

# USGA® GREEN SECTION **Record**

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**Dr. Patricia A. Cobb**  
*2001 USGA Green Section  
Award Recipient*

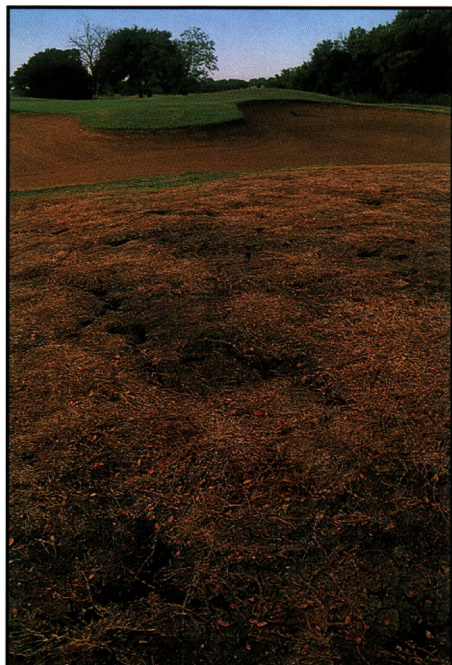


A PUBLICATION ON TURFGRASS MANAGEMENT

BY THE UNITED STATES GOLF ASSOCIATION®



Cover Photo:  
Dr. Patricia A. Cobb's love of  
entomology earns her the 2001  
USGA Green Section Award.



Cracks in the ground are a telltale sign  
that irrigation coverage is lacking.  
See page 12.



After ten years, how far has the Audubon  
Cooperative Sanctuary Program gone?  
See page 23.

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# Cobb Receives 2001 USGA Green Section Award

**D**R. PATRICIA A. COBB, retired extension entomologist with Auburn University, was selected as the recipient of the 2001 Green Section Award. Granted by a distinguished panel of experts in the turfgrass field, this annual award recognizes persons for distinguished contributions to golf through work with turfgrass. It was presented to Cobb at the Green Section's Education Program at the Golf Course Superintendents Association of America Conference and Show in Dallas, Texas, on February 17, 2001.

Dr. Cobb is known throughout the industry as one of those rare educators who is able to share her extensive scientific expertise and wisdom in a manner that is understandable and practical. This trait, combined with her sense of humor, enthusiasm for turf insects, and the ability to "tell it like it is," makes her respected throughout the industry and always in demand for educational programs. In presenting the award, John O'Neill, a member of the USGA Executive Committee and chairman of the Green Section Committee, noted, "Dr. Cobb is an extraordinary person who has a light touch, a razor-sharp mind, and is extremely accomplished in her field. What a great legacy she has created."

Pat's interest in entomology began in an unusual way. As a child, she worked on her family's farm, but she was intensely terrified of insects and had nightmares about them. Her parents took her to the doctor, who said she was fine. He advised her parents to show her which insects could and couldn't hurt her. Her father went overboard and showed her everything, including how to catch them. As a result, since she was eight years old she has wanted to be an entomologist.

After obtaining a B.S. degree in biology and chemistry from Huntingdon College in Montgomery, Alabama, she spent the first five years of her career teaching high school chemistry, biology, and general science courses. She returned to school and obtained her M.S. and Ph.D. degrees in entomology from Auburn University.

Having worked for 21 years as a dedicated extension entomologist at



*John O'Neill, USGA Executive Committee and chairman, USGA Green Section Committee, presented Dr. Pat Cobb with the 2001 USGA Green Section Award for her distinguished work with turfgrass.*

Auburn University, Cobb is known for her knowledge and integrity. She specialized in turfgrass integrated pest management (IPM), management of soil insect pests, and IPM for landscape and woody ornamentals. While at Auburn, she conducted more than 175 field trials and demonstrations that enabled her to make reliable insecticide recommendations and develop new IPM strategies. These programs resulted in substantially reduced costs and pesticide use, and increased environmental awareness.

Much of her work focused on how to manage mole crickets and fire ants, two of the most destructive turfgrass insects in the southeastern United States. Her techniques for mapping, sampling, and field research have become standards for mole cricket research. Dr. Cobb's management plans involve all interest groups throughout the turfgrass industry. This thorough approach ensures that the management plans are practical and increases the likelihood that the plans will be implemented.

One of Cobb's greatest strengths is her ability to communicate with turfgrass professionals, whether they are seasoned veterans or in their first years

as golf course superintendents. Her ability to deliver the message clearly is valued throughout the industry. She will let it be known when an error has been made, but she does so in a manner that is not to affix blame, but rather to educate, provide solutions, and help golf course superintendents be more successful in their profession.

A noted author, Dr. Cobb has published more than 45 extension publications and written more than 44 trade journal articles and 22 research reports. She is co-author of the book *IPM Handbook for Golf Courses* and for many years co-taught a seminar of the same title for the Golf Course Superintendents Association of America.

She has shared her expertise through work on many industry committees, working groups, and other activities. Currently serving as a visiting scientist on the USGA Turfgrass and Environmental Research Committee, Cobb lends her practical expertise to the review of new research proposals brought before the committee and participates in visits to USGA-sponsored research sites throughout the year.

As a result of her dedication, expertise, and caring for those around her, Dr. Cobb has had a tremendous positive influence on people in every phase of the turfgrass and academic communities. She has served as a challenging mentor and excellent role model for many in the turfgrass industry, always interested in student success and engaged with learning and positive outcomes. Her outstanding character, cooperative spirit, excellent communication skills, and boundless energy make her an ideal recipient of the USGA Green Section Award.

In accepting the award, Dr. Cobb stated, "This award represents to me the work of a whole lot of folks besides me. You've encouraged me along the way. I want to dedicate this award to the golf course superintendents and to those allied with the golf course industry. It's been a team effort, and I've just been privileged to be one member of that team. You are the people who have given me a chance to follow a dream." The turf industry is certainly glad she did.



# Big Challenges – Unique Solutions

February 17, 2001, Dallas, Texas

FOR THE 20TH CONSECUTIVE YEAR the annual Green Section Education Conference was held in conjunction with the Golf Course Superintendents Association of America International Turfgrass Conference and Show. This year more than 1,300 people attended the Green Section's program on Saturday, February 17, at the Dallas Convention Center. James T. Snow, National Director of the USGA Green Section, served as moderator for the afternoon's program of 15 speakers who addressed this year's theme, "Big Challenges – Unique Solutions."

## THE BEST TURF TIPS OF 2000

*One of the most popular annual features of the Education Conference is the Best Turf Tips. This year, 12 Green Section staff members reported on some of the helpful ideas and ingenious innovations they came across while visiting golf course superintendents in every part of the country during 2000. The Turf Tips appear throughout this issue.*

## A Map for Success

*An easy tool in developing pest management strategies.*

by JIM SKORULSKI

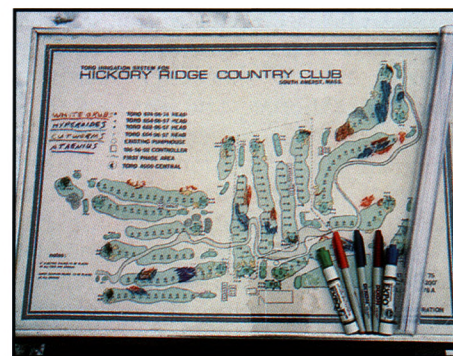
**M**APS have many purposes in day-to-day golf course management. They can serve as an accurate visual reference for irrigation, drainage, communication, and electrical lines. Maps are also used for communication and documentation, inventory purposes, as a historical reference, and in pest and fertilizer management programs.

The advent of Global Positioning Systems (GPS) to produce accurate computerized map images and the Global Information Systems (GIS) to incorporate or link image or map information with related databases further expands the value of mapping in turf management programs. The new computerized mapping technologies hold great promise for irrigation, pest, and fertilizer management programs, and their usefulness will only grow as our industry evolves.

Do not let the lack of a GPS-formulated map or the more sophisticated GIS computer software prevent you from generating and utilizing maps in your management programs. Bob Ruszala, of Hickory Ridge C.C. in Amherst, Massachusetts, has developed a very inexpensive and useful mapping system to aid in implementing an integrated pest management program on his golf course. An irrigation map

generated in 1975 provides an outline of greens, tees, fairways, and other golf course features. Mr. Ruszala uses a sheet of transparent, 8mil-thick vinyl film sized to overlay the map. The material is available in hardware stores under the name Multipurpose Vinyl Film (Tuff Company). Non-permanent marking pens are used to designate on the overlays the soil types, water features, drainage, nesting boxes, and active disease and insect pests on the golf course. The soils, water features, and drainage remain basically unchanged, while the pest activity overlays are updated based on scouting information from daily monitoring. A key is developed for each of the items featured on a particular map.

The overlays created provide an effective means to visualize pest activity on the golf course. They can be used as a documentation tool and are helpful for formulating monitoring and control strategies, and selecting appropriate pesticides. The maps provide a historic perspective of pest activity and expose reoccurring hot spots that might correlate to a specific site characteristic. The hot spots highlighted on the overlays can then be targeted through site modification, cultural practices, or spot treatments with control agents to potentially reduce pesticide use.



*An inexpensive mapping tool can be a useful aid in implementing an integrated pest management program on the golf course. The components of the mapping system include the irrigation map, vinyl film, a completed disease transparency, and nonpermanent marking pens. The maps are easy to update and are helpful for formulating pest monitoring and management programs.*

The cost of the map overlays is minimal. The vinyl film can be purchased in hardware stores in 40" x 15' rolls for about \$40. A wide array of non-permanent markers can be purchased at any arts and crafts or office supply store.

The overlay maps will likely be displaced by computer-generated maps in time. However, this tip provides an easy and economical means to create a very useful tool for pest management and other day-to-day operations, and it is truly a map for success.

JIM SKORULSKI is a Green Section agronomist visiting golf courses throughout New England, upstate New York, and eastern Canada.



# WAVING THE RED FLAG

*A cart use policy for golfers with physical limitations.*

by PAT GROSS

**R**EQUIRING carts to stay on the paths at all times is the dream of most golf course superintendents. It is frustrating to get the course in great condition only to see widespread damage caused by out-of-control golf carts. It makes superintendents want to wave the white flag of surrender.

Instead, Woodland Hills Country Club, in Woodland Hills, California, is waving the *red* flag. Steve Sinclair, CGCS; Kerry Hopps, head golf professional; and the board of directors have developed a program for issuing a red flag to golfers with physical limitations so they can drive on the fairways while still enforcing stricter rules for other golfers who use carts. For many years, Woodland Hills Country Club had a policy requiring carts to stay on the paths at all times, especially on holes one through nine. This policy was devised to reduce excessive turf wear and soil compaction due to narrow, shaded, clay soil fairways.

Like most clubs, Woodland Hills Country Club has some golfers with legitimate physical limitations who require an exception to the rule of limited cart access to the fairways. Unfortunately, some members without physical limitations abused the policy, resulting in additional and unnecessary damage to the golf course. As a compromise, a new program was developed involving a four-step application and review process. It is designed to help those who need assistance while weeding out potential abuses.

Step #1: If a golfer wants to be issued a red flag, the first step is to get an application package from the club. The package contains information that describes the procedure for obtaining a red flag, outlines the cart use rules, and includes an evaluation form that must be filled out by a doctor. The applicant is issued a yellow flag for two weeks to allow access to the fairways while the application is being reviewed.

Step #2: Have a doctor complete the medical evaluation form. The doctor must certify that the patient suffers a medical disability that limits his or her activity level on the golf course. Potential medical conditions include:

- Lumbar disc surgery.
- Neuromuscular disorders.
- Pulmonary disease.
- Other specified disabilities.

The doctor also must list the anticipated duration of the recovery. Golfers are reevaluated every six months to retain their privileges. The doctor evaluation form and the six-month reevaluation are key aspects of the program.

Step #3: The red flag committee evaluates each application. The committee includes members from the golf committee, green committee, disciplinary committee, a physician who is a member of the club, as well as the superintendent and head golf professional. The physician serves as a peer review to avoid abuses and is another important aspect of the program.

Step #4: After the application is approved, the golfer is issued a numbered red flag that can be used only by the designated golfer. The flags are approximately 12" wide and printed with a prominent white number, which is easily seen from a distance. The flags attach to the cart roof supports with velcro strips. A local manufacturer made the flags for Woodland Hills Country Club for approximately \$20 each.

Red flag users must ride alone or with another red or yellow flag user. If cart use rules are violated, a staff member

or fellow golfer can report the incident by simply reporting the flag number. Sanctions are imposed for violating cart rules, including a written warning for the first violation, a two-month revocation of privileges for the second violation, and permanent revocation of privileges for the third violation.

Although the red flag policy has been in effect for less than a year, the club has already benefited from the program. There have been fewer abuses of the cart rules, resulting in better course conditions. The new policy also has created an objective system that provides assistance to golfers with physical limitations. Other major reasons for the success of the program include the doctor evaluation form, having a physician on the review committee, and the six-month review of golfers with red flags. The policy at Woodland Hills Country Club is a reasonable compromise that allows people to enjoy the game without excessive damage to the course from unrestricted cart use. Hopefully, it can do the same for your golf course.

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PATRICK GROSS is director of the USGA Green Section Southwest Region, based in Santa Ana, California. He shares practical information and Turf Tips with the courses he visits in California, Nevada, and Mexico.



*At Woodland Hills Country Club (Woodland Hills, Calif.), golfers with legitimate physical limitations can apply for a numbered red flag that allows them to drive off the cart paths. Application for a red flag involves a four-step process that includes a medical evaluation form that must be completed by a physician.*

- Knee/hip surgery.



# MONEY TALKS

*Quantify maintenance costs to qualify a request for course closure.*

by KEITH HAPP



*Aerification is an essential management tool, and by timing the treatment correctly, maximum benefit can be obtained. This is one reason why more and more golf courses are choosing to close for a short period when conditions are optimal to do what is best for the turf.*

**C**LOSING the golf course for turf maintenance activities can be a difficult concept to sell to golfers. A common response to such a request may be, "No way! The weather will be perfect then; we can't give up the course." All too often, agronomic programs are compromised to avoid golfer inconvenience, and this frequently occurs with aerification practices. Aerification is one maintenance program that, if postponed until later in the season, is often much more disruptive to play. For example, if this cultural treatment is delayed until later in the fall, recovery can also be delayed. Changing environmental conditions, such as lower temperature, soil moisture, and decreasing day length, may not allow for most rapid recovery. Prolonged recovery just perpetuates the perception that aerification serves only as a process to aggravate golfers rather than prepare the turf properly for play.

Ken Flisek, golf course superintendent at The Club at Nevillewood, in Pittsburgh, Pennsylvania, put forth a plan to accomplish all necessary agronomic cultural treatments during the summer. In fact, he proposed closing the course for four days during the third week of August. Ken knows that the timing of aerification is as important as

the aerification technique itself. Communicating to his golfers that the timing of the treatment should coincide with active turf growth and that the optimum time to aerify is when the turf looks the best, was not enough to sell the concept of closing the course to his members. However, aerification is often referred to as the cornerstone of a turfgrass management program, and with this philosophy in mind Ken searched for additional information to further substantiate his request for course closure.

Agronomic reasons for aerifying at the right time of year were presented to the Green Committee. There were distinct concerns about thatch accumulation, soil compaction, and seedbed preparation. In addition, the cost of the entire agronomic effort was quantified. Expenditures for green, tee, and fairway treatments were \$8,708, \$8,021, and \$18,937, respectively. The total cost for aerification was \$35,666, and this cost was going to be incurred regardless of when the treatments were performed. It is difficult, if not impossible, to estimate the cost of not aerifying at the most favorable time. However, Ken wanted to do everything possible to shift away from a position of having to react to problems and treating symp-

toms. His position centered on doing what was right both agronomically and economically for course conditioning. Why not complete the process when the weather was conducive to receiving the greatest value possible from the maintenance investment? Initiating the process during the summer also ensured that sufficient labor resources were available to complete the tasks at hand, within the time frame allotted, and without compromising other agronomic or maintenance issues for the rest of the course.

While many skeptical golfers considered this a great sacrifice, they soon realized the benefits. When the process was completed in a timely fashion, the turf healed rapidly and uniformly. In fact, when golfers returned following the course closure, over most areas it was difficult to tell that aerification had taken place. Turf quality was excellent and course playability was not compromised. The turf was prepared well for the remainder of the golfing season and the winter weather ahead. One major benefit the golfers enjoyed from the course closure in August was that they could look forward to uninterrupted play during the late summer and entire fall. The turf maintenance crew benefited because they could focus on leaf removal and other seasonal course maintenance activities during the fall. For all involved, the short course closure has been a win-win scenario.

There are many uncontrollable factors that affect turf quality and its performance. To prepare golf course turf in general and putting green turf in particular, the need to be proactive is distinct and real. Being proactive begins by communicating the importance of doing what is right for the turf so that playing conditions can meet the standards desired by the golfers.

If aerification has been difficult to schedule and complete, give Ken's strategy a try. Take the time to quantify maintenance costs to help substantiate a request for adequate time to complete necessary agronomic programs when they can be of greatest value to the turf.

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KEITH HAPP is an agronomist in the Green Section's Mid-Atlantic Region, based in Pittsburgh, Pa.



# Lessons from the Lorax

*The golf industry would do well to pay attention to sage advice from Dr. Seuss.*

by FRANK S. ROSSI, Ph.D.

WHILE gazing out his window at the north coast of San Diego, Theodore Seuss Geisel noticed an endless landscape of “condominiums and look-alike houses.” In his eyes, the ever-expanding metropolis exemplified the public’s indifference to the environment. After reading many “dull things on conservation, full of statistics and preachy,” he decided to make the subject more amusing by having it come to life in a child’s story. This difficult task eventually led to Dr. Seuss’s first serious case of writer’s block.

To escape the concrete jungle of southern California, Dr. Seuss took a trip to the Mount Kenya Safari Club in East Africa. While sitting by a pool, he saw elephants walk across the mountain. The elephants “broke the logjam” and that afternoon 90% of *The Lorax*, a piece of environmental propaganda, was completed.

The story of the Lorax is a polemic about pollution, impassioned and bristling with confrontation and name-calling. Its main character, a Lorax, is a protagonist who speaks for conservation. On the opposing side is the greedy old Once-ler who tells a young boy how a town is ruined when the magnificent Truffula trees are cut down to knit Thneeds, “a fine something that all people need.”

The result of removing the Truffula trees is “smogulous smoke” that causes a “cruffulous croak” and “gluppity glup” that chases the humming fish to “search for water that isn’t so smeary.” In the final scene, with the air and water polluted, the animals evacuated, and the last tree cut down, the Once-ler leans from his mysterious Lurkim and drops the last Truffula seed to the boy, saying,

“Unless someone like you  
Cares a whole awful lot,  
Nothing is going to get better.  
It’s not.”

*The Lorax*, by Dr. Seuss, would be his only book banned from school curricula across the United States. It was his slowest-selling book for a decade, until the booming environ-



*In the final scene of The Lorax, by Dr. Seuss, with the last tree cut down and pollution everywhere, the Once-ler leans from his mysterious Lurkim and drops the last Truffula seed to the boy, saying, “Unless someone like you  
Cares a whole awful lot,  
Nothing is going to get better.  
It’s not.”*





*A golf course property must be shared with all of the local residents.*

mental movement of the 1980s made it his most popular. In fact, Seuss biographers have stated it was his personal favorite. The true question at hand is, what are the lessons that this story holds for the relationship between golf and the environment?

The golf industry experienced a similar "Lorax" event in 1988 when the United States General Accounting Office published *Are the Hazards of Lawn Care Pesticides Underestimated?* Then in 1989, the Attorney General of New York State published *Toxic Fairways: The Risk of Groundwater Contamination from Golf Courses*. Jay Feldman of the National Coalition Against the Misuse of Pesticides (NCAMP), along with other activists, seized the moment to confront the golf industry.

The initial response from the industry was defensive. In 1992, at the GCSAA Conference and Show there was a packed session of thousands of golf course superintendents who heard from Mr. Feldman and officials from the Environmental Protection Agency (EPA). In 1995, the USGA invited Michael Fumento, author of *Science Under Siege*, to speak. He reported the results of a topical search he had conducted on golf courses and cancer. "Golf courses fight cancer, as professional tournaments raise funds," Fumento proclaimed. The crowd erupted and you could sense that the golf course superintendents wanted this crisis over. Still, information was



lacking regarding the fate of pesticides and nutrients applied to turf.

In response to mounting public concerns, the USGA embarked on a multi-million-dollar research initiative to more thoroughly understand the influence of golf turf management on environmental quality. The environment under investigation was air and water quality. Concurrently, Ron Dodson, President of Audubon International, introduced the Cooperative Sanctuary Program to the golf industry to assist golf course superintendents with environmental management. Ron also encouraged the USGA to establish Wildlife Links, a research funding program that investigates the influence of golf turf management on wildlife.

In 1998, the USGA held a symposium at a meeting of the American Chemical Society (ACS) to discuss a decade of environmental research. As a member of the USGA's Environmental Research and Turfgrass Committee at the time, I enjoyed hearing

from leading researchers in the turf industry and reviewing their work in a symposium book published in 2000. The opening chapter, authored by Jim Snow and Dr. Mike Kenna, is an excellent overview of the research to date. In the concluding section, they state, "University research shows that most pesticides used on golf courses, when selected and applied properly, have a negligible effect on the environment."

Audubon International's cooperative sanctuary programs for new and exist-

ing golf courses have grown over the last decade, but still only about 15% of all courses in the U.S. participate. Furthermore, the number of courses receiving full certification for all six environmental categories is less than 3%. Many others have become certified in one or more categories, however. The bottom line is that most golf courses are either not involved or, if they pay the annual subscription fee of \$150, have not actively pursued full certification. The sad irony in all of this is that in many states the Audubon International programs are actively embraced by government agencies as a means of ensuring environmental quality when a new facility is proposed.

Many golf courses throughout the country continue to face public opposition to the use of pesticides and fertilizers. Several communities in California, for example, have banned the use of most pesticides, and in New York this same trend is actively being pursued. The turfgrass industry has



responded by mounting significant lobbying efforts to combat the legislative agenda of advocacy organizations. At the same time, unfortunately, the industry faces new pest problems, such as bentgrass deadspot and gray leaf spot, that require substantial pesticide input to maintain expected quality.

Millions of dollars have been invested in researching the environmental fate of applied chemicals. These studies attempt to determine the role that specific management practices may play in minimizing off-site movement and often use EPA concentrations to evaluate success. In general, these levels are established from toxicological research that determines concentrations that might cause human health concerns. But what if these levels are harmful to other species vital to aquatic ecosystems?

Environmental researchers from Canada published an assessment of the influence of nitrogen pollution on amphibians in a 1999 issue of *Environmental Health Perspectives*. The paper is a review of available water quality information for the Great Lakes region of the United States and Canada. Of the more than 8,000 water quality samples collected in areas surrounding the Great Lakes, 20% of them were found to have concentrations that cause sublethal effects in amphibians, such as physical deformity.

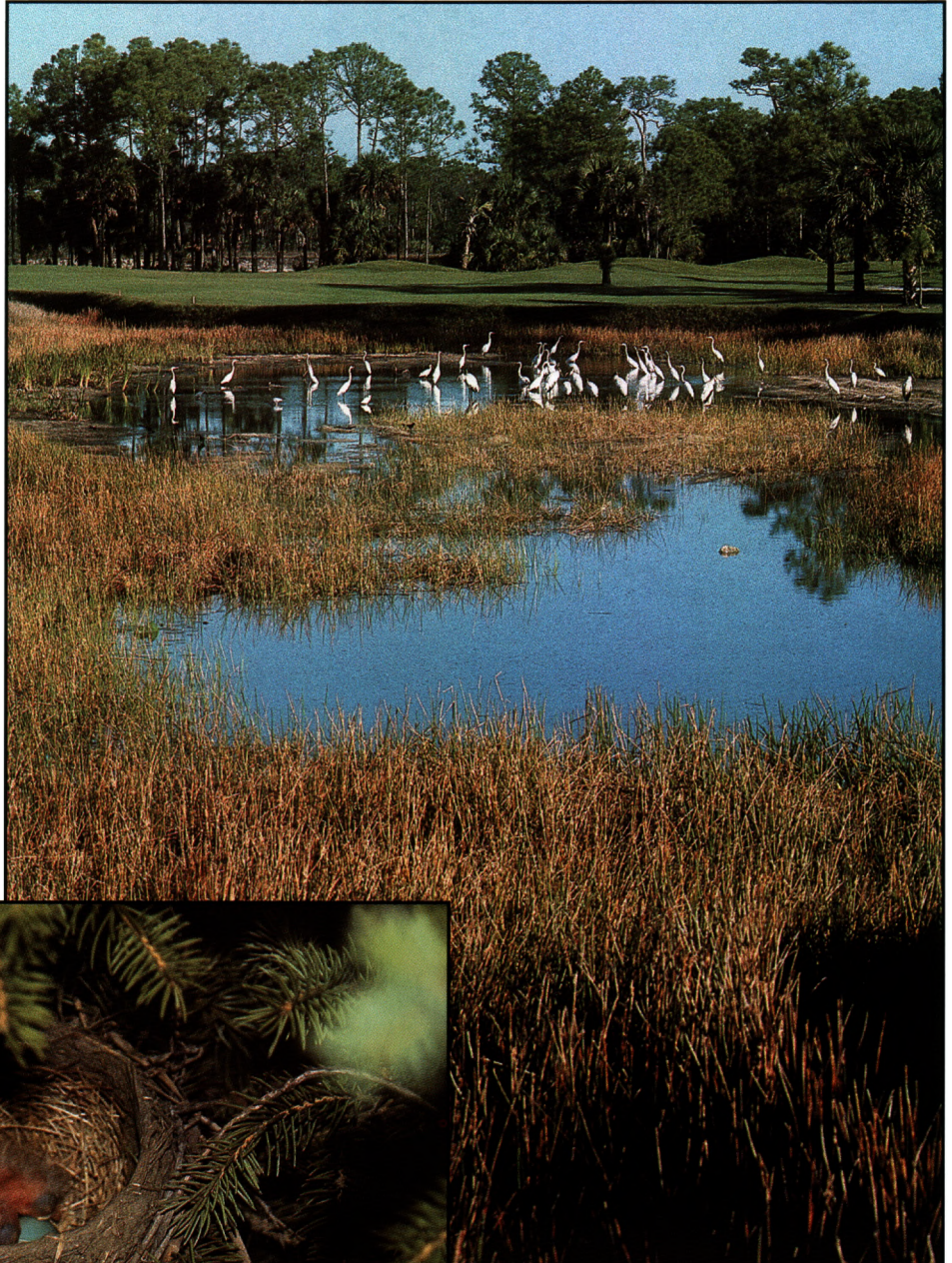
The review did not point a finger at the turfgrass industry, but rather showed the influence of wastewater treatment, livestock management, precipitation, and fertilizer use on nitrate pollution. Clearly, as a major user of fertilizer for turfgrass management, the

golf industry should be aware of the information and adopt best management practices to minimize off-site movement. In addition, golf course superintendents should take every available opportunity to use turf as an effective vegetative buffer or bio-filtration system to protect sensitive aquatic habitats. Now is certainly the time to think about this bigger picture.

Interestingly, the public does not currently view environmental degradation

as a major issue. Gallup polls prior to the 2000 election found that 29% of Americans felt that the environment was either not or only somewhat important. Even though the environment only ranked eighth out of 14 in importance, 15% of the poll respondents said that the environment would be one of the most important issues facing the U.S. in the next 25 years.

Mr. Snow and Dr. Kenna agree on the importance of the environment and



*Golfers play an important role in demanding environmental stewardship. Everyone needs to support those golf course superintendents who achieve environmental excellence.*

*The birth of a new generation is one of the most promising signs of a healthy environment.*



***“As an industry, golf cannot rest on its laurels; it must be vigilant in all its efforts to inform golfers about the ultimate price of their demands.”***



state in the final chapter of the ACS symposium book that “The USGA and the game of golf need to keep asking questions and looking for new ways to maintain golf course grasses. More important, efforts should be increased to educate the golfer about environmental issues.” The importance of these points cannot be overstated, yet I am regularly amazed at how many in the turf industry feel that the environmental crisis is over. I sense complacency among organizations and industry leaders that professional image, labor issues, and expected turf quality are greater challenges now that the results of USGA-funded research studies are known.

There is nothing more important to the well-being of the game of golf and the turf industry than environmental quality. Yes, the data are encouraging in that, as far as we can measure, current management practices appear to have little negative influence on the environment.

At the same time, however, the golf industry needs to scrutinize decisions beyond everyday course maintenance. Should fairways be established with

perennial ryegrass where gray leaf spot is going to be a problem? Are architectural features created on new courses with the environment in mind or a thirst for future television coverage? Why isn't every golf course actively participating in the Audubon Cooperative Sanctuary Program?

If the goal is to reach the public with a positive environmental message, and we know the influence of televised events, why don't we use the medium? Is it unreasonable to request that courses hosting either a major championship or a PGA Tour event demonstrate environmental excellence by enrolling in a program such as Audubon International's Cooperative Sanctuary or Signature Programs, the Michigan Environmental Stewardship Program, etc.? Televised events should highlight environmental stewardship as much as green speed.

Superintendents should be judged by an enviro-meter as much as they are by the Stimpmeter.<sup>®</sup> If golfers do not demand environmental stewardship, will complacency grow until the next crisis? Everyone should support those superintendents who achieve environ-

mental excellence at great risk to their professional stability. I believe we can have environmentally responsible golf and high-quality playing conditions, if we so choose.

Concern for environmental quality will steadily increase as the human population continues to grow worldwide. As an industry, golf cannot rest on its laurels; it must be vigilant in all its efforts to inform golfers about the ultimate price of their demands. In some cases the exact price may not be known, but shouldn't we err on the side of caution? The amphibian study conducted in Canada is only one aspect of what Rachel Carson refers to in her statement in *Silent Spring*, “the fabric of life, on one hand delicate and destructible, on the other miraculously tough and resilient, and capable of striking back in unexpected ways.”

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FRANK ROSSI, Ph.D., is an assistant professor of turfgrass science and a member of the Cornell University turfgrass team. From his office in Ithaca, New York, he has written numerous articles and in each case challenges his readers to actively participate in environmental stewardship.



# Used, But Not Useless

*Modified golf carts to transport supplies.*

by CHRIS HARTWIGER

**F**OR A GOLF COURSE to reach its potential, high standards must permeate every aspect of the maintenance operation. Budgets have been on the rise for years, but recent reports about a downturn in the economy have many turf managers facing reduced budgets. Improving quality with a larger budget is easy, but maintaining good quality at a lower cost is innovative. This turf tip is dedicated to those who are interested in maintaining a high-quality facility while cutting costs.

Mark Hoban, CGCS at the Standard Club (Atlanta, Georgia), and Herb Zeihm, mechanic at the Standard Club, have modified golf carts to transport mowers and carry setup supplies. These setup carts have replaced expensive utility vehicles and trailers, saving the Standard Club thousands of dollars in capital purchases.

## Introducing the Setup Cart

It is an accepted fact that walk-behind mowers produce the highest quality of cut on putting greens. One of the challenges in walk mowing greens is getting the mower from one green to the next. On courses with a small amount of acreage, attaching wheels to the walk mower has been an efficient way for the crew to move from green to green. However, many modern golf courses weave through residential developments or rugged terrain and feature long distances between putting greens. These courses typically use expensive utility vehicles and trailers to transport the mowers.

Mark Hoban realized utility vehicles and trailers can cost three to four times as much as the mower and that the type of transport vehicle had nothing to do with the quality of cut. He knew there had to be a better way. Working with his mechanic, Herb Zeihm, Hoban decided to modify an old golf cart to act as a setup cart that could carry one walk-behind greens-mower.

The setup carts at the Standard Club contain the following items:

- Walk-behind greensmower.



*Creating an inexpensive setup cart saves a golf course thousands of dollars without affecting the quality of the playing surfaces. The setup cart eliminates the need for a trailer and also carries a clipping container, backpack blower, whipping pole, and other essentials for morning jobs.*

- Whipping pole.
- Backpack blower.
- Brush attachment for mower.
- Clipping can and yardstick.
- Insecticide for fire ant mounds.
- Mowing route and directions.
- Rain gear.

To say the setup cart has been a success at the Standard Club is an understatement. The club has saved thousands of dollars in capital purchases that might have gone for utility vehicles and trailers. The approximate cost of creating a setup cart is \$1,500 for the golf cart, \$200 for materials, and \$50 for headlights. The mower platform keeps the bedknife elevated, which reduces the potential for knocking the bedknife out of adjustment during transport. Hoban acquires needed carts every three years as the Standard Club replaces its golf car fleet. Also, the setup carts require little or no annual maintenance. Finally, the setup carts greatly reduce the prep time before leaving the maintenance facility in the morning.

## Creating and Maintaining Your Own Setup Cart

The most difficult part of creating a setup cart is locating a golf cart. All the other supplies for the platform are readily available and are outlined below:

- Heavy-duty springs (2).
- Metal brackets (angle iron).
- $\frac{3}{4}$ " plywood.
- Mounting hardware.

Construction of the platform and brackets is straightforward, but attaching the platform bracket to the frame of the cart may require some trial and error, depending on the type of cart. Contact Mark Hoban at the Standard Club for detailed plans for the setup cart.

Hoban has found that there is much less maintenance with an electric setup cart than with a gasoline-powered vehicle. The repairs that have had to be made over the years have been infrequent, inexpensive to fix, and easy to complete. Parts that sometimes need to be repaired or replaced include batteries, battery cables and connections, solenoids (rarely), and tires.

## Conclusion

Budget reductions do not mean that quality must be sacrificed. The creation of a setup cart is just one example of cutting costs while maintaining high quality. Let your imagination go, because one person's trash just might be another person's treasure.

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CHRIS HARTWIGER shares innovative ideas as agronomist for the USGA Green Section Southeast Region, based in Birmingham, Alabama.



# NATURE WILL FIND A WAY

*Common myths about soil microbiology.*

by MIKE KENNA, Ph.D.

**T**OO OFTEN, we fall into the trap that the system is broken and we need to add something to it or manage it differently to make it better. Advertisements and secondhand stories abound about the increased use of microorganism products on putting greens. This turf tip deals with three common myths about putting green soil microbiology that are used to persuade people to apply microorganisms to their greens.

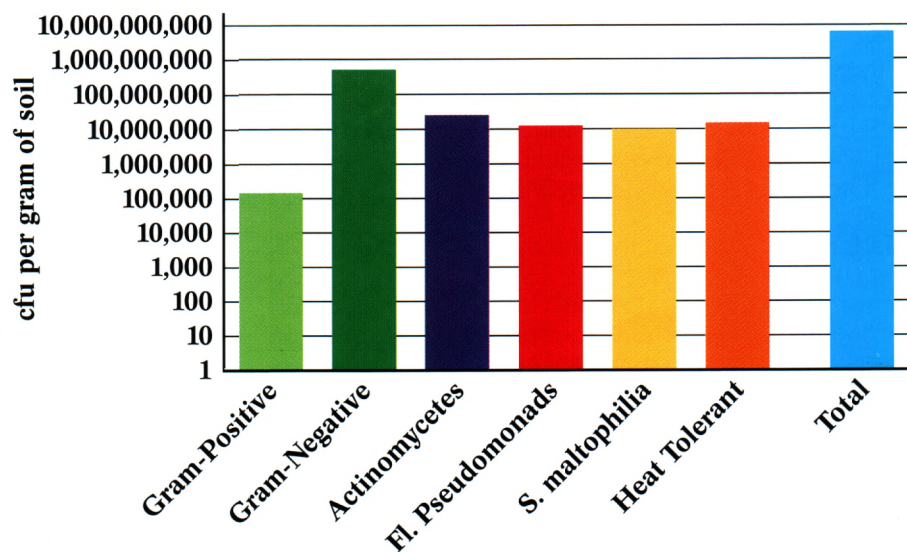
*Myth #1: A product is needed because microorganisms cannot establish in the harsh environment of a sand rootzone.* A two-year research project at Clemson University by Dr. Horace Skipper investigated the number and diversity of microorganisms found in amended sand bentgrass greens at the Charlotte Country Club, in Charlotte, N.C.

In Figure 1, the average of eight sampling periods for six microorganism categories and a combined total of all microbes are reported. Note that this is a log scale rather than a linear scale. If it were a linear scale, this graph would be impossible to draw. In other words, if one unit on the scale is equal to one inch, a million would be 16 miles, and a billion would reach nearly 16,000 miles. For example, the average gram-positive bacteria found were 100,000 per gram of soil. If a linear scale were used, the bar would have to extend 100,000 inches or 1.6 miles.

For most all of these soil bacteria categories, there were one million to 10 million colony-forming units found in a single gram of soil (Figure 1). More importantly, there was a total of 10 billion colony-forming units in a single gram of soil. This represents only a small fraction of the soil microbe species that scientists can easily culture and identify at this time. ∴ Microorganisms easily establish themselves in sand-based greens.

*Myth #2: Fumigation will kill all the beneficial microorganisms in putting greens.* Dr. Monica Elliott at the University of Florida demonstrated that for every soil bacteria category, except the fluorescent pseudomonads, microorganism levels were equal to or greater than the pre-fumigation levels and

**Figure 1**  
Six categories of bacteria were monitored in new sand putting greens established to creeping bentgrass at the Charlotte Country Club in North Carolina. For most all of these soil bacteria categories, averaged over eight sampling dates, numbers ranged from a million to 10 million colony-forming units (cfu) in a single gram of soil. An average of more than one billion cfu were observed in a single gram of soil.



**Table 1**  
Number of bacterial colony-forming units per gram of soil found in a sand putting green before fumigation and 23 days after treatment.

Bacterial Group	Pre-Fumigation	23 Days	
		Control	Methyl Bromide
		Colony-Forming Units Per Gram of Soil	
Total	6.9	6.6	7.0
Fl. <i>Pseudomonads</i>	2.5	1.6	0.0
<i>S. maltophilia</i>	2.6	0.8	3.1
Gram positive	2.3	0.7	5.2
Gram negative	5.1	4.6	5.3
<i>Actinomycetes</i>	3.2	3.0	1.9

untreated control 23 days after treatment (Table 1).

A similar study on bermudagrass greens repeated at Clemson University and the University of Florida found the same results. All six categories of bacteria, including the fluorescent pseudomonads, reached levels of one to 100 million colony-forming units per

gram of soil in less than two years after fumigation (Figure 2). ∴ Fumigation does not sterilize the soil.

*Myth #3: Repeated use of fungicides will kill all the beneficial soil microbes in a putting green.* Dr. Gary Harman at Cornell University conducted a three-year study comparing an untreated control with repeated applications of



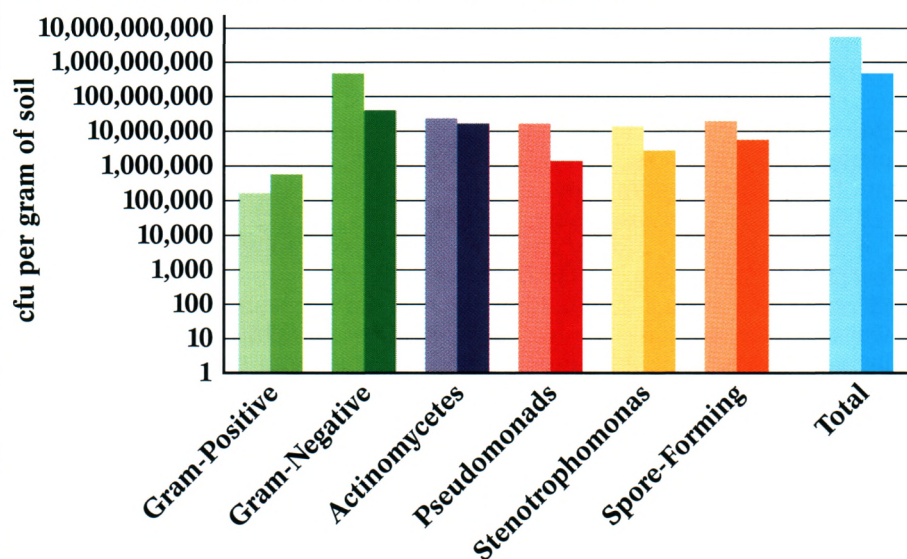
eight fungicides (Figure 3). The products included Daconil, Chipco, Subdue, Banner, Bayleton, Prostar, and Sentinel. There were no significant decreases for the soil microbes measured during each of the two-month sampling periods for the years this study was conducted. ∴ Fungicide use does not have a significant effect on numbers of soil microorganisms.

## Conclusions

Do not be fooled by false advertising or sales pitches. Scientific research indicates that microorganisms establish quickly and thrive in high-sand root-zones because they grow in association with plant roots. They have evolved over millions of years to have this close relationship with plants, *not* soil particles.

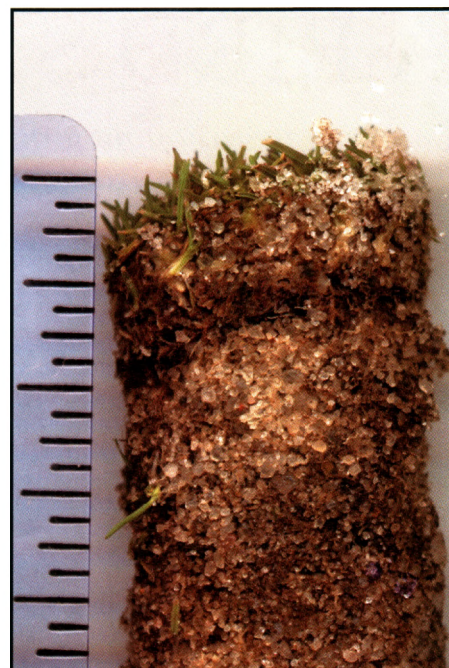
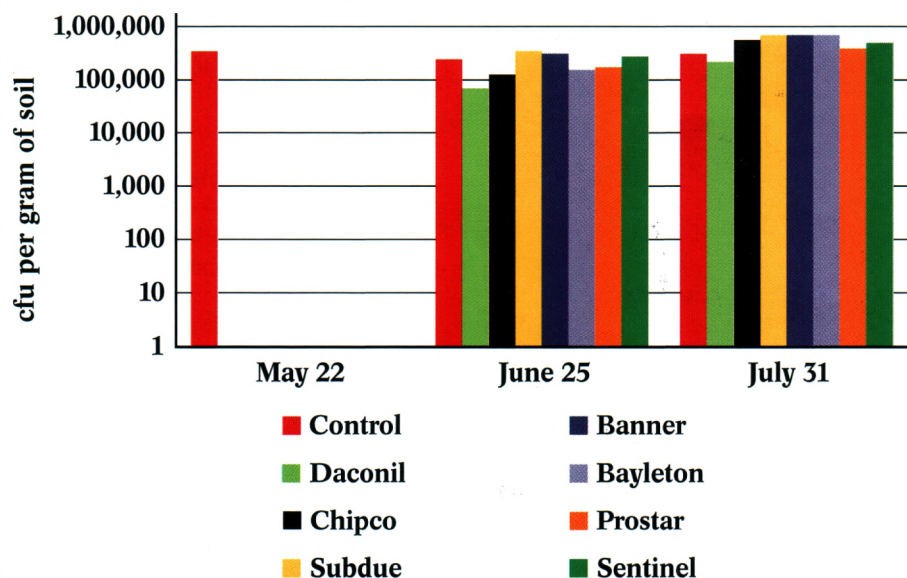
**Figure 2**

A two-year study conducted at Clemson University (lighter bars) and the University of Florida (darker bars) indicated that fumigation had no effect on the soil microbiology of amended sand putting greens.



**Figure 3**

Actinomycetes were monitored for two months during repeated fungicide applications in a study at Cornell University. In most cases, fungicide applications had little effect upon microbial populations, even when the microbe assessed was quite sensitive to the fungicide in question.



Scientific research indicates that microorganisms grow in association with plant roots and establish quickly and thrive in high-sand rootzones.

Second, fumigation does not kill all the beneficial microorganisms. There are billions of microbes that lie dormant in the soil and are not awakened until an actively growing root provides them a home.

Last, fungicide applications have an insignificant effect on numbers of microorganisms. This is most likely due to the way fungicides adsorb to turfgrass leaves, which in turn makes it difficult for them to move downward into the soil. Systemic fungicide products would have even less effect on soil microorganisms.

Remember, a proper rootzone that maintains 45% mineral, 3-5% organic matter, 20-30% air-filled pore space, and no more than 20-30% water-filled pore space will provide an adequate growing environment for putting green cultivars. In turn, this will promote the growth of billions of naturally occurring microbes in just a single gram of soil. You will be able to maintain this naturally occurring balance with adequate sunlight, proper irrigation and nutrition, and using common sense to provide reasonable mowing height and cultivation regimes.

So tell the sales people who insist you have a problem that we do not need their magic because . . . *nature will find a way!*

DR. MIKE KENNA is the director of research for the USGA Green Section.



# A BIRD'S EYE VIEW

*Checking irrigation performance with aerial infrared photography to help illustrate irrigation system deficiencies.*

by BRIAN MALOY

CONVINCING golfers or course owners to upgrade an irrigation system can be a challenging task, to say the least. During the summer months, players often make comments like "Is the irrigation system turned off?" or "Why are there so many dry spots on the course?" Most golfers are simply unaware of the irrigation system limitations at their courses. Displaying aerial photographs of the golf course may be just the ticket to help convince the skeptics.

At the heart of the issue is the fact that many older courses were built with limited irrigation coverage. Consequently, it is not uncommon to find only a single row of sprinklers down the middle of the fairway. Larger in-ground sprinklers have replaced quick couplers, but they are not capable of meeting the specific watering requirements of the terrain. For example, due to the slopes and contours it is impossible to water a mound without most of the water running down the hill into the lower-lying areas. Computerized syringe and soak cycles of modern-day irrigation systems can help mask this situation, but ultimately smaller appropriately spaced sprinklers that can be run independently are the best solution.

Many players simply don't realize that their irrigation system is technologically obsolete. Therefore, it is critical for superintendents to make the club leadership aware of irrigation limitations so that they can be addressed in the long-range plans. One strategy that superintendents can take advantage of is an annual USGA Turf Advisory Service visit to help increase players' awareness about crucial agronomic limitations, including irrigation system deficiencies. Unfortunately, a complete irrigation system renovation can easily exceed \$1 million. Just discussing the cost of such a system will likely raise a few eyebrows with players not familiar with irrigation costs. In addition, there is always concern about losing revenue while the improvement is underway. Overcoming these roadblocks is essential if the golf course is to continue to improve.

During periods of drought, the lackluster performance of any irrigation system becomes obvious. Yet, while course officials seem to understand the terrible conditions that often plague the agricultural industry, there seems to be little compassion for similar problems on the golf course. Chuck Gast, golf course superintendent of The Country

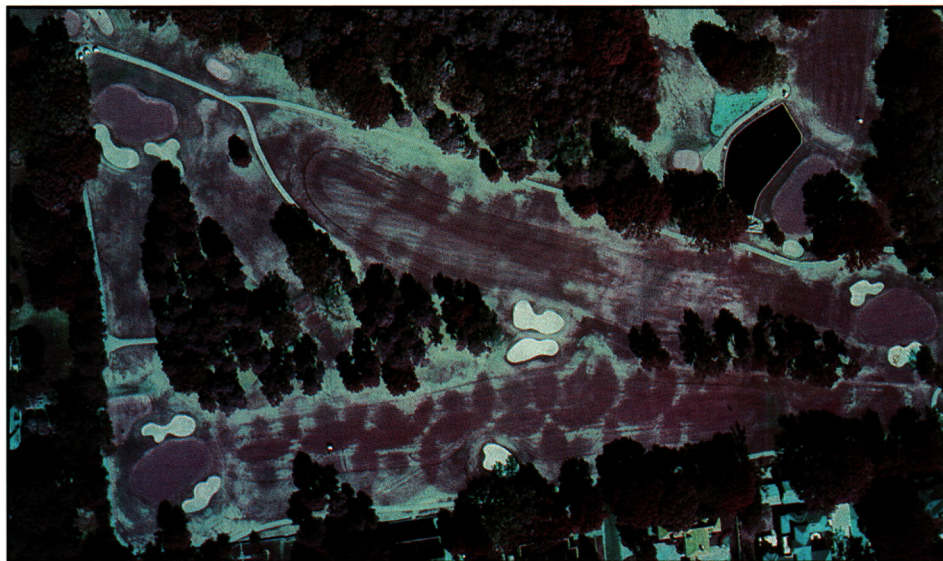
Club of Little Rock, in Little Rock, Arkansas, used common sense to help his players realize the limitations of their irrigation system. His intent was to encourage his course officials to include an irrigation system renovation in their long-range plan. Most superintendents only want to take pictures of their golf course when it looks its best, but Chuck suggests taking pictures when it looks its worst.

During the height of the 1999 drought, Chuck hired a professional aerial photographer to take infrared pictures of the golf course. Color infrared photography was chosen because the technology provides five times more contrast between stressed and healthy areas of turf. In most cases, the professional photo shoot can be accomplished for less than \$500. To obtain a price quote, check your local yellow pages under the heading "photographers – aerial."

The picture was blown up and displayed in the clubhouse to illustrate the shortcomings of the irrigation system. Now the picture is prominently displayed in the maintenance facility as a gentle reminder of the importance of an upcoming project within the long-range plan. It is said, "A picture is worth a thousand words." Sometimes that is just what is needed to make course officials aware of course deficiencies.

Chuck's ingenuity used the drought to his advantage. Taking aerial photographs of the property provided the players with a different perspective of the irrigation system. After reviewing the aerial photographs, the club leadership has decided to schedule an irrigation renovation as a key component of their long-range plans. So, if you are having difficulties convincing your players or course owner of the necessity to upgrade the irrigation system, consider looking at it from a bird's eye view.

BRIAN MALOY has been an agronomist for the USGA Green Section Mid-Continent Region since 1996. He conducts Turf Advisory Service visits in Arkansas, Louisiana, Mexico, New Mexico, Oklahoma, and Texas. His office is located in Carrollton, Texas.



*Aerial photographs of the golf course give another perspective of the irrigation system's performance. Color infrared film provides five times more contrast between stressed and healthy turfgrass areas than standard film.*



# Multi-Task Mowing

*A strategy for combining routine jobs to compensate for limitations in resources.*

by JOHN FOY

**P**ALM BEACH County, Florida, claims to be the Golf Capital of the World. Across the state on the west coast, Collier County and the town of Naples are supposed to have the highest numbers of golf courses per capita of any location in the United States. With hundreds of courses already in these areas and more coming on line each year, it is difficult to argue against these claims. Furthermore, I would venture that there are not many other areas of the country where you will find a similar concentration of highly maintained courses.

While the primary focus is the winter season, there is really no off season for South Florida courses. Furthermore, the vast majority of courses are part of real estate developments and must be maintained from property line to property line. The combination of year-round operation and very high standards dictates large budgets and a lot of staff. Golf course management in South Florida is indeed a unique proposition.

While the majority of USGA Turf Advisory Service (TAS) visits in Florida are conducted in South Florida, we also visit a number of clubs and courses throughout the rest of the state. Visiting courses in Central and North Florida provides diversity in management concerns and, in some instances, a good reality check. This was the case this past fall when a TAS visit was conducted at the University of South Florida Golf Course in Tampa. The University Course is a daily-fee operation and the green fees are on the low to moderate end of the scale for Florida. Typical of other daily-fee operations, the annual budget is based solely on the revenues generated.

The operating budget and size of the staff at the University Course are below average for the Central Florida area. Naturally, this presents a number of challenges to Jim Torba, the course superintendent, who also oversees maintenance of all of the sports fields for the university. With 18-hole rounds starting on the first tee, and nine-hole rounds going off the tenth tee each morning, simply getting the course ready for play each day is a big chal-

lenge. Yet, as they say, "necessity is the mother of invention."

Given the limitations in both time and staff size, multi-task mowing has proven to be a good solution for accomplishing daily course maintenance. Working with the head mechanic, Francesco Pisacane, some simple modifications to the triplex putting green mowers were made so that

facility. Thus, there was a very minimal investment in money and time.

Each day the operators assigned to mow the greens also change the hole location before going to the next green. This process is utilized to help minimize scalping of the freshly changed hole plugs. Besides increased operating efficiency, Mr. Torba pointed out that because of the additional training and



*Jim Torba, golf course superintendent at the University of South Florida Golf Course (Tampa, Fla.), uses some creative ingenuity to combine routine jobs to compensate for limitations in resources. Simple modifications to a triplex putting green mower result in the ability to make mowing multi-tasked.*

multi-task mowing could be practiced. The modifications consist of a bracket to hold a hole cutter, a plastic milk crate attached to the back of the mower to carry a sand bucket and tools, along with a PVC tube and metal frame for carrying flagsticks and a dew whip. All of the materials needed to fabricate these modifications, except the milk crate, were found at the maintenance

higher skill level of the operators, fewer problems are experienced with changing and location of the holes on the putting greens. Thus, if limitations in labor are an issue at your club or course, you might want to consider multi-task mowing.

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JOHN FOY is director of the USGA Green Section Florida Region.



# Are You Missing Anything in Your Efforts to Communicate?

*A website provides a tool to communicate current information regarding golf course maintenance operations.*

by **DARIN S. BEVARD**

**I**N REPEATED surveys regarding the skills golf course superintendents need, better communication skills continue to be mentioned at the top of the list among course officials. In numerous publications, superintendents state that maintaining turfgrass is often the easiest part of their job. Interacting with people is the most difficult. These two statements provide a great insight into the relationship between the superintendent and course officials.

Many different priorities and agendas exist within the framework of turfgrass maintenance at public and private facilities. The golf course superintendent is ultimately responsible for setting priorities and coordinating maintenance, whether it is for the putting greens or the clubhouse grounds. Oftentimes, the public at large is not privy to the goals that management sets and the superintendent implements on the golf course. Communicating the priorities and goals of the golf course maintenance staff as they relate to the needs of the customer can make interacting with people easier and more productive.

So what are the best ways to communicate? There are standard ways of communicating with members and customers, such as through newsletters and bulletin boards. Unfortunately, newsletters are published monthly at best, and an individual must be at the facility to see a bulletin board. Of course, face-to-face communication is still very important. However, not every person, superintendent or otherwise, is comfortable with speaking before groups or even talking face to face with the people in power. In a world of cell phones, pagers, and the Internet, other options are available.

One available avenue of communication that, in my opinion, is being underutilized by superintendents is the Internet. Many private and public golf courses now have websites. Several superintendents have taken the opportunity to ask for a portion of their course's website so information can be



*Kennett Square Country Club (Pa.) uses a golf course maintenance website to introduce crew members to the membership and provide regular updates on course conditions, weather impacts, daily maintenance routines, and future projects.*

provided about golf course maintenance. These superintendents can inform their customers about the daily operations and goals of the golf course maintenance staff. Pictures can be posted easily to show progress on current projects. Maintenance schedules can be posted so that people know what to expect regarding pesticide sprays or disruptions in play due to tasks such as putting green aeration. In this way, individuals have regular access to information that they may be interested in. Additionally, the information can be updatable easily so it can be kept current.

A very high percentage of golfers are accessing the Internet. At Brandywine Country Club, in Wilmington, Delaware, the club was interested in initiating a website. Superintendent Randy Hess said that a club survey indicated that 85% of the membership had Internet access. Thus, a website seemed to be a good way to reach the members. Brandywine Country Club is moving forward with its website.

At Kennett Square Country Club, in Kennett Square, Pennsylvania, superintendent Joe Liebsch has been maintaining communications with his membership through a website for six months. The site has provided the opportunity to introduce the maintenance staff and update the membership on everyday maintenance issues. Addi-

tionally, timely updates can be provided. In December, when a severe storm brought close to four inches of rain, Mr. Liebsch was able to post pictures of course damage that occurred, especially to the bunkers. Very cold weather prevented the bunkers from being repaired due to frozen sand and ice-covered bunkers. These facts were provided in the weekly "Grounds Update" on the club's website, alerting the membership to the unfortunate condition of the bunkers. Past updates are archived for those who may have missed them or want to review them. However, as Mr. Liebsch mentioned, people cannot be forced to the site, and promotion of the website is needed to make the membership aware of what is available.

Several web companies specialize in websites for golf courses. Usually, updating the sites is quite easy to accomplish through the website host. Text and pictures can easily be included. A digital camera allows for this information to be e-mailed to the hosting company for quick posting, but photos can be scanned for the website as well. For private clubs, membership numbers provide access to the club website.

A website may not be for everyone. Discipline is needed to maintain current information on the site. Interest can decline quickly if regular updates are not provided. Additionally, there is no substitute for good face-to-face communication with the membership. However, the golf course superintendent's job does not always allow for face-to-face meetings with all parties on a consistent basis. Having a web page that highlights the activities and philosophies of the superintendent and his crew can be a valuable tool for the superintendent and the entire golf course operation.

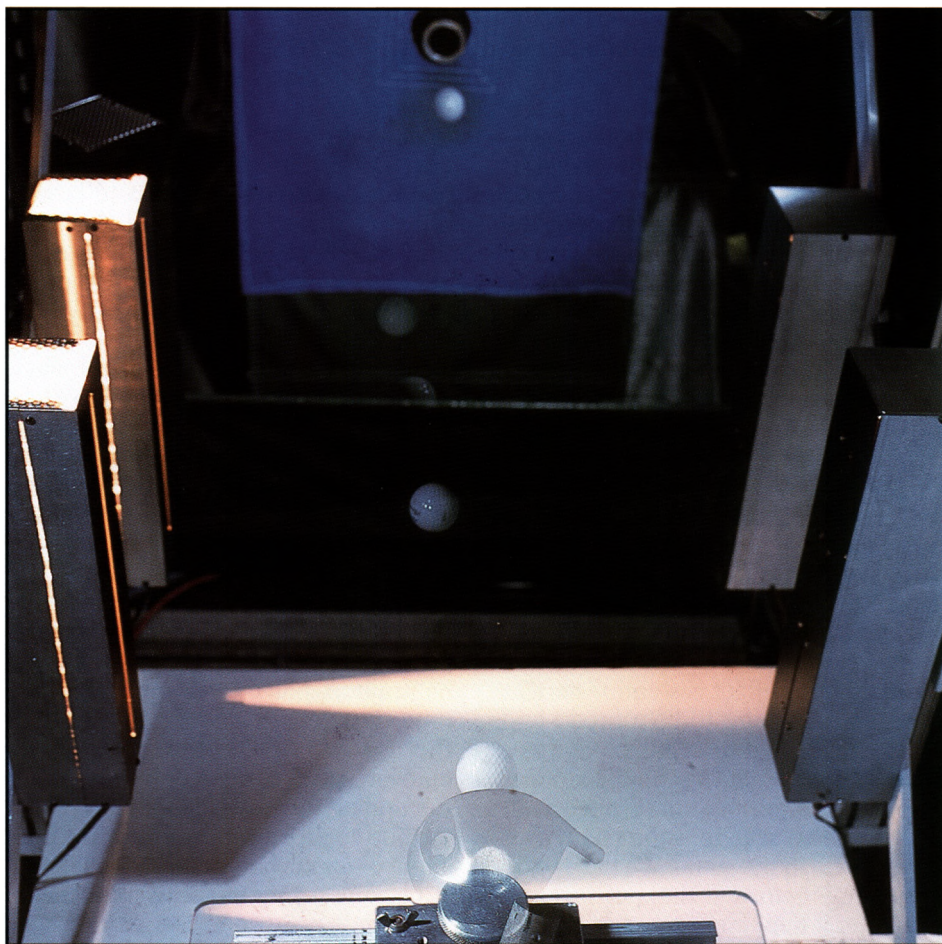
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*DARIN BEVARD has been an agronomist in the Mid-Atlantic Region for four years, visiting courses in Delaware, Maryland, Pennsylvania, Virginia, and West Virginia.*



# SPRING FEVER

*Dick Rugge Q&A – The head of the USGA Test Center fields some frequently asked questions.*



*The USGA's test to determine its coefficient of restitution (COR) measures the rebound velocity of a golf ball fired at a clubhead.*

*Ed. Note: This presentation summary was originally published in the March/April 2001 Golf Journal magazine.*

SINCE Dick Rugge first heard the words “spring-like effect” a few years ago, he has read and seen as much fact as fiction on one of the industry’s hotly debated topics. Every golfer Rugge meets, it seems, has an opinion on the subject, and not all of it is based upon scientific research. Rugge, who in early 2000 became the USGA’s senior technical director, recently sat down to discuss the physics and philosophy of the matter. An 11-year veteran of club development for a major equipment manufacturer, Rugge discussed how and why his Test Center staff examines clubs for spring-like effect, as well as why the game’s two

governing bodies are not in complete agreement on the matter. The questions included those posed most frequently to the USGA.

**Q:** What is spring-like effect?

**A:** I can best describe it by describing the test. We fire a golf ball at the face of a clubhead, and we measure the velocity of the ball just before it hits the clubhead. It strikes the clubhead and rebounds in the opposite direction. We measure the velocity again after it bounces off the clubhead. For example, if the ball started at 100 mph coming in, bounced off the head, and went back at 75 mph, we would say that club has a coefficient of restitution, or COR, of 75 divided by 100, or .75, or 75 percent.

If we put a persimmon clubhead in that test, the ratio of the outgoing velocity to the starting velocity is about

78 percent. When we replace that club with the first generation of steel clubs, it’s a tiny bit faster going out, about 78.5 percent. First-generation titanium clubs are about 79 percent, maybe 79.5. It’s hard to notice a difference. But then titanium clubs started to evolve; they became larger and the face became thinner. What started out at 78 percent with wood, and 79 percent or so with first-generation titanium, went to 80, 81, 82 percent. So the ball’s going out faster than it had with previous models.

The USGA developed this COR test and put a limit in of 83 percent. That has been the limit for more than two years. Since that limit was put in place, some clubs have come on the marketplace that have exceeded that limit. They’ve gone up to 84, 85, as much as 86 percent.

**Q:** Is it possible that further development will take those numbers even higher?

**A:** We’ve studied it with very good engineers we have working at the USGA, and consultants and physics and mechanical engineering professors from places like the Massachusetts Institute of Technology, Princeton University, and Lehigh University. They have studied this at length and have told us we can expect a limit of perhaps 88 percent.

So where we started out was 78 percent. Where we think it can end up is 88 percent. We drew a limit right smack in the middle, at 83, and clubs so far have gone to about 86.

**Q:** What does this mean in terms of additional yardage a player may get?

**A:** Let’s assume a good PGA Tour player swinging that wooden club hits it 289 yards – a long poke. As he changes his club and increases his COR, let’s say he goes to the USGA conforming limit of 83 percent. He’ll get another 10 yards and that 289 will become 299. If he continues on with the highest COR club we’ve seen so far, that will be a 305-yard hit, and if he continues on with what we expect to be the maximum, it’ll be about 309. So he will have gained 20 yards from the wood. We’ve drawn a line at 10 yards, and he can get another 10 on top of that.



**Q:** What does any of this mean to the average player?

**A:** A player who hits the ball 220 yards is going to get about three-quarters of the benefit. In other words, that player's going to see an increase of about seven or so yards at the conforming limit of 83 percent and about 15 yards at the ultimate.

Now that is if – and that's a big “if” there – the player happens to hit it right smack on the sweet spot, because that is where this effect occurs. What I mean by that is, within the half-inch diameter circle of the sweet spot is where this effect works. Outside of that, the above-the-limit COR goes away. So you've got to be able to swing it pretty hard, but more importantly, you've got to be able to put it on the sweet spot reliably and repeatedly.

**Q:** Some people have said the USGA is stifling innovation. Is that true?

**A:** No, not at all. Consider in the past 20 years some of the equipment innovations: metal woods, shafts of exotic materials, long putters, square grooves. Those help golfers of every ability. But spring-like effect doesn't do that; it generally helps the very best player most and rarely helps the lower-ability player.

I'll give you an example of a technology that has had just the desired impact. The perimeter-weighted iron helps the lower-skilled players far more than it helps elite players. Elite players really don't need it because they always hit the ball very close to the sweet spot. The benefit of the perimeter-weighted iron is that when you hit it off center, you get a better shot than you would have gotten without perimeter weighting. And that makes the game more

enjoyable for those players who can't reliably put it on the center of the clubface. That's the kind of technology the USGA likes to see.

**Q:** Is excess spring-like effect possible because of the thinness of a clubface?

**A:** I'll give you the recipe to make a spring-like driver: Make it from titanium, make the clubhead broad, and make the clubface thin.

Why titanium? Because titanium is strong and light and allows you to make it big. But titanium is also springier; it has a higher elasticity than steel. Then you make a big face; by the same token that a long diving board is springier than a short one, the bigger face is springier than a small one. Think about a diving board that's a foot long versus one that's 15 feet long. You're going to get a lot more spring out of the 15-footer. And the third thing is, make the clubface thin. Thin gives more than thick does.

**Q:** How thin are we talking about for these clubfaces?

**A:** They're a little bit more than a tenth of an inch, or less than the thickness of a compact disc.

**Q:** Why does the USGA believe that regulating this effect is so important?

**A:** Golf is meant to be a broad and deep challenge for a golfer, and we want to make sure equipment doesn't alter the balance it should have with skill in such a way that the challenges become less in the game. We have to do something before it happens rather than after it happens. Our mission is to protect the game.

There are two examples I'll cite – two sports that have been longtime competitors for participants with golf.

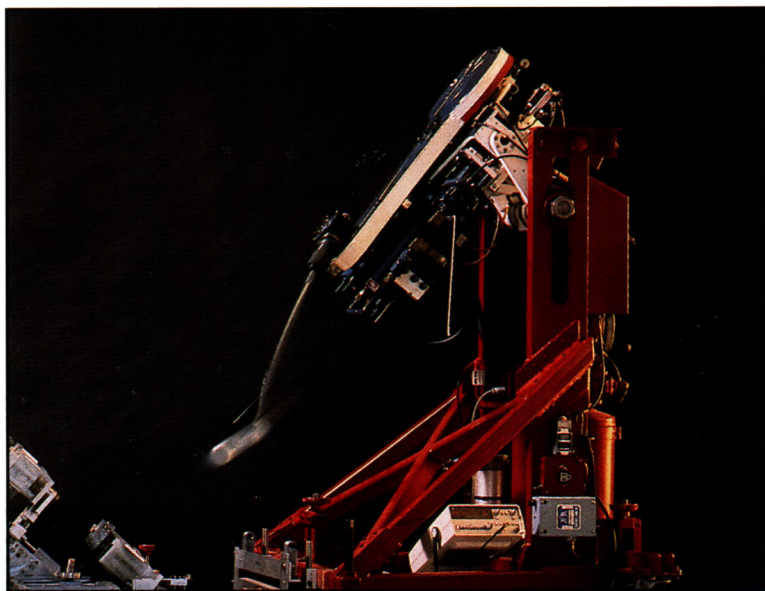
One is bowling. If we went back 30 years, we would find a couple of interesting things. There were about 9.5 million serious bowlers, as defined as people who belonged to bowling leagues and bowled every week. There were about 900 perfect games rolled in the United States in 1969. During the ensuing decades, there have been a lot of technical changes made to bowling equipment, to balls and the lanes themselves. Bowling ball ads today look like golf club ads. They talk about moment of inertia and the use of titanium, believe it or not, and having different surface treatments that grab the lanes better, all for the purpose of allowing for control and supposedly to give the bowler more enjoyment of the game. Well, they've made the game more “enjoyable” in a couple of ways. Those 900 perfect games in 1969? In 1999, the number had swelled to 35,000. Many lanes never saw one in a year and now it just happens all the time. And by the way, those 9.5 million serious bowlers have shrunk to about 3 million.

Another example: tennis. In 1975, the high-water mark of tennis participation in the U.S. reached about 34 million players. About the same time, the oversize racket was brought to the U.S. to make the game more enjoyable and easier to play and more fun and all those kinds of things. From 1975 to 1985, one decade later, the elite game of tennis had markedly changed. It became a power game. The finesse that had been present before was largely gone, and it wasn't so interesting to people anymore. And that 34 million had shrunk to about 13 million – interestingly enough, about the same ratio as bowling. And according to people at the United States Tennis Association, the hardcore tennis players stayed. The ones lost were the marginal players, the ones the game was trying to turn into hardcore players. They disappeared.

Now I can't say for sure it was the oversize tennis racket that drove them all away, but it sure didn't keep them in the game. I think it's our responsibility not to allow unchecked technology experiments, like they had in bowling and tennis, to come into golf. To be true to our mission of protection, we can't take these kinds of chances, especially when other sports have shown that an easier game resulting from equipment “advances” is not the road to more participation.

**Q:** Why have the USGA and the Royal & Ancient Golf Club, the two

*Iron Byron, the mechanical golfer, reproduces a golfer's swing. It can be used for both indoor and outdoor testing.*





governing bodies, taken different positions on the need to test for excess spring-like effect?

**A:** The USGA and the R&A have taken different positions based not on science, but on philosophy. The R&A looked at the same data and said, "Well, the highest COR clubs today gain only about six yards on top of the USGA limit." The USGA looked at the same data a little differently. The USGA said, "Wow, that's six yards and that's already on top of 10 we allowed by setting the limit at 83 percent. So that's 16 yards. That's a bunch."

The other part of that philosophical difference is that the R&A looks at the clubs that have been made so far and said, "Well, that's about as much as they're going to get. They're not going to go to 88 percent as the USGA said they might."

Driven primarily by my years of working at a major club manufacturer with multi-million-dollar research-and-development budgets and 50 engineers working away, I tend to think the manufacturers will continue to exceed the results with their second, third, and fourth models. I have a more optimistic view of their abilities than the R&A does. I don't think they are finished. I think they're just beginning. The R&A thinks the future is already here.

**Q:** What supports your view?

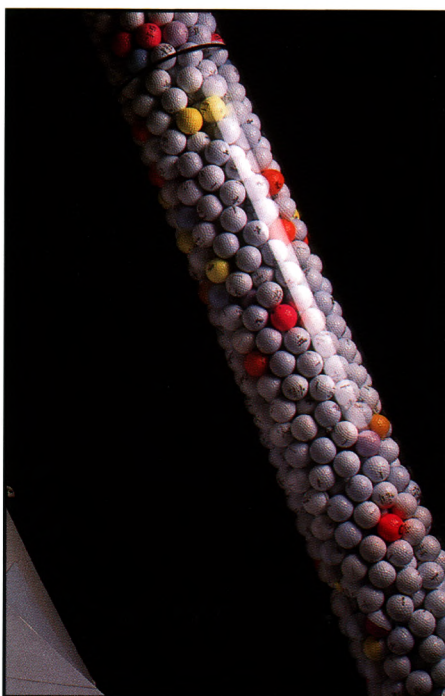
**A:** My experience in the business. You find something, get a first try at it, then keep working at it. You don't stop until you really have nothing more in the well. And I think they have something more in the well.

COR is not the crux of club design. To my way of thinking, it's one small part. There are many opportunities to make clubs that are more enjoyable to play, that work better for any specific golfer. To focus so much on this one issue is not in keeping with the history of golf. The history of golf proves that new development comes from all angles, and I would say the recent merchandise show in Orlando showed that. There wasn't much of a focus on high-COR clubs, if any at all, yet we saw some new, interesting developments in shafts, grips, and clubheads, all within the Rules.

**Q:** The way clubs are developed for the marketplace has changed drastically in recent years. How would you characterize the changes in this era of clubmaking?

**A:** Certainly it has been a more engineering-driven era in the past 10 or 15 years, which is the era I've been in-

***"Equipment innovations of the past 20 years have helped golfers of every ability. But spring-like effect doesn't do that; it generally helps the very best player most and rarely helps the lower-ability player."***



*The USGA Research and Test Center tests more than 20,000 golf balls each year.*

volved in golf. And that's driven by a couple of things: significantly more investment from publicly owned companies, a lot of aerospace engineers who like to play golf, and the advent of using computerized tools, analysis, cad-cam equipment – virtual designing on the computer – bringing those tools from other industries into golf. People have seen that you can make improvements.

The game has a history 500 years long or more, and that's 500 years of not just playing, but also tinkering with clubs. And that tinkering continues. It's an important part of the history and the future of golf. Only the tinkering that's done today isn't done in somebody's workshop. It's done in front of cad-cam computers by Ph.D.'s, and that accelerates the pace of tinkering. It also allows them to weed out the bad ideas from the good ones much more easily,

quickly, and inexpensively. But there's nothing like the good ol' creativity that comes springing forth from the human mind, and that will continue forever.

**Q:** Are all of these equipment advances possible because the clubs are made of metal and not wood?

**A:** The whole reason metal clubs came to replace wood clubs was because they had a more forgiving characteristic. They were tolerant of off-center hits, and that's simply because their moment of inertia, which is a body's resistance to twisting, is higher than wood clubs. The weight is located further away from the center. And the same thing is true when drivers became larger in the early '90s, and continue to grow larger, with titanium.

It was a story of the two Ps: physics and psychology. The physics is a higher moment of inertia, allowing for more forgiveness on off-center hits. The psychology is looking down at a small, old driver head, and one of the thoughts going through a player's mind before hitting that would be, "Don't whiff." With a big driver of today, that thought is no longer there. There's a much more relaxed sense, and people know that a relaxed golfer is generally a better golfer.

**Q:** The Rules of Golf would infer that no spring-like effect is allowed. By drawing a line at 83 percent, is the USGA saying that some spring-like effect is allowed, but only up to a certain point?

**A:** Let me give you the exact wording from Appendix II in the Rules: "The material and construction of, or any treatment to, the face or clubhead shall not have the effect at impact of a spring."

What we have is a pragmatic application of an extreme Rule, and I'll give you another example of that. We say in the Rules that a shaft must be straight. I guarantee you that if we make a fine enough measurement, no shaft ever manufactured or made in the history of the world, or the world to be, would be straight. So we make a pragmatic application of a severe Rule. That's throughout the Rules book. That's what we did here.

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DICK RUGGE, USGA senior technical director, coordinates the USGA Test Center activities from Far Hills, N.J.

More information on the USGA's Test Center, including how it conducts conformity tests, can be found on the USGA's website at [www.usga.org/test\\_center](http://www.usga.org/test_center).



# A Perpetual Kodak Moment

*Taking pictures provides  
the benefit of journals that  
cover an entire career.*

by **BOB BRAME**



**E**VEN in our high-tech world, the value of the age-old adage “a picture is worth a thousand words” continues to reverberate – in fact, possibly even more so as a result of today’s technology. This tip comes from Stuart Cagle, CGCS, MG, superintendent at Old Oakland Golf Club in Indianapolis, Indiana. Stuart has been at Old Oakland since 1987. Yearly photo journals have allowed Stuart to maximize and preserve the experience of each and every year.

Stuart takes pictures continually throughout a season and then compiles the best into a chronological journal for the year. A typical year involves the use of between 35 and 40 rolls of print film. The key is being ready to snap a picture at a moment’s notice. Stuart has a utility bag that he keeps with him at all times, and contained within are his camera and supplies. Having to run back and retrieve a camera when a picture presents itself often results in losing the moment. At the end of each season, about 150 of the best, most telling pictures are compiled into a journal. Labels and notes are added where necessary to preserve the story. To make certain that life’s proper priority is guarded, shots of his family also are included in each year’s photo journal.

The camera, film, and all supplies needed to put together each year’s journal are paid for by Stuart. This means the journal collection belongs to Stuart and not the club – an important factor that ensures availability of past years’ journals for future use. A job change need not disrupt the compiling of journals on the reference shelf. Should your employer like photo documentation of golf course projects, a duplicate set can be compiled.

In addition to serving as an invaluable general reference, the photo journals have multiple uses. They make it possible to determine how a problem or need was handled in the past. Weather patterns can be established and documented more accurately as compared to the typically general overview offered by outside sources. Before, during, and after shots document and remind the course officials of key projects completed and help sell future budget allocations. At the end of each season, Stuart shows that year’s journal to his boss as a review and to support his performance appraisal and contract negotiations. In like manner, what better tool is there to help a prospective employer consider your overall suitability for a new position?

The primary difference between this strategy and that of simply taking

pictures is the volume of shots and the subsequent compiling of a chronological journal. The same combination could be accomplished using digital images, appropriate text box labeling where needed, and storage on compact disks (CDs). This method would yield a CD each year instead of a photo album. The digital images can be obtained using a digital camera or using a scanner to process either prints or slides. A digital approach to creating a yearly photo/image journal may actually offer greater flexibility in the future and provide easier storage.

As we move into a new millennium, candidly consider how you have handled past “Kodak moments.” Being ready, consistent, obtaining an ample quantity of images, and storing for future reference are the key components in Stuart’s “perpetual Kodak moment.” Use it to build a system that works for you.

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**BOB BRAME** directs Green Section agronomic activities in the six states of the North Central Region, while focusing his course visiting on Indiana, Kentucky, and Ohio. Pictorial records are often discussed on Bob’s visits.



# Getting Your Green Back Without Greenbacks

*Recovering from devastation on a shoestring budget.*

by LARRY GILHULY



*Rhizomatous regrowth of seashore paspalum allows a small nursery to be reused up to three times per year.*

VIRTUALLY every golf course has had to deal with high winds and the resulting cleanup that lasts for days or weeks before the course is back to normal. But how many have had to deal with a truly *big challenge* that required a *unique solution*? Put yourself in this situation. A weather station air speed indicator located 25 miles from your site recorded a wind gust of 230 mph just before it was obliterated! Your golf course was directly in the path of the same winds, and all of the local hotels that lodge your clientele are completely wiped out from the force of the hurricane. This was the situation faced by the entire island of Kauai in 1992 when Hurricane Iniki devastated the Garden Isle. This turf tip is about one golf course that found a unique way to bring “green” back despite the lack of “greenbacks.”

## Kiahuna's Big Challenge

Kiahuna Golf Club is found on the dry southwest side of Kauai and relies heavily on tourist play. After Iniki inflicted its fury, the monumental job of cleaning the golf course was faced by the staff of 18. During the next three months, the maintenance staff removed

portions of homes and other buildings, trees, and other debris from their site. While this first challenge was eventually overcome, the next three years of challenge included:

- *Staff size reduced to 5.* Without play and the resulting income, Kiahuna became a mow-and-irrigate operation.

- *Drastic reduction in fertilizer and complete elimination of herbicides.*

## Kiahuna's Unique Solution

In 1995, Robert Medeiros was hired as the golf course superintendent and immediately faced the monumental task of reducing weed populations. As a member of the maintenance staff prior to assuming the superintendent's position, he had noticed that a very aggressive grass (seashore paspalum) had been introduced with bermudagrass sod after small renovations in the late 1980s. Seashore paspalum is a warm-season grass adapted to temperate and tropical climates.

After Iniki, seashore paspalum began to take over the ninth fairway as the existing bermudagrass offered little resistance when the fertilizer was eliminated. After watching this grass outperform bermudagrass and weeds

on his site, Mr. Medeiros decided that the unique solution to his biggest challenge was changing the grass to the more desirable seashore paspalum.

Many golf courses have undergone the major renovation of changing grasses on greens, tees, and fairways. However, few, if any, have used the following unique methods created by Mr. Medeiros.

- *Nursery establishment.* After using sod on site for spot treatments, a quarter-acre nursery was established from sprigs in 1997.

- *Strip sodding tees.* Starting in 1998 through today, nearly 90% of the tees have been strip sodded, leaving a 5" to 6" gap between the strips of sod to make the nursery cover a larger area. Due to the unique salt tolerance of seashore paspalum, common table salt is then sprinkled on the bermudagrass to suppress growth. The tee is practically 100% seashore paspalum within several weeks.

- *Sprigging fairways.* Approximately 7 to 10 days after an application of Roundup, a selected area of the fairway (never an entire fairway) is aerified in four directions and then covered with seashore paspalum sprigs. The sprigs are rolled and lightly covered with mulch to retain moisture from the four daily syringings provided by an above-ground, temporary irrigation system. Within four months the area is nearly 100% converted to seashore paspalum. Common table salt is used as the herbicide for goosegrass and bermudagrass reinvasion.

The future includes completion of all tees and fairways and the possibility of converting the greens. The fertilizer and herbicide budget has returned as players provide the revenue; however, Mr. Medeiros reports these costs are currently 40% to 50% less than the pre-Iniki levels, with greatly improved playing conditions. It is safe to say that Kiahuna has gotten its “green” back despite the lack of “greenbacks”!

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LARRY GILHULY is director of the USGA Green Section Northwest Region.

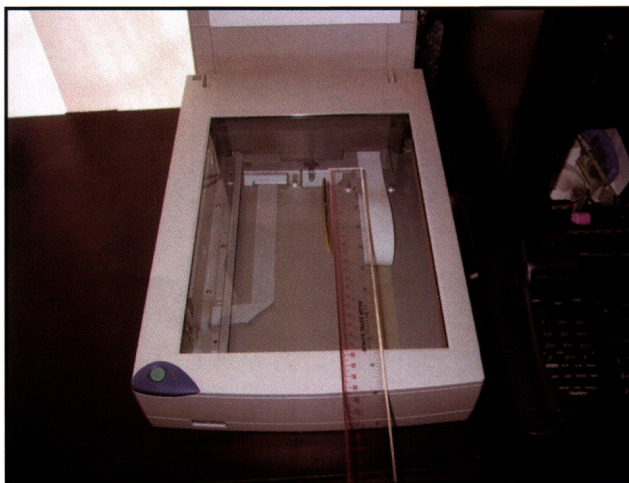


# SCANNING NEW HORIZONS

*A fun and effective way to enhance your communication efforts.*

by JIM MOORE

*A flatbed scanner provides golf course superintendents with a useful tool beyond its intended use. Scanners also do a great job on 3-D objects, and can be utilized as an efficient magnifying tool.*



A GOOD dissecting microscope is one of the tools almost every golf course superintendent would love to have, but few feel comfortable asking for one due to their high cost. Even the least expensive models run \$150, and high-quality equipment can easily cost \$500 and more. Although a good scope helps the superintendent identify problems, it does not help much with another major challenge facing all of today's superintendents – communicating with golfers and employers.

Most golf course superintendents are fortunate enough to have one of the best tools to enhance communications – the personal computer. With easy-to-use software, superintendents can now produce informative, high-quality documents ranging from newsletters to websites. These communication tools help the superintendent better explain what is currently being done on the course and, just as important, what is planned for the near future.

So what do a dissecting microscope and communicating with golfers via the computer have in common? How about combining the two ideas into one really powerful technique for less than \$150! That's all a first-rate flatbed scanner costs these days.

Every superintendent who has a computer also should have a flatbed scanner, but not just for scanning papers. Most people are unaware that

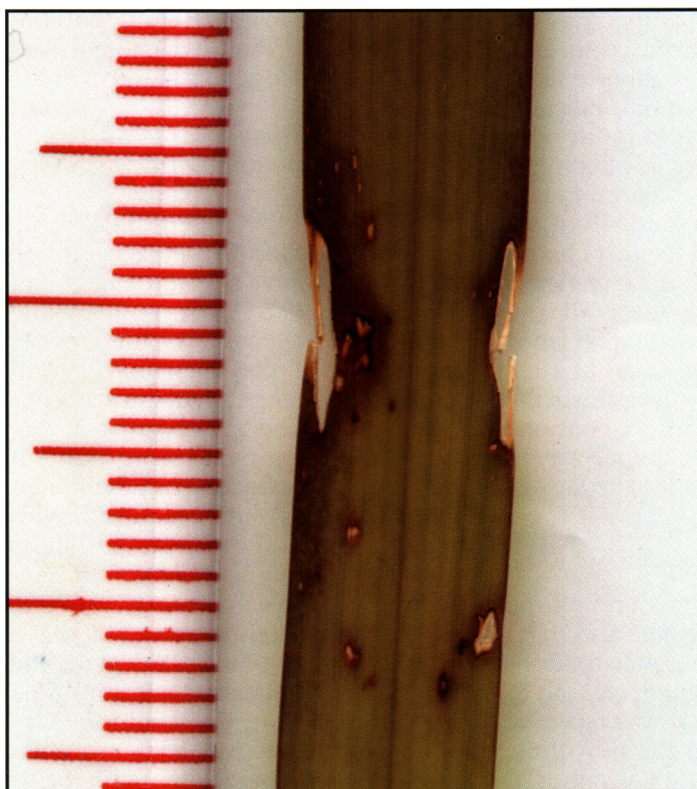
scanners also can do a great job on three-dimensional (3-D) objects. And, if you properly utilize the scanner's resolution capabilities, you can turn it into a great magnifying tool as well. Once the object is scanned, the image can be included in the next newsletter, green committee report, and so on. If the object happens to be a weed, insect,

or diseased leaf, the image can be e-mailed to an expert to help with identification.

Let's consider a few examples of how scanning 3-D objects can improve your communication skills.

One of the most common problems on golf courses is poor bunker drainage. Often, bunkers drain well at first but steadily slow down as they age until they more closely resemble swimming pools than hazards. A high-resolution scan of sand collected from the poorly draining bunker should be compared to a scan of sand from a bunker that still drains properly. The scans will clearly illustrate the presence of silt and clay blocking the large pores between the sand particles. The silt and clay also cause the sand to be "crusty" when it dries.

These images can be used to illustrate why high, flashed sand faces in bunkers result in reduced bunker life. As the sand is washed from the face, it mixes with the silt and clay from the bunker's soil floor. Each time the sand washes,

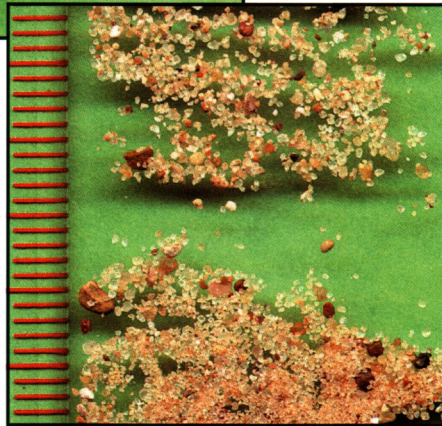


*One challenge to the golf course superintendent is disease diagnosis. A scanner can be used to get an up-close and personal look at leaf lesions. The image also can be e-mailed to a university turf specialist who can assist in the diagnosis.*





*The amount of silt and soil in bunker sand impacts drainage capabilities. A high-resolution scan of a bunker sand that drains properly (right) compared to a slow draining bunker sand will probably show the presence of silt and soil (above).*



the percentage of silt and clay increases, and drainage decreases. Even the non-agronomically inclined will better understand this problem once they can see the images for themselves.

Another good scanning subject is a soil profile removed from a green. Layering in the profile is extremely easy to identify when the profile is magnified. Scanning clearly reveals the enhanced rooting of the turfgrass in the aerifying holes as well as the tendency of excess organic matter to hold too much water. Golfers still will not like it when you aerify, but at least they will be able to see for themselves why it is so important to the good health and performance of the greens.

Turfgrass diseases are often difficult to identify. Today, fortunately, help is only an e-mail away. Take a picture of the damaged area from five to ten feet away to provide an overall view. Next, take a picture from as close as your camera will focus (most cameras can only get to within a couple of feet). Scan these photos into your computer. Now

for the next step – a 3-D scan. Remove a plug of the diseased area and lay it turf side down on the flatbed scanner. Scan it at different resolutions to enlarge the image. You will now be able to e-mail a variety of images to the individual helping you with the diagnosis.

When scanning 3-D objects, the key is to experiment. Start with the scanner software set at 150 dpi (dots per inch) and gradually increase the resolution to magnify the images. One note – be careful about going over 1200 dpi unless you have a really fast computer and a massive hard disk. Extremely high-resolution scans can result in files that are dozens of megabytes in size and may take many minutes for your machine to process and display the image. Also, experiment with laying different colored paper over the object to create a background. Laying a ruler on the scanner next to the object will help illustrate size.

There are many other examples of 3-D objects to scan. Insects, weeds, and diseased plant leaves are the most obvious. Sand, soil profiles, root systems, and flowers also provide dramatic and highly useful images. Have a little fun, and in the process greatly enhance the quality of your communication efforts.

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JIM MOORE is director of the USGA Green Section Construction Education Program.

*Take some time to experiment when scanning 3-D objects. Scan at a variety of resolutions and try using different colored backdrops to enhance the object of interest.*





# Nursery Rhymes

*Damage to greens can be quickly repaired with putting green nursery sod.*

by DARIN S. BEVARD

*The hydraulic oil killed our green in streaks.  
The damage could be visible for many weeks!  
The members want the green fixed fast,  
That putting green nursery will save my . . . green!*

**S**EVEN YEARS AGO, David Oatis, director of the Green Section's Northeast Region, wrote a *Green Section Record* opinion article regarding the need for golf courses to have a high-quality turfgrass nursery as an insurance policy (Sept./Oct. 1994). Evidently, some things are worth repeating. Most golf courses still do not have a putting green nursery, and many that do still manage the nursery as an aside rather than as an important part of putting green management.

A putting green nursery can be critical for maintaining the quality and playability of putting greens in the face of unseen adversity. A sod source that matches a course's existing greens in the event of something as simple as a scalped cup or as major as an act of vandalism can be a good safety net. Some very basic guidelines for establishment and maintenance of a putting green nursery must be considered.

## Size

The bigger a nursery green is, the better – within reason. While it is not always possible, the nursery green should be at least close to the size of

the largest green on the golf course. In this way, a reliable sod source is available for repairs in the event of a catastrophe or to address numerous small problems that may arise.

## Construction

Construction of a nursery green does not need to be elaborate, but it should be done in such a manner that high-quality grass can be maintained. Good drainage is very important. Several inches of a soil mix can be spread over the area where the green is to be established. It is not necessary to use a soil mix that exactly matches the existing greens; however, a *compatible* mix must be used. The particle size of the mix must not provide the chance for surface sealing or other drainage and water movement problems when the nursery sod is used for repairs on the golf course greens. An accredited physical soil testing laboratory can compare samples of the soil mix from the existing greens with potential construction mixes to ensure compatibility. On new projects, a nursery green can be included in the initial plans, while

older properties must pick an area that is out of the way of play.

Irrigation also should be installed at the time of construction to provide adequate overhead and hand-watering capability.

## Matching the Existing Grasses

One of the biggest benefits of a nursery green is the ability to establish a sod that matches the turf on the existing greens of the golf course. On older courses, replacing damaged areas that contain a mix of older creeping bentgrasses and *Poa annua* with new creeping bentgrass sod will cause the repaired areas to be very visible for several years. Shredded aeration plugs from the existing greens can be used in conjunction with a low rate of creeping bentgrass seed at the time of establishment for a cool-season nursery. This nursery turf should provide an acceptable turf match with the existing greens. For new greens, simply use the turfgrass variety established on the greens. Aeration cores or sprigs from the existing greens should provide the desired result for bermudagrass greens.

## Maintenance

Maintenance of a nursery green is simple. Use the same management practices on the sod nursery that are used on the golf course greens. Aeration and topdressing practices should be the same. Thatchy sod does not perform well! Mowing heights also should be the same. With the same maintenance practices in place on the nursery green, the sod will be ready for immediate use when it is needed.

A nursery green provides a great backup plan in the event that unfortunate damage does occur to a putting green or greens. Also, new employees can be trained and new maintenance techniques can be used experimentally on the nursery green prior to use on the golf course greens. With a good putting green nursery in place, potential uses are many.

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*Since 1996, DARIN BEVARD has been an agronomist in the Mid-Atlantic Region West Chester, Pa., office. He visits golf courses in Pennsylvania, Maryland, Delaware, and Virginia.*



*During times of unforeseen adversity, a putting green nursery can be a critical sod source that matches a golf course's existing green.*



# The Audubon Cooperative Sanctuary Program for Golf Courses: Promoting Environmental Stewardship

*Where we've been and where we're going.*

by RON DODSON



*Above (before): Wetland areas provide habitat for a wide variety of wildlife. Right (after): Establishing a wetland corridor creates a more varied habitat (C.C. of Florida, Village of Golf, Fla.).*

**I**N THE BEGINNING . . . a little more than ten years ago, the golf industry was under intense scrutiny from the environmental community. Governmental agencies and non-profit groups alike felt that golf courses were polluting the environment, and those who designed, built, and managed them were the culprits. Golf courses were denounced for loss of wildlife habitat, over-use of limited water resources, and excessive use of toxic chemicals. The golf course industry appeared unresponsive to criticism and suspicious of anyone with an environmental agenda.

About the same time, as President of the Audubon Society of New York State, I created a program to work with communities – reaching out to homeowners, schools, and businesses – to engage landowners and land managers in environmental stewardship. Although the program was designed to work with entire communities, I came to realize that a more effective approach might be to involve one property at a time as a

“grassroots” movement by developing programs for specific types of properties. I called it the Audubon Cooperative Sanctuary System.

During the process of developing educational materials for the program, I received a call from a golf course superintendent in upstate New York. He was having trouble with skunks tearing up turf to get to grubs and was looking desperately for an environ-

mentally friendly solution. After visiting the course, and several others in the area, it became clear to me that golf courses needed a program that directly addressed environmental issues specific to golf courses, and that there must be some way to merge course management with environmental stewardship.

Since I went to college on a golf scholarship and majored in wildlife biology, I was intrigued with the idea of working proactively with golf courses. Surely, golf course superintendents could improve their management practices in ways that would benefit both the wildlife on their golf courses and the environment as a whole. So I wrote a



letter to the USGA explaining that my organization was interested in exploring opportunities to work cooperatively with golf courses. A few months later I received an invitation from the USGA to speak at an educational session during the GCSAA conference.

After the conference, I met with Jim Snow, National Director for the USGA Green Section, to discuss the development of the Audubon Cooperative



Sanctuary Program for Golf Courses and funding for membership development. During 1991, with the USGA's support, I spent the year on the road talking at USGA regional seminars, learning about the golf industry, developing a process and educational materials for the program, and encouraging people to join. By the end of the first year, we had surpassed our membership goals, launched the program nationally, and subsequently created the parent organization, Audubon International, to reflect the national scope of the programs and the growth of the organization.

It has been ten years since those modest beginnings, and I have again been invited to speak at the USGA's educational session to talk about what we have accomplished and what future lies ahead. I am pleased to say that the USGA is still the sponsor of the ACSP for Golf Courses and has continued to support our efforts. We believe that the USGA's support for the ACSP for Golf Courses, as well as their other environmental initiatives, has been instrumental in changing the environmental perspective of the game of golf.

### After Ten Years, Where Are We Now?

Since the beginning of the program, more than 2,400 golf courses have registered in the ACSP for Golf Courses, comprising more than half a million acres of human and wildlife habitat. During the ten years, we have awarded more than 2,600 certificates of recognition for environmental initiatives for Environmental Planning, Integrated Pest Management, Education and Outreach, Water Conservation, Wildlife Habitat Management, and Water Quality Management. More than 240 members have been awarded certificates in all six environmental areas and have been designated Certified Audubon Cooperative Sanctuaries. But what's more important than the certificates themselves is what they represent.

Do courses that participate achieve the program's desired goal of enhancing and protecting the environment? To answer this question, Audubon International conducted an environmental survey in April 2000 to assess the impact of program participation on a number of key environmental priority areas. The survey was sent to all of our

golf course members, from which we received a 14% response rate. We believe the results of the survey demonstrate strong environmental outcomes for participating courses. Following are a few highlights of the survey.

### Wildlife and Habitat Management Results

The ACSP provides significant educational information and resources to help land managers enhance and protect habitat for native wildlife species. Results of the survey show that the majority of participants are implementing a variety of measures to enhance and protect wildlife habitats. Since joining the ACSP for Golf Courses:

- 73% added gardens for birds/wildlife;
- 79% decreased the amount of managed turfgrass;
- 49% removed exotic invasive plants;
- 44% are currently involved in an ecological restoration project;
- Average increase in acres devoted to providing wildlife habitat increased from 40 acres per



*The beauty of flowers not only adds to the golf course, but also plays an important role in providing a food source and habitat for native pollinators (Aurora C.C., Aurora, Colo.).*



*“A golf course never stands alone — it is always part of a larger context. It is part of a community made up of humans, wildlife, plants, watersheds, and natural resources, and, to survive, it must ensure that all of those parts are healthy.”*



*Golf courses can provide natural or man-made transition areas or corridors between habitat types. This transition area is important to allow wildlife to move from one area to another (Semiahmoo Golf & C.C., Blaine, Wash.).*

course before joining to 70 acres after joining — a 75% increase;

- Average increase in naturalized shorelines around water features increased from an average of 2,197 feet per course before joining to 3,820 feet after — a 74% increase;
- Average increase in forest understory was allowed to grow from an average of 28 acres per course before joining to 42 acres after — a 54% increase;
- Members maintaining an inventory list of plants and wildlife on the property grew from 16% before joining to 64% after joining;
- Members conscientiously choosing native plants when landscap-

ing grew from 45% before joining to 90% after joining.

#### **Water Quality**

The ACSP aims to help land managers protect water quality for irrigation, drinking water supplies, and aquatic habitats and wildlife species. Responses to the survey suggest that managers increasingly are taking steps to protect water resources from potential pollutants. Since joining the ACSP for Golf Courses:

- 51% increased the amount of emergent vegetation in ponds;
- 56% increased the width of “no-spray zones” around water features;
- 21% increased the number of drains that are daylighted or emptied into vegetative swales.

#### **Chemical Use Reduction and Safety**

Helping members to reduce the use of pesticides and fertilizers as well as safely using, storing, and handling chemicals is a key priority of the ACSP. Results of the survey show that people have been able to achieve that goal without sacrificing golf course playing quality or member satisfaction. Since joining the ACSP:

- 86% reduced pesticide use;
- 92% used pesticides with a lower toxicity level;
- 90% decreased chemical use by improving cultural control methods;
- 66% reduced fertilizer use;
- 84% increased the percentage of slow-release fertilizers used;
- 78% increased the percentage of natural-organic fertilizers used.





*Left: Maintaining healthy aquatic habitat is important for the wildlife using these naturalized areas. During the past decade, golf courses participating in the Audubon Cooperative Sanctuary Program on average have increased the space devoted to wildlife from approximately 40 to 70 acres. Above: Establishing a buffer strip of vegetation in and along the banks of streams, lakes, and ponds is an excellent means of controlling erosion, creating new aquatic habitat, and adding interest to the golf course.*

We believe the results of this survey provide a snapshot of the types of environmental awareness and improvement that have occurred as a result of participation in the ACSP for Golf Courses, and we are heartened by the enthusiasm and commitment of our members. We applaud the courses who responded to the survey and who participate in the program. Not only are they contributing to improved environmental quality on golf courses, but also they are helping to spread the word that golf course superintendents can be excellent stewards of the environment. Nevertheless, there is more we can all do.

### **Where Do We Go From Here?**

We have made great strides with the support of the USGA, but we still have a long way to go. Our members make up only a small portion of all the golf courses across the United States. Given current population growth, increased development, and subsequent demand for natural resources, golf course superintendents, developers, and architects will be subject to intense criticism if they do not voluntarily and actively address environmental issues. Audubon International remains enthusiastic

about working with superintendents and the golf industry and helping them to address those environmental concerns.

During the past year, we have worked to streamline the certification process for the ACSP for Golf Courses to encourage superintendents to implement and document their environmental activities. We have produced additional educational materials to provide them with more and better environmental information. We have continued our membership development and outreach efforts, as well as research efforts, to provide golf course superintendents with conservation projects that will benefit the golf course, the greater community, and the environment. We intend to continue those efforts.

Environmental stewardship on a community-wide basis, not solely on golf courses, has always been the ultimate goal of Audubon International. We believe that golf courses have the opportunity to assume leadership positions in their communities. They can serve not only as demonstration sites of environmental stewardship, but also as catalysts for community-wide stewardship.

We know that many of our members have reached beyond the golf course – involving community members and organizations in their projects and activities and making their own resources and expertise available to local schools and community organizations. A golf course never stands alone – it is always part of a larger context. It is part of a community made up of humans, wildlife, plants, watersheds, and natural resources, and, to survive, it must ensure that all of those parts are healthy.

The game of golf is rooted in history and tradition, a part of which is its connection to nature and the environment. It is this connection that positions golf to be a catalyst for environmental stewardship action in the 21st century. Audubon International remains steadfast in its commitment to help people help the environment and to help the golf course industry be a catalyst for nationwide environmental stewardship – one community at a time. We hope you will join the USGA and Audubon International in making that happen.

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RON DODSON is President and CEO of Audubon International, based in Selkirk, N.Y.





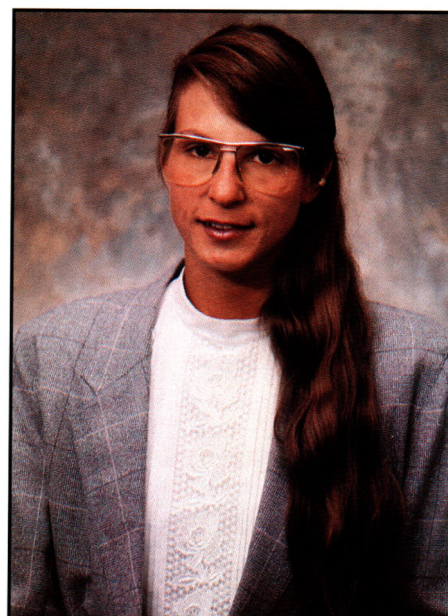
*Rick Fredericksen, CGCS, presents Dr. Mike Kenna, USGA director of research, with a check for the USGA's Turfgrass and Environmental Research Program on behalf of the Minnesota Golf Course Superintendents Association. The research program employs science as the foundation to benefit golf in the areas of turfgrass and resource management, sustainable development, and environmental protection. From 1983 to 2002, the USGA will have distributed \$21 million to fund more than 215 research projects at land grant universities across the country. Rick is the golf course superintendent at Woodhill C.C. (Wayzata, Minn.) and vice president of the Minnesota GCSA.*

## Green Section Internships Awarded for 2001

For the fifth year, the USGA Green Section has awarded internships to outstanding turfgrass management students. During 2001, the Green Section will provide the opportunity for 12 students to travel with the Green Section staff on Turf Advisory Service visits. Each intern will travel for one week with an agronomist in his region between the months of May and August. The goal of the internship program is to provide students with a broader view of the golf course industry and the opportunity to learn about golf course maintenance through the perspective of the Green Section agronomists. More information about each intern can be found on the USGA Green Section website at [www.usga.org/green](http://www.usga.org/green).

Intern	Year in School	School	Advisor
David Bacon	Junior	U. of Massachusetts	Dr. J. S. Ebdon
Kevin Fortune	Senior	Virginia Tech	Dr. David Chalmers
Michael Harrell	M.S. Candidate	U. of Florida	Dr. Grady Miller
Christopher Hayman	Senior	Cal Poly – Pomona	Dr. Kent Kurtz
Gordon Kauffman	M.S. Candidate	Penn State	Dr. Thomas Watschke
James Kerns	Junior	North Carolina State	Dr. Richard Cooper
Daniel Meersman	Senior	Michigan State U.	Dr. John Rogers
Joseph Meyer	M.S. Candidate	U. of Illinois	Dr. Bruce Branham
Raymond Molina	Senior	Tarleton State	Dr. Kevin Kenworthy
Travis Pauley	Senior	Ohio State U.	Dr. Karl Danneberger
Neil Redmond	Senior	Cal Poly – San Luis Obispo	Dr. David Green
Travis Ricard	Senior	Washington State U.	Dr. William Johnston
Erik Salmela	Senior	Oregon State U.	Dr. Tom Cook
William Weeks	Senior	Mississippi State U.	Dr. Mike Goatley

## Antaya Joins Green Section Staff



The USGA Green Section Northeast Region is proud to announce the addition of a fourth agronomist to its staff. Kathy Antaya will be joining the Easton, Pa., office to work with David Oatis, Director, and Jim Skorulski and Jim Baird, agronomists in the region.

Kathy's introduction to golf was as a caddie, which eventually evolved into a position on the grounds staff. She holds a B.S. degree in agronomy from Michigan State University. Most recently, she was a golf course superintendent at The Meadows at Grand Valley State University, in Allendale, Mich. In addition to spending several years as an assistant superintendent at various golf courses, Kathy worked as a Michigan State University research technician and spent time on an internship program with the Soil Conservation Service. She has written a number of articles for golf trade publications and volunteered her time as a board member for the Northern Michigan Turfgrass Managers Association, the Michigan Turfgrass Foundation, and the Western Michigan Golf Course Superintendents.

Kathy joined the staff in April. Her responsibilities will include making Turf Advisory Visits throughout New Jersey and New York. The USGA Green Section welcomes Kathy to the staff.

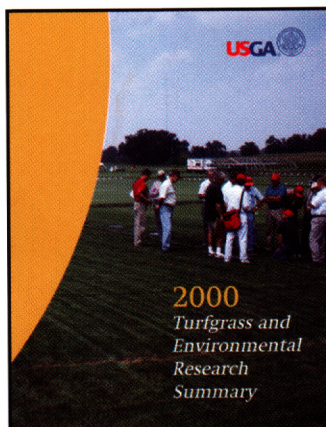


## USGA Green Section Publishes 2000 Annual Research Report

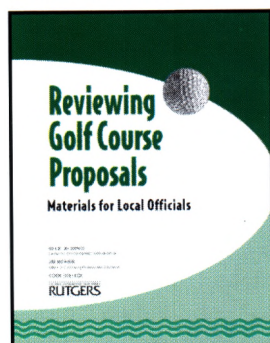
The 2000 Turfgrass and Environmental Research Summary has a new look. The 86-page, full-color report contains short summaries on more than 80 USGA-sponsored research projects throughout the USA. Every report highlights research progress or results for each project. Color photographs illustrate the research topics and the people conducting the work. Reports are available free of charge while the supply lasts by contacting Mary McConnell in the USGA Green Section (call 908-234-2300 or e-mail [mmcconnell@usga.org](mailto:mmcconnell@usga.org)).

The research summary is divided into eight sections, including introductory information, construction research, integrated turfgrass management, breeding, environmental impact, sustainable land use, Audubon International, and Wildlife Links. Each section begins with a short description of the research area and a map of the project locations.

In 1998, the USGA embarked on a new five-year research program that employs science as the foundation to benefit golf in the areas of turfgrass and resource management, sustainable development, and environmental protection. The two primary objectives of the research effort are 1) to develop turfgrasses that use less water, fertilizers, and pesticides; and 2) to investigate environmental and resource management issues related to golf courses.



## Publications Available



Across the country, community planners and golf course developers are making important decisions about how to build and operate golf courses that can both benefit local communities and protect and enhance the local environment. As a product of a USGA education grant, the Rutgers University Center for Environmental Communication has produced an information packet entitled **Reviewing Golf Course Proposals**, which is oriented to community land use planners to assist communities in the crucial planning phase of golf course development.

Included in the easy-to-use packet are:

- **Reviewing Golf Course Proposals: Ten Environmental Issues to Consider**, a brochure outlining the bottom-line environmental questions communities should ask when reviewing golf course proposals.

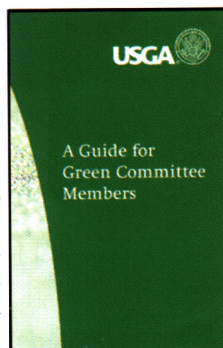
- **Environmental Principles for Golf Courses in the United States**, guidelines developed by Golf & the Environment, a committee of golf, environmental, and government representatives.

- Supplemental materials and case studies providing more in-depth information for each of the ten issues.

- Selected golf course planning websites and publications.

The packet is available for \$5.00, plus shipping and handling, through the USGA Order Department at 1-800-336-4446.

The Green Section has updated and released the popular publication **A Guide for Green Committee Members**. This publication, available for \$2.00 each through the USGA Order Department, is designed to help guide Green Committees past the common pitfalls, show the opportunities of participating in the Green Committee, and assist in making the Committee work as an asset to the golf course. In addition, the book highlights the features of the Green Section, defines common agronomic terminology, and provides a list of references and resources for additional information.



## Physical Soil Testing Laboratories\*

The following laboratories are accredited by the American Association for Laboratory Accreditation (A2LA), having demonstrated ongoing competency in testing materials specified in the USGA's Recommendations for Putting Green Construction. The USGA recommends that only A2LA-accredited laboratories be used for testing and analyzing materials for building greens according to our guidelines.

### BROOKSIDE LABORATORIES, INC.

308 S. Main Street, New Knoxville, OH 45871  
Attn: Mark Flock  
(419) 753-2448 • (419) 753-2949 FAX

### EUROPEAN TURFGRASS LABORATORIES LIMITED

Unit 58, Stirling Enterprise Park  
Stirling FK7 7RP Scotland  
Attn: John Souter  
(44) 1786-449195 • (44) 1786-449688 FAX

### N. W. HUMMEL & CO.

35 King Street, P.O. Box 606  
Trumansburg, NY 14886  
Attn: Norm Hummel  
(607) 387-5694 • (607) 387-9499 FAX

### ISTRC NEW MIX LAB, LLC

1530 Kansas City Road, Suite 110  
Olathe, KS 66061  
Attn: Bob Oppold  
(800) 362-8873 • (913) 829-8873  
(913) 829-4013 FAX  
e-mail: [istrcNewMixLab@worldnet.att.net](mailto:istrcNewMixLab@worldnet.att.net)

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22170 S. Saling Road, Estacada, OR 97023  
Attn: Michael S. Hindahl, Ph.D.  
(503) 630-7769

### THOMAS TURF SERVICES, INC.

2151 Harvey Mitchell Parkway South, Suite 302  
College Station, TX 77840-5247  
Attn: Bob Yzaguirre / Jim Thomas  
(979) 764-2050 • (979) 764-2152 FAX  
e-mail: [soiltest@thomasturf.com](mailto:soiltest@thomasturf.com)

### TIFTON PHYSICAL SOIL TESTING LABORATORY, INC.

1412 Murray Avenue, Tifton, GA 31794  
Attn: Powell Gaines  
(912) 382-7292 • (912) 382-7992 FAX  
[pgaines@surfsouth.com](mailto:pgaines@surfsouth.com)

### TURF DIAGNOSTICS AND DESIGN, INC.

310-A North Winchester Street  
Olathe, KS 66062  
Attn: Sam Ferro  
(913) 780-6725 • (913) 780-6759 FAX

\*Revised March 2001. Please contact the USGA Green Section (908-234-2300) for an updated list of accredited laboratories.





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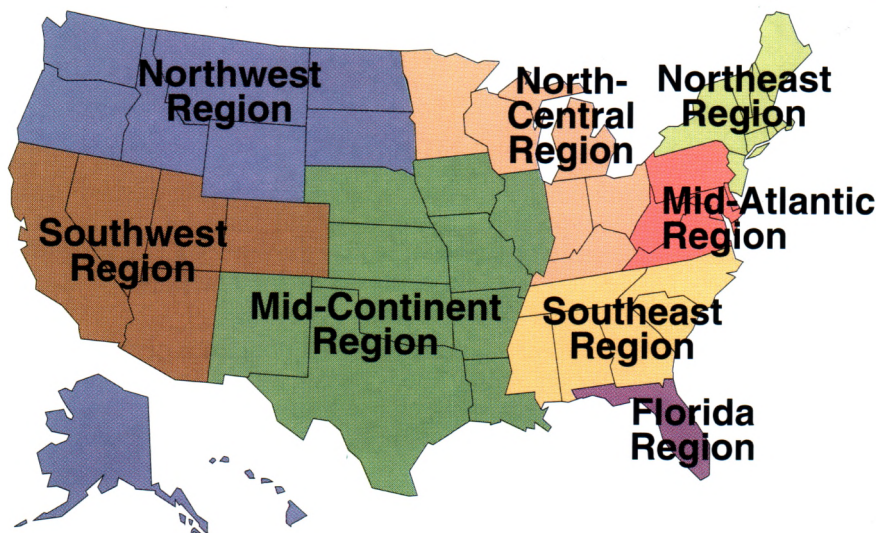
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# TURF TWISTERS

## WITH LOWER MOWING HEIGHTS

**Question:** Mowing heights on putting greens are being pushed lower and lower. Bench setting using the old bar-and-screw technique is becoming more and more difficult due to the small increments of change in mowing heights during the growing season. I realize the more precise gauge-type height adjustment tools are being used more often. However, I am a bit confused by the numbers. What do decimal numbers such as 0.130 mean in terms of cutting height? (Pennsylvania)

**Answer:** The decimal numbers represent fractions of an inch. For example, 0.125 is equal to  $\frac{1}{8}$  inch; 0.140 is equal to  $\frac{7}{64}$  of an inch; 0.156 is equal to  $\frac{5}{32}$  of an inch; and 0.250 is  $\frac{1}{4}$  of an inch. The gauge-type height adjustment tools allow mowing heights between these heights to be set as well. These tools can take some getting used to, but they provide a greater level of precision when setting mowing heights.

## DON'T CONSERVE

**Question:** We are facing an energy crisis in California, with the potential for rolling blackouts and higher rates for electricity. Is there anything we can do on our golf course to be more energy efficient and prevent any problems caused by the blackouts? (California)

**Answer:** The best advice is to be proactive. Even if your golf course is not currently facing an energy crisis, there are several things you should do to become more energy efficient:

- Obtain a power audit by your local utility account representative to make sure you are getting the best possible rate structure.
- Investigate upgrading irrigation pumping equipment.
- Back up computer programs to avoid losing data due to power surges or blackouts.
- Consider installing surge protectors and phase monitors on irrigation pumping equipment.
- Implement conservation measures in the maintenance facility and clubhouse, including energy-efficient lighting and timers on lights in such areas as restrooms and lunch rooms.

## THE SUN

**Question:** I heard that morning sunlight is better for turf than midday or afternoon sunlight. Is that true? (Connecticut)

**Answer:** The current thinking is that morning sunlight is no better than the light at other times of day in terms of light quality. However, it is advantageous to turf health in terms of helping to dry the turf canopy and therefore reducing disease incidence. Furthermore, via photosynthesis plants produce their own food by converting energy from sunlight into usable forms. The morning is an optimal time for photosynthesis. Research and observation indicate that turf requires at least eight hours of sunlight per day (preferably including four hours in the morning) to sustain growth and recuperate from moderate wear.