst things you see at some courses is an artificially dug pond with stone work all around the edge of it like a gothic cathedral. Then you have golf balls bouncing off it, and it starts getting much too much like a miniature golf course rather than being out with the elements.

Energy use?

Golf is going to require some energy use, but there are energy-efficient ways of doing things. I've talked with Kenwood Golf and Country Club here in Bethesda [Md.] about using solar panels. We've potentially got so much solar and wind power. We've got these vast outdoor parking lots in this country, like at the Pentagon here in D.C., or Dulles Airport. If you put solar collectors over these outdoor parking lots—up on pedestals so that they'd shield the cars from the heat that builds up during the day—you'd be generating fantastic amounts of electricity. If you did all those outdoor parking lots, you'd generate more electricity than the U.S. uses. It's a no-brainer to do it. The problem is that fossil fuels are heavily subsidized, and what we pay for them does not reflect their true cost, or their external costs on society. That's not in accordance with the free-market system. When you externalize your cost onto the rest of society, that's cheating. But that's exactly how we've allowed it to proceed.

Pesticides?

When I play golf, I'm trying to get a healthy walk in a natural setting. Too many times you find you're walking right in the areas where they've sprayed. And you're like, "Whoa, what am I doing walking here?" I'd rather be doing something else than following a truck that's spreading chemicals everywhere, especially when the guy driving the truck has got the protective suit on and is using a respirator. One of the serious concerns with pesticides is that, whereas, say, an adult male with a large body weight might not be that susceptible, for youths or women of childbearing age, exposure to a chemical in even a very small amount at the wrong time can do awful things. We're just learning about this. There are only two cancers that are dropping in age-adjusted incidence: lung cancer in men, for the obvious reason that men aren't smoking as much, and stomach cancer; it's not clear why. A lot of the others—prostate cancer, breast cancer, childhood cancer—are very much on the increase. The survival rates are better, but the incidence is growing. We should be going after prevention, because if we just go after cures, we're going to lose the ballgame in the long run.

Is it realistic to think that golf courses could ever stop using pesticides?

What is realistic is all golf courses using the principles of Integrated Pest Management, which is typical in agriculture. There's no doubt that that's the first step. You don't automatically spray everything as soon as there's any problem. You try to identify the problem and understand the reasons for it and use the pesticide only sparingly, and as a last resort. From that, some courses might start moving toward being more organic. It happened in agriculture. People said, "Oh, you can't grow organic food." But now we have a growing organic farming movement. Look at how whole-foods grocery stores and local farm markets are just skyrocketing in popularity.

What about genetically engineered grasses? A lot of people in the golf industry say a "Roundup Ready" grass should be approved because it would allow superintendents to spray less often, and with just Roundup, which they say is a benign product. What's your view?

It's totally the wrong way of thinking about it. I think it's fine to do hybridizations—selective breeding of different grasses. That has served humanity well for 10,000 years. But when you're doing genetic engineering, you're doing stuff that doesn't occur in nature, cannot occur in nature. You're putting animal genes in plants, plant genes in animals, genes from one species into another. And when you do that, strange things can begin to happen. It's one thing to look at this stuff in closed labs, but once it's out in nature, you've got something that's live, it's breeding, it's multiplying, it's replicating. It's potentially a biological pollution that you've put out into the world. This technology is powerful. We're pretending we know what we're doing, but we are at a stage of incredible ignorance. With genetic engineering, you're putting something really wild into the equation, and you'd better be ready for some big surprises. And we're getting enough environmental surprises today with things like climate change.

The other point I'd make is that the big selling point for genetically engineered plants in agriculture—which were approved and are in widespread use—was that they'd need less herbicide use. That's not been

'IF YOU PUT SOLAR COLLECTORS OVER THESE OUTDOOR PARKING LOTS . . . YOU'D GENERATE MORE ELECTRICITY THAN THE U.S. USES.'

the case. They also said there'd be increased yields. That's not been the case, either. It's terrible—the majority of soybeans now are genetically engineered, as are vast acreages of corn, and there's no monitoring of it. And there's no way to know if we've eaten genetically engineered food today, because there are no labels on anything that we've eaten.

But for genetically engineered golf-course grasses, what is the worst that could happen if it were approved? What are the dangers?

One of the problems is that some genetically engineered grasses are getting into the national forests, and the U.S. Forest Service cannot get rid of them. Try to get rid of some invasive species, like garlic mustard, that have come into our forests from Europe. It's spreading like wildfire. Or look at the American chestnut. It was the most important timber species east of the Mississippi—great, gigantic trees, durable lumber, produced more nuts than anything else. A very valuable wildlife tree. Well, 100 years ago, the Department of Agriculture thought, *Wouldn't it be nice to bring the Asian chestnut into the United States?* And the American chestnut disappeared like that. It succumbed to a blight, an airborne fungus, from the Asian chestnut. There are no native American chestnuts now that can do anything other than grow up 15 feet and die. And we have no answer to it. And I'm just saying, you think that's bad? What happens with a plant that's got animal genes stuck into it? What happens to the things that eat that plant? Who knows? And what does that do to the rest of the food chain? It's hard for us to even conceive of what the effects might be.

You've been an environmentalist for almost 40 years. Have you seen an increase in awareness and concern among the American public in that time?

There's tremendous awareness now. Probably a thousand-fold increase in awareness of an issue like global warming, of how our use of fossil fuels affects every nook and cranny on Planet Earth. Now most people are very much pro-environment, and they just cannot believe that politicians aren't doing all they can to protect it. But the truth is, they're not.

Since 1970, when I started as a volunteer for Friends of the Earth, I've seen Republicans and Democrats come and go, from when Nixon was president to George Bush Jr. We're a bipartisan organization. But I would say that George Bush Jr. is the most anti-environmental president we've ever had in that time. Nixon, in contrast, appointed people to environmental agencies who really cared about what they were doing. Under his regime, major laws like the amendment to the Clean Air Act, the Clean Water Act, the National Environmental Policy Act, were signed into law. There was a much more bipartisan approach. Whereas Bush Jr. has failed to enforce basic pollution laws, and he's tried to prevent states that wanted to do more from doing so. He's even gone against standards that would make our use of energy more efficient, which is very surprising. At the environmental agencies, he's appointed some people into positions of authority who don't even believe in the constitutionality of environmental laws. Public lands have been devastated by oil and gas leasing. Some of the worst coal mining—mountaintop mining—has continued. The EPA has failed. Again and again, the EPA has to be ordered by the court to comply with the law. A big failure. The United States, by the way, used to be the world leader in environmental quality, with those pioneering acts during the Nixon administration. Other nations looked up to us at that time. And now we've gone from being the environmental leader to a country that's despised. Other countries look at the United States as arrogant, the biggest greenhouse gas polluter, and disdainful of the impact of that pollution on other people worldwide.

'WE'VE GONE FROM BEING THE ENVIRONMENTAL LEADER TO A COUNTRY THAT'S DESPISED.'

The U.S. has less than 5 percent of the world's population, but produces 25 percent of CO_2 greenhouse gas emissions. And it's one of the few countries not to ratify the Kyoto Protocol [to reduce greenhouse gases that cause climate change].

Right. Now that Australia has signed it, we're really out there like a sore thumb. It's tragic to see that leadership we once had just be turned on its end. Now it's not leadership, it's like an anchor slowing down the progress of the rest of the world, which is trying to move toward clean energy. The oil, coal and gas guys are running this administration.

Final question: What would golf be like in a perfect world?

You'd be playing on an organic course. The maintenance equipment would be charged by solar power. Recycled water would be used for irrigation, and used efficiently and sparingly. There'd be a great variety of wildlife habitats. This idea that you've got to make everything look like a miniature golf course with a green carpet is crazy. It's the same problem that we see with these lawn fetishes—all the water and chemicals and energy that are used for a lawn that just sits there. So let's get back to the rugged qualities of the game. People ought to read the history of golf.

We've not been very good stewards of the earth as a species. We should be a blessing to the rest of life, not such a curse. The whole idea of living with and appreciating and understanding our surroundings is something we need more of. We have this incredible nature-deficit disorder worldwide. We're sitting all day in front of a computer in an office and not getting out for a walk in the woods. Golf is a great opportunity to be outdoors. It should be a fun, interesting, great walk out there; a healthful, salubrious experience.

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