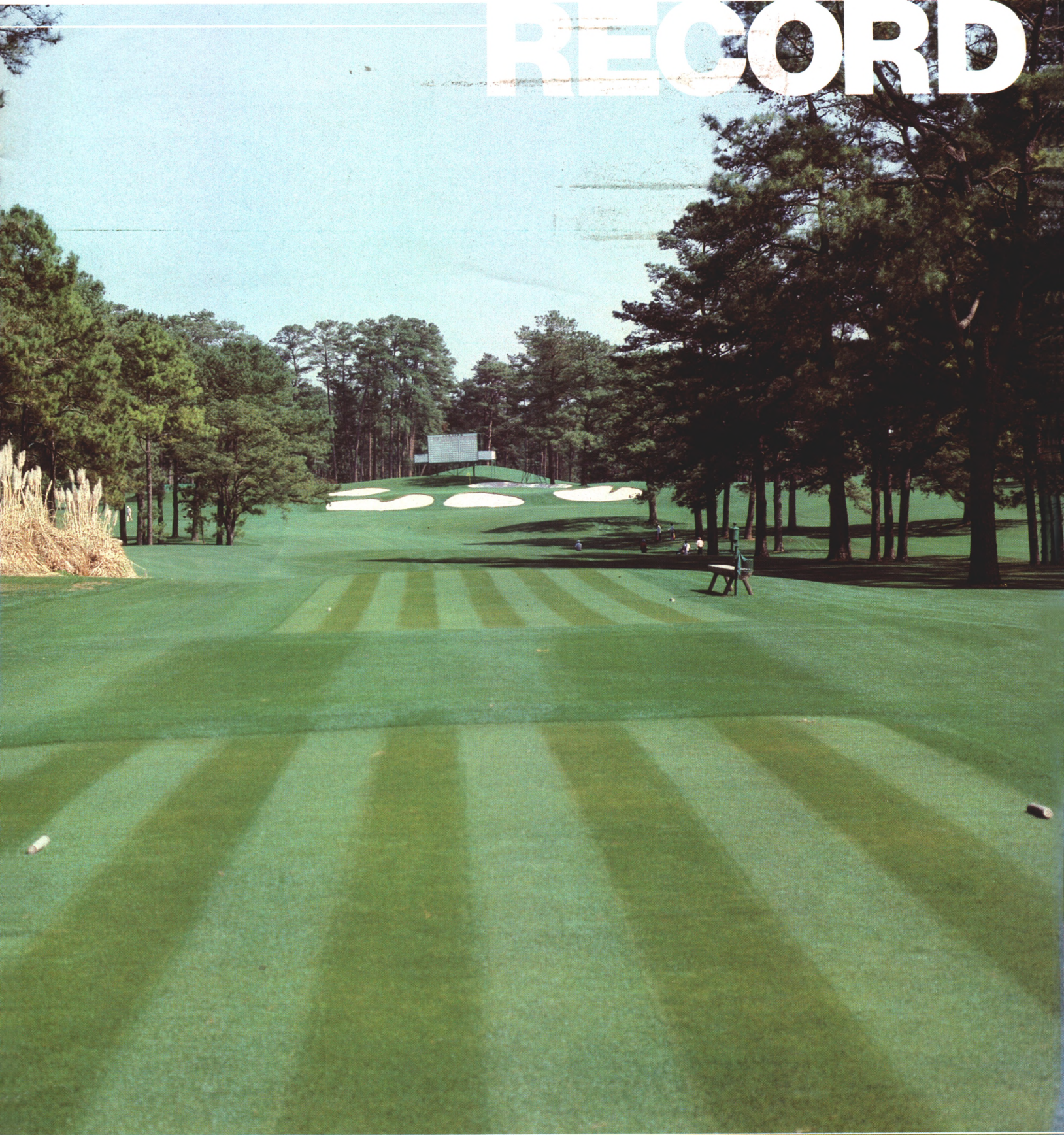


A Publication on
Turfgrass Management by the
United States Golf Association®

May/June 1985

USGA®

Green Section RECORD



USGA®



Green Section RECORD

EDITOR:

William H. Bengeyfield

MANAGING EDITOR:

Robert Sommers

ART EDITOR:

Diane Chrenko

Vol. 23, No. 3

MAY/JUNE 1985

GREEN SECTION COMMITTEE CHAIRMAN:

George M. Bard

5200 Newport Drive

Rolling Meadows, Ill. 60006

NATIONAL DIRECTOR:

William H. Bengeyfield

P.O. Box 3375

Tustin, Calif. 92681

(714) 544-4411

GREEN SECTION AGRONOMISTS AND OFFICES:

Northeastern Region:

United States Golf Association, Golf House

Far Hills, N.J. 07931 • (201) 234-2300

James T. Snow, *Director*

Gary A. Watschke, *Agronomist*

R.R. #2, Box 521

Dudley, Mass. 01570 • (617) 943-6749

Karl Ed Olson, *Agronomist*

Mid-Atlantic Region:

P.O. Box 2105

West Chester, Pa. 19380 • (215) 696-4747

Stanley J. Zontek, *Director*

P.O. Box 3408

Richmond, Va. 23235 • (804) 272-5553

Patrick M. O'Brien, *Agronomist*

Southeastern Region:

P.O. Box 4213, Campus Station

Athens, Ga. 30605 • (404) 548-2741

Charles B. White, *Director*

Great Lakes Region:

4680 W. Bradley Road, Suite 2

Brown Deer, Wis. 53223 • (414) 354-2203

James M. Latham, Jr., *Director*

Mid-Continent Region:

300 Sharron Drive, Waco, Texas 76710 • (817) 776-0765

James F. Moore, *Director*

Western Region:

P.O. Box 3375

Tustin, Calif. 92681 • (714) 544-4411

Larry W. Gilhuly, *Director*

**1 The Member and Superintendent Relationship
Complainin' and Explainin'**
by Larry W. Gilhuly

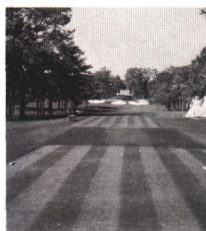
5 News Notes for Summer

6 Remodeling Sand Bunkers On Your Course
by John R. Steidel

**9 Now Open
The Turfgrass Information Center**
*by Richard E. Chapin
and Peter LePoer*

**11 Drought Emergency Planning
Philadelphia Association of Golf Course
Superintendents Responds**
by Michael R. Smith

Back Cover Turf Twisters



Cover Photo:

*The 7th tee at Augusta
National. No doubt about
the tee alignment here.*

©1985 by United States Golf Association®. Permission to reproduce articles or material in the USGA GREEN SECTION RECORD is granted to publishers of newspapers and periodicals (unless specifically noted otherwise), provided credit is given the USGA and copyright protection is afforded. To reprint material in other media, written permission must be obtained from the USGA. In any case, neither articles nor other material may be copied or used for any advertising, promotion or commercial purposes.

GREEN SECTION RECORD (ISSN 0041-5502) is published six times a year in January, March, May, July, September and November by the UNITED STATES GOLF ASSOCIATION®, Golf House, Far Hills, N.J. 07931. Subscriptions and address changes should be sent to the above address. Articles, photographs, and correspondence relevant to published material should be addressed to: United States Golf Association Green Section, Golf House, Far Hills, N.J. 07931. Second class postage paid at Far Hills, N.J., and other locations. Office of Publication, Golf House, Far Hills, N.J. 07931. **Subscriptions \$9 a year.**



"Why are they always irrigating on the day I play?"

THE MEMBER AND SUPERINTENDENT RELATIONSHIP

Complainin' and Explainin'

by LARRY W. GILHULY

Director, Western Region, USGA Green Section

"THE WAY we generally strive for rights is by getting our fighting blood up; and I venture to say that that is the long way and not the short way. If you came at me with your fists doubled, I think I can promise you that mine will double as fast as yours, but if you come at me and say, 'let us sit down and take counsel together, and, if we differ from one another, understand why it is that we differ from one another, just what the points at issue are,' we will presently find that we are not so far apart after all, that the points on which we differ are few, and the points on which we agree are many, and that if we only have the patience and the candor and the desire to get together, we will get together."

Woodrow Wilson

IT'S A CLOUDY spring morning with a very light mist. A club member is driving past the course on his way to work. He notices the irrigation system is on and wonders why a currently wet golf course is being watered. Doesn't the superintendent know what he is doing?

This Wednesday an important client is in town and you've invited him to a round of golf. The course was in extraordinary condition last Saturday. You have lunch and tee off at 1 p.m. You reach the first green and find it (and all others) aerified and topdressed since last Monday! Why do they always have to tear up and ruin the greens just when they're perfect?

The preceding are just two examples of questions the golf course superintendent must answer daily. If he is approached with an inquisitive attitude and a desire for honest information, the superintendent can usually explain the situation. He can give good reasons that, hopefully, will not be perceived as excuses. The

superintendent, on the other hand, must strive to avoid as many controversies as possible. When he sets his programs, he must attempt to disturb the fewest number of playing members.

The subject of communication has been discussed and written about by experts, so I will not attempt to discuss how to communicate; rather, I will try to explain several often-repeated complaints of golf course maintenance practices and some practical methods to reduce or eliminate these concerns.

Why do the sprinklers always seem to be on?

Perhaps the most difficult area of communication between the member and superintendent concerns irrigation practices. In the past, overwatering was a nationwide golf course affliction. However, decreasing water supplies, soaring electrical and water costs, and a more understanding attitude from golfers (green doesn't always equate to good playing conditions) has begun to change

that. In spite of the need to reduce watering, many times the superintendent is confronted by understandably disturbed members who question his irrigation practices. To those who want wall-to-wall green, it is important to realize that most golf courses are not as easily maintained as home lawns. There will probably be occasional brown areas; this is much more desirable than wet spots.

As described earlier, a member may be on the way to work or dropping by the club for lunch and drive by the course. One can imagine the reaction when it is raining and the irrigation system is in operation! It is natural to wonder (sometimes aloud) what in the world is happening! In most cases there is a very logical explanation. Many times the irrigation specialist cannot check the system while there is play on the course. Therefore, bad weather brings an opportunity for making sure sprinkler heads are turning, checking valves, nozzles, etc. Another common problem occurs when a hot fertilizer is applied. A light rain may be falling, but it may not provide enough moisture to dissolve the fertilizer particles. On many occasions the superintendent is simply making sure the fertilizer does not produce an undesirable burn. In this situation, it may be best to fertilize early in the evening to reduce potential problems.

Why are maintenance personnel allowed to drive on the golf course while members must stay on the cart paths?

This problem can become particularly troublesome during the winter, during rainy periods, or during times of heat stress. All it takes is one employee using bad judgement and the repercussions can last for weeks.

Obviously, the maintenance of the golf course must be completed within a certain period. The employee tends to keep this constantly in mind, and this causes mistakes. It is the responsibility of the superintendent to set strict guidelines to define where employees can and cannot operate maintenance equipment. Whenever possible, the employee should be instructed to remain on cart paths or in rough areas and be especially careful around putting greens and landing zones. However, there are conditions where speed must also be considered, for example, a fast application of a fungicide during Pythium weather, fast syringing during heat stress periods, and setting pin placements in front of early morning play.

Employees, therefore, should not be allowed to roam freely with maintenance vehicles except in emergencies, or else when it substantially saves time and labor.

Why are the greens always aerified on Mondays, and why are they always aerified just when they are beginning to play well? Can't we reduce or eliminate aerification altogether?

As a rule, most clubs have specific days for different groups of players. For example, Tuesday is often ladies day, Wednesday is men's day, Thursday may also be men's day, and Friday is mixed play day. Weekends, of course, are usually the busiest time of all. This leaves basically one day a week — Monday — when significant maintenance can be accomplished without disturbing a large amount of play. Many times the women members express justifiable concern about these Monday maintenance practices that greatly affect playing qualities on Tuesday. One of the best methods to handle this particular situation is to provide as much information as possible. A meeting once a year to describe how and why maintenance practices are accomplished can reduce problems. This meeting is best conducted by the superintendent and green committee chairman, in conjunction with a regular ladies club meeting.

The aerification of greens should be accomplished as fast as possible. While some clubs have the ability to complete the aerification program in one day, many others cannot and will aerify nine greens on successive Mondays. Others aerify nine greens on Monday and finish the operation by completing three or four greens per day on Tuesday through Thursday doing the work in early morning, before play begins. Some clubs do not close their courses, use no temporary greens, and take one to two weeks to complete the aerification. This method is the most difficult for both the maintenance crew and the golfer.

The superintendent faces the problem of timing the aerification program with various club functions. Often, he is asked to aerify earlier or later than normal rather than change the date of a tournament. Providing the membership understands the consequences of switching aerification timing, there should be little problem. Unfortunately, information is not always received or understood, and the superintendent is held

responsible for less than optimum playing conditions because of improper communications.

One method to aid in the aerification problem is suggested. Provided adequate equipment and manpower are available, complete nine holes on Monday by closing down one nine. To achieve more efficiency, aerify three or four of the greens late Sunday afternoon, when play is minimal. Then, close down the other nine on Tuesday and conduct a special "Aerification Tournament" for the regular players on Tuesday. If done properly, this can not only effectively complete the aerification operation quickly, but bring the course back into normal playing conditions in less time.

Why are there wet areas around greens?

Since golf course soils and terrain usually are not consistent, one can expect the biggest problems with irrigation where the largest variations exist. This area, needless to say, is the area surrounding the putting greens.

The modern putting green is constructed of predominately sandy material to allow for faster water drainage and to



(Above) Complaints about shade-covered greens and poor turf: Attention tree committee.

(Opposite page, top) A notice on the first tee.

(Opposite page, bottom) "But I didn't have time to use the path."

withstand compaction. Even many older greens built of less permeable material have been modified with topdressing material to improve rooting depth, aid in drainage, and resist compaction. Most maintenance practices performed on the actual putting surface are either reduced or not done at all around the green. Many times, because it is cheaper, the area surrounding a green is not made of the same material. Usually native soil is used to create the mounds and dips that add interest and character to a particular green. When excessive foot and vehicular compaction, shade from trees, and reduced maintenance practices (aerification, topdressing, etc.) occur on a native soil that is irrigated with the same system that irrigates a putting green, built on a base of sand, irrigation and drainage problems will occur.

There are many alternatives (some very expensive, other moderately priced) to aid in this dilemma:

1. Excessively wet areas should be drained by tile or a catch basin.
2. If equipment and manpower are available, a more intensive maintenance program should be undertaken. Aerification and topdressing twice per year will aid these areas greatly.
3. Reduce watering for the surrounding area — not the green. This, of course, will increase hand watering on the putting surfaces.

4. Several options are available within the irrigation system itself. Sprinkler heads and nozzles with lower precipitation rates, a separate, very low volume system, and separate partial turn heads for the surroundings only are some of the alternatives.

Why can't the greens be slower, fairways longer and roughs shorter? Or, why can't the greens be faster, fairways shorter and roughs higher?

These are very frequent questions asked by high and low handicap players. Often, high handicap players ask the former question while the low handicap player asks the latter. The important question for club officials to ask is, "What type of golf course does the membership want?"

As a general guideline, putting green speed for normal membership play in the 7-foot to 8-foot range (depending on green contours) should provide adequate pace. If a special tournament or club championship requires slightly faster greens, this can be achieved easily on the short term. Excessive speed on the long term is becoming an increasingly difficult problem. The player must understand the agronomic factors involved in excessively fast or slow greens, while the superintendent must provide the best putting surfaces for his membership.

For fairway playing conditions, a height of 1/2-inch (bentgrass, bermudagrass, zoysiagrass) to 3/4-inch (bluegrass) is desirable in most cases. A number of golfers want to know why fairways are cut so short. Raise the mowers and the ball will sit up higher, right? Wrong. Players should understand that a higher height of cut actually makes the ball sit down in the grass and results in more flyer lies. It becomes unfortunate when the height of fairway cut is raised and complaints suddenly begin about hard greens. We must all remember it is the responsibility of the player to put enough backspin on a ball to cause it to stop; it is not the responsibility of the green to hold any shot.

In regard to rough height, it depends primarily on the type of grass within the rough areas. A 2½-inch bentgrass, ber-





"Why must they always aerify on the day I play?"

mudagrass or kikuyugrass rough will play with much greater difficulty than a 2½-inch perennial ryegrass or Kentucky bluegrass rough. Again, the membership must be taken into account. Rough mowed at the 2- to 2½-inch level for normal membership play will provide improved fairway framing and an adequate challenge. As with green speed, additional rough height for special tournaments can be achieved for short periods.

To summarize, putting green speed from seven feet to eight feet, fairways mowed from 1½- to 3¼-inch, and roughs mowed 2- to 2½-inches may provide the least amount of controversy from the golfing membership.

Why are some of the tee blocks consistently out of alignment?

This problem is often caused by one of two factors — improper tee alignment-mowing patterns, or employee error. We have all seen tees that aim the player either left or right of the intended landing zone. Add improper tee block placement to this, and many players will align themselves incorrectly.

One method of correction is to rebuild the tee. This can sometimes be quite costly and unnecessary. A less costly approach is to make changes in mowing patterns on the tee. While some teeing area may be lost, it is the simplest answer to this surprisingly frequent problem.

To reduce or eliminate employee error, construct a T-square out of 1- to 2-inch PVC irrigation pipe using a T coupling. When the longest axis is placed in the intended line of flight, the tee blocks are then placed in a direct line of either side of the shorter axis. This tool would be used by whoever changes the cup in the morning and the tee mower operator later in the day.

I just played Perfection Country Club last week. Why can't our course be as good?

Of all complaints, this is the most difficult to answer. In many cases the best answer is no answer at all. Those golfers who insist on comparisons should obtain as much information as possible before they draw conclusions. As more information is delivered, the clearer the picture becomes. Comparing golf courses is like comparing snowflakes — no two are the same.

The second green sits so beautifully under the surrounding trees. Can't we improve the grass on this green?

Trees and turfgrass. If ever there was a match not made in heaven, these two would be candidates. As Frank Hanigan, Senior Executive Director of the USGA, states, "We've become victims of the arboretum syndrome. There are too many trees on golf courses and too many trees in the wrong places.

"By wrong places, I mean approximate to targets. There is something very wrong in suffering an unplayable lie under a blue spruce when you miss the green on a 440-yard par-4 hole by 30 feet.

"Green Committees over the years have treated courses like organic crossword puzzles by filling in all the blank spaces with trees. So I hope we'll be a little more careful about trees in the future."

This is especially critical around putting greens. None of us likes to see trees — large or small — removed, but trees could be the reason why a green may not perform properly. Accepting the trees means accepting the existing playing conditions. All complaints about poor turf conditions on shade covered greens should be directed to the tree committee.

The continual little problems. Why are the benches wet? Why is there no water in the ball washers? Why are the ball washer towels always dirty? Why is there no sand in the bunkers? Why don't the employees turn off their equipment while I'm putting? Etc.

While many of these questions may seem petty, they actually are small indicators of how the maintenance staff views the golfers and their course. Instilling pride in the maintenance staff can eliminate many of these problems. So often we take the little things for granted, and these small problems can become rather large. It is important to remind every crew member that he is working for the golfers and providing a service. Even the smallest complaint must be listened to attentively as it is important to that particular person.

While the preceding questions are some of the more frequently heard, they are by no means the only questions a superintendent must handle. The predictable and unpredictable problems that arise must be handled with tact and sincerity.

The effective turf manager knows many of the questions in advance, and he has carefully prepared the proper answers. He also takes advantage of every opportunity to pass on information about the golf course and the maintenance programs that affect play.

SEVERAL METHODS of information dispersal are available to the superintendent and green committee chairman. The more explanations about the course operations given to the mem-

bership, the more they are given an opportunity to understand the peculiar problems in a golf course maintenance operation. These methods include:

1. Club newsletter — Every month, the superintendent should have a short article describing his planned operations or covering questions that are continually asked.

2. Monthly bill — When club dues notices are sent out, a short paragraph or two about course operations can reach many people who otherwise may not read the newsletter or notice articles posted throughout the club.

3. Announcement boards — While a bulletin board can be effective, many times it becomes cluttered. The superintendent's memos (aerification dates, topdressing dates, fertilizer dates) can become lost or forgotten. An erasable announcement board for the golf course only, displayed in a prominent location, is more noticeable. Daily, weekly or monthly programs can be shown to forewarn players of maintenance practices. While many maintenance practices can mildly upset golfers, they can become

very upset if these practices are a surprise and done without prior notice.

4. Special meetings — The idea of a special meeting in the spring put on by the superintendent and green committee chairman for the membership to outline the coming year's operation has been used successfully at some clubs to disseminate information. You can expect several of the preceding questions to arise. This offers an excellent method to provide needed information to the membership. Also, it allows all members an opportunity to state complaints or comments concerning the golf course operation.

5. Occasional rounds of golf with both men's and ladies' groups regardless of the superintendent's playing skill provides constructive conversation opportunities. It is important that the membership understands that the superintendent is a golfer and understands the game. This alone often gives credibility to the superintendent's programs. Without it, golfers wonder (often mistakenly) if the superintendent really does understand how to maintain a golf course.

6. Use outside sources — If your club subscribes to the USGA Green Section Turf Advisory Service, use it to inform the membership about ongoing programs and the problems faced. If not posted in a prominent place, or reproduced in part in the club newsletter, it should be available to the board of directors and green committee for their information. This can be extremely valuable, because the USGA agronomist has nothing to sell. He is there solely to help your club produce the best possible playing conditions for the membership. More often than not, this tool can be very effective in explaining maintenance operations and offering useful suggestions for further improvements on the golf course.

While we should all strive to understand and respect the golfer's point of view, it is the superintendent's responsibility to educate the golfer about his maintenance programs. Through mutual respect and understanding, complainin' and explainin' can become a positive avenue to answer questions and disseminate information for the member and superintendent.

News Notes for Summer

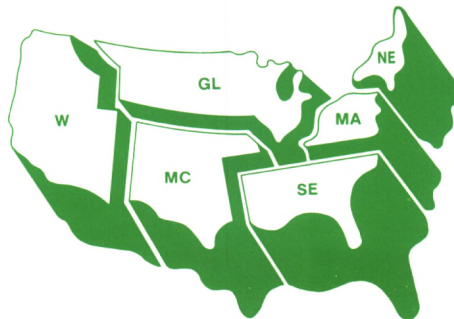
The North-Central becomes the Great Lakes Region.

With the realignment of some states for the Green Section Turf Advisory Service, a new name has also been adopted for the North Central Region. The Great Lakes Region is the new title. **James M. Latham, Jr.**, will bring 30 years of turfgrass experience to TAS subscribers from Michigan to Montana. Although Montana, North Dakota, South Dakota, and Iowa may feel Great Lakes Region is stretching it a bit, we think you'll feel right at home with Jim Latham. He has had tremendous experience throughout the nation. We know he can make a contribution to turf management operations at any golf club

interested in turf progress and perfection. His address is 4680 West Bradley Road, Suite 2, Brown Deer, Wisconsin 53223. Phone: (414) 354-2203.

The map shows all of the USGA Green Section Regions.

A USGA-trained agronomist is not more than a day away from your golf course. For the best golfing turf your course will ever have, contact your Regional USGA Green Section office today and subscribe for 1985.

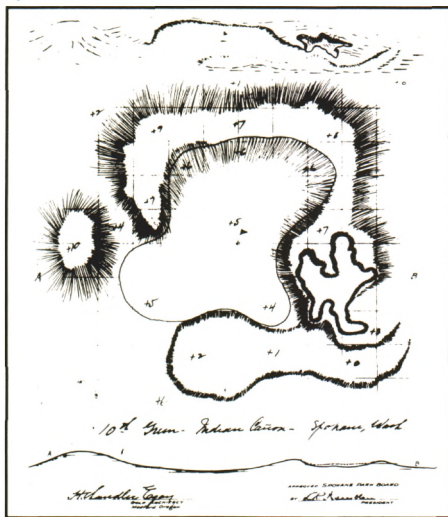


A Turfgrass Research Memorial Fund Established for Dr. Marvin H. Ferguson

A Memorial Fund for Dr. Marvin H. Ferguson has been established by the Ferguson family and the USGA Foundation. Dr. Ferguson died in early January 1985. He served on the GREEN SECTION staff for 20 years, the USGA Turfgrass Research Committee, and he was responsible for many advances in turfgrass science, including the USGA Specifications for Putting Green Construction. In later years, he was the turfgrass research director for the American Society of Golf Course Architects.

Donors wishing to make a memorial tribute to Dr. Ferguson may do so through the USGA Foundation, in care of James R. Hand, President, USGA Foundation, Golf House, Far Hills, New Jersey 07931. Please attach a cover letter stating the gift is for the Dr. M. H. Ferguson Memorial Fund. It will be used strictly for turfgrass research, and the USGA Foundation will acknowledge the gift to the Ferguson family. Such donations are tax deductible and the donor will receive a letter of acknowledgement for tax purposes.

The original sketch of the 10th green, by H. Chandler Egan.



Bunker renovation at the 10th green at Indian Canyon, Spokane, Washington.

Before...

Remodeling Sand Bunkers On Your Course

by **JOHN R. STEIDEL**
Golf Course Architect,
Kennewick, Washington

AS A GOLF COURSE architect and a golfer I like to see sand bunkers. They are one of the game's original hazards. Often pleasing to the eye, they are an integral part of design in terms of adding interest, defining landing areas, and creating challenge. Often sand bunkers are the only fair method of creating sufficient difficulty on a flat, treeless, or otherwise uninteresting site.

Having remodeled many mature courses, it's always a pleasure to get an immediate and favorable response from golfers who see sudden improvement in their old layouts. However, anyone tinkering with an established course must remember that those same golfers can just as quickly become the most severe critics if the job isn't done right.

Remodeling by adding bunkers has a distinct advantage over new construction, from an architect's standpoint, in that you know how the hole is played at all times of the year and under all climatic conditions. There is really no excuse for



During...

After.



misplacing a bunker on an existing course.

In contrast, it is not uncommon to find a sand bunker located out of play on a new course, or one that unfairly penalizes golfers, especially the higher handicapper. That often occurs because what looked good on paper doesn't quite work that way when it becomes part of the topography, is affected by a particularly hard or soft fairway, or is blown out of proportion by regular winds not adequately considered at the time of construction.

too much time worrying how the bunkers looked, rather than concerning myself with where they were placed and how they played.

I personally prefer to look at irregularly shaped, curvilinear sand bunkers. They should also be designed with maintenance in mind. I think most golfers prefer that treatment, although much of the bunker design that appears in articles of popular golf magazines today features those with steep grass or sand faces or ones that are extremely unusual in shape or appearance.



A liner in a bunker, placed beneath the sand, not only prevents weeds from reaching the surface but also keeps the sand in place. Second hole, Whitefish Lake, Montana.

If the bunkers are to be placed or remodeled on your course, it is extremely important that the course be considered as a whole. It is possible to add or delete them on different holes on separate occasions and believe you are making proper decisions, but this often results in a course on which holes of a similar nature are all bunkered in a similar manner. I find that the preparation of a master plan for remodeling that allows for ideas from the golf professional, golf course superintendent, and the green committee eliminates this possibility.

In retrospect, my most common mistake earlier in my career was spending

OBVIOUSLY, sand bunkers cost money to build and maintain. At \$35 to \$45 per cubic yard — more in some locations — white sand and large bunkers can add up to a very expensive proposition. Still, I believe that the cost of bunker maintenance depends much more upon the amount and quality of edge maintenance than it does on the total area of the sand. Though mechanical rakes have their drawbacks, they have made taking care of large bunkers much easier.

It would be far less expensive to have a course without sand bunkers. Such courses usually arise from a tight budget,

often alibied by the mistaken belief that bunkers unnecessarily cause slow play. In my opinion, such layouts are not particularly interesting, challenging or attractive. I find that at least 40 bunkers are necessary on even the most heavily played municipal course to insure sufficient challenge and interest. A course with more than 80 bunkers has them for aesthetics, special effect, or some other reason, but that many are certainly not needed for playability. One bunker properly located can do the job of three or four in the wrong place.

After it has been decided where the bunkers are to go, it must be decided what they should be like. As I mentioned earlier, many professional and part time golf course architects worry too much about appearance. Although I've already stated my preference in bunker design, that isn't necessarily what I always build. Each project requires a design plan that takes into consideration what is right for that course, its maintenance budget, the climate, and the golfers who are going to play it regularly.

If a course is in an area of frequent heavy rainfall or high winds, it makes no sense to construct bunkers with steep faces that will require constant attention just to keep the sand in place. If a course is played by mostly high handicappers, it makes sense to keep the sand hazard flatter. However, if a course really takes itself seriously, that type of design is unacceptable. On a course with a limited budget, the need for hand work must be kept to a minimum, which means no steep grass slopes, or turf fingers, or islands protruding into the bunkers, although the use of growth retardants may help some. Finally, I have nothing against either oval-shaped or pot bunkers if they are appropriate. Many great courses have sand bunkers that are pretty unremarkable visually. An architect should not force his style upon a course.

PROPER SELECTION of sand for new or remodeled sand bunkers is a subject that should not be dealt with lightly. For the most part, golfers and superintendents know what sand works best in their area. If sand is too coarse or packs too easily, it won't stay in use very long. The United States Golf Association has tested some sand characteristics to determine their suitability for bunker use.

Some touring professionals have expressed a dislike for silica sands. Apparently these sands don't allow a player to stop the ball as easily on the green. It has

been my experience that such sands are easier for the average golfer to play out of, and clients seem to like their brilliant white color. Once again, you must consider who will be playing your course before making a decision.

Two years ago I was retained by the City of Spokane, Washington, to provide golf course design services for three municipal courses, including the picturesque Indian Canyon Golf Course, which was to be host to the 1984 U.S. Amateur Public Links Championship. Part of the job required preparing plans and super-

I was fortunate to have a set of Egan's original plans as a guide. Some bunkers on his plans were either never constructed or filled in over the years. The City and I saw no reason to change the design of the course.

It was obvious, however, that whether or not the Public Links Championship was going to be played there, the bunkers needed work; just edging them would not be enough. Sand had built up the lips on some to over 18-inches high. They weren't lips anymore — they were cliffs! Turf around the bunkers had

great. I doubt that anyone who hadn't played the course in a year or two noticed any difference, even though the total area of sand surface was probably doubled. The result requires more maintenance by hand and the bunkers are a little steeper at Indian Canyon than on many of my other courses, but as the local USGA committeeman kept advising me, that was how it should be, because Indian Canyon is a special golf course. He was right, of course, but I didn't tell him that every course is special to some golfer.

This is not a technical article because building good sand bunkers is not all that technical. Successful sand bunker remodeling requires the involvement of at least one individual who can properly balance the artistic and the practical with the golf. I would like to offer three points to keep in mind if you are thinking of reconstructing or adding bunkers on your golf course.

FIRST, make sure the hazard is necessary. I have found that a twenty-yard-long fairway bunker, properly placed, is often all that is needed to tighten a landing area. The proper place is generally beyond a good drive of a short hitter from the regular tee, yet set far enough out so that the bunker cannot be carried by the best golfers from the tournament tees.

Second, pay special attention to drainage, both inside and outside the bunker. A complaint I always hear from golf course superintendents is that sand washes off the faces. This can be eliminated if most water from higher ground is intercepted and redirected before it gets to the bunker. Furthermore, the sand face itself should never be built on a slope greater than 3:1. Steeper slopes mean daily hand raking. Remember also to drain your bunkers. Whether it's in the form of sump, drainline, or both, it isn't just the heavy shower that causes problems, but it's also nightly irrigation.

Finally, know in advance what you are trying to build, especially in relation to the maintenance it will require. Be wary of trying to build a bunker like the one you saw on television last week or one your green committee chairman saw on his vacation in Palm Springs. Even if you could duplicate the hazard, it probably won't work as well on your course.

Proper study, planning, knowledge of construction and maintenance were prime factors in our success at Indian Canyon and I believe they are the keys for all successful remodeling.



Fallen into considerable disrepair.

vising the renovation of the course's sand bunkers, which over the years had fallen into considerable disrepair.

Indian Canyon was designed by H. Chandler Egan, a former U.S. Amateur Champion; it was built in the early 1930s by a WPA crew (Egan also had a hand in the redesign of Pebble Beach). The Indian Canyon Course is not long and the site is heavily wooded and very hilly. In my opinion, Egan designed the best hilly golf course I have ever seen. The greens are medium in size and many of them are well designed. There are no fairway bunkers and only 23 on the entire course. The bunkers generally frame the greens, and even if they are in front of the greens, they tend to be set toward the sides.

grown in considerably, and there were other signs of old age. The edges were broken, turf had encroached on the original design, and sand that should have been in bunkers had washed down and out, creating a mess at the lowest point. This was partly caused by the original design, which did not install drainage lines.

The work was done by the City crew with my supervision during the fall of 1983 and spring of 1984. It was completed just in time for the tournament. The renovation required a lot of hand labor, which I believe helped maintain the course's original flavor. Drainage was installed at the low points of all bunkers.

The result has been very successful. The bunkers play very well and look

A GREEN SECTION RESEARCH PROJECT

NOW OPEN

The Turfgrass Information Center

by **RICHARD E. CHAPIN**

Director of Libraries, Michigan State University

and **PETER LePOER**

TGIF Project Coordinator, Michigan State University

ARE YOU having trouble with tall fescue in your Kentucky bluegrass? Perhaps you should try chlor-sulfuron. Do you routinely syringe your bentgrass greens? Maybe it is not necessary. Is TGIF something more than an excuse for the weekend libation? It certainly is. The TGIF at Michigan State University is the USGA-sponsored Turfgrass Information File; it can provide information on these and other topics in turfgrass management and research.

In the spring of 1984, the USGA and Michigan State signed an agreement whereby the MSU Library would design and develop a bibliographic computer database to provide access to all published materials reporting the results of research that affects turfgrass and its maintenance. Such a project had top priority with the USGA Turfgrass Research Committee at its initial meeting, on March 1, 1982.

One of the principal reasons for locating the project at Michigan State University Library was the existence of the O.J. Noer Memorial Turfgrass Collection, including books, journals, and conference proceedings. The collection was based on O. J. Noer's personal library and was supplemented by gifts from James Watson, Thomas Mascaro, James Gallagher, and others who had been solicited by Charles Wilson and James Latham, acting on the behalf of the O.J. Noer Foundation. Since its inception, the collection has grown and has become recognized as one of the best in the country. It made good sense to build the bibliographic project on an existing collection.

A private foundation, the United States Golf Association, and Michigan State University have come together to create the Turfgrass Information Center (TIC). The center will have three goals:



Part of the O. J. Noer Memorial Turfgrass Collection. The past can be a key to the future.

The USGA Turfgrass Research Committee examines part of the O. J. Noer Memorial Turfgrass Collection, at Michigan State University, July, 1984. (Left to right) Dr. Richard E. Chapin, Dr. Paul E. Rieke, Dr. James R. Watson, Charles W. Smith, James B. Moncrief, Dr. Marvin Ferguson, members of the Committee.



(1) to develop and maintain the collection (Noer Foundation), (2) to provide computer access to the bibliographic data of turfgrass research (USGA), and (3) to deliver documents or copies from the collection to researchers, practitioners, and other appropriate users (MSU).

The librarian at TIC will devote whatever time is necessary to the acquisition of materials for the turfgrass collection. A network of researchers and practitioners in the field will be developed to assist in acquiring the variety of materials for the collection and for the automated bibliographic files. Preservation of the collection, including binding and microforming, will be undertaken.

BIBLIOGRAPHIC access to the collection is provided by the project's retrieval system, supplemented by appropriate printed reports. The library has purchased an Alpha Microsystems computer, and the STAR information program. The system was installed on August 8, 1984, and the data — the Turfgrass Information File (TGIF) — already has more than 3,000 abstracts.

All articles in the 30 or so technical journals and newsletters devoted specifically to turfgrass information (such as *California Turf Culture*, *Florida Turf*, *Golfdom*, *Ground Maintenance*, *Sports Turf Bulletin*, and USGA GREEN SECTION

RECORD) will be added to the file; the 15 or so scientific journals that publish primary research materials relating to turfgrass (such as *Agronomy Journal*, *Crop Science*, and *Plant Disease Reporter*) will be reviewed and appropriate articles will be added to the file; technical and scientific journals in allied areas (such as *Groundsman*, *Landscape Industry*, and *Park Maintenance*) will be reviewed regularly.

For now, the current journals are being abstracted and added. As time is available, journal articles back to January 1980, will be added, and additions from previous years will be reviewed with the USGA Turfgrass Research Committee.

Files and bibliographies of the National Agricultural Library, the Commonwealth Bureau of Great Britain, Biological Abstracts, and others will be reviewed monthly and searched for omissions and for other titles that do not usually report on turfgrass research. Articles so identified will be added to the file.

THE TGIF database can be searched in a variety of ways. For a basic subject search, the searcher can insert a term, and the computer will find records in which that term appears, as part of the title, as an assigned subject term, or in the abstract. For a more precise search, the searcher can restrict the search to

records in which the term appears in only one of these elements. One can also limit retrieval of records to only those by specific authors, from specific journals or proceedings within a particular year or range of years.

Progress in providing bibliographic access to collections has improved dramatically with the new technology; progress in providing physical access to collections remains much the same as it was when the first inter-library lending code was established. During the initial years of the USGA-MSU contract, the Turfgrass Information Center cannot be expected to provide physical access that is much more than the U.S. Mail and limited photocopies. In succeeding years we might expect facsimile transmission or full text retrieval and an electronic mail type of access for requests.

Michigan State University Library will provide loans and/or appropriate photocopies to all users who have reason to need access to the turfgrass collections. The objective is to respond to most requests within 48 hours.

Alpha Microsystems and Cuadra Associates, the developer of the STAR program, have developed new programs to permit access to the Alpha and the TGIF with the IBM personal computer or other computers compatible with the IBM. After this effort has been evaluated, the center will provide information to potential users on how to gain access to the collection.

ANOTHER possible computer service for the future is a turfgrass information exchange. The Information Center computer can support a bulletin board where telephone users could leave messages and ask questions of other users of the system. A caller could, for example, leave a message asking if anyone had advice concerning a certain disease.

Anyone now interested in a subject bibliography from the TGIF database should either call the center or mail his request. If mailing a request, please be as specific as possible about your subject. First, provide a paragraph or two describing what information is desired and why, and, second, provide a list of terms relevant to your request, including possible synonyms for the topics of interest.

Requests, questions or comments should be addressed to Turfgrass Information Center, W-212 Library, Michigan State University, East Lansing, Mich. 48824-1048. Phone requests should be made at (517) 353-7209.

Dr. Paul Rieke, Dr. Peter LePoer, Dr. Richard Chapin and James B. Moncrief at the Michigan State Library.



Drought Emergency Planning

PHILADELPHIA ASSOCIATION OF GOLF COURSE SUPERINTENDENTS RESPONDS

by MICHAEL R. SMITH, Secretary

THE ISSUE of water use on golf courses is rapidly developing into the central theme around which all future golf course management plans will be made. Though this was accepted long ago by superintendents in the West, it is only beginning to hit home in the Mid-Atlantic, Eastern regions, where adequate rainfall and irrigation water sources have always been taken for granted.

The drought of 1980 brought about the most serious water shortage to the Mid-Atlantic region since the mid-60s. In 1981, in response to the drought of the previous year, state agencies in the Delaware River Basin area — which includes all or parts of New York, New Jersey, Pennsylvania, Maryland, and Delaware — enacted restrictions on golf course irrigation. These restrictions initially ranged from total elimination of irrigation (greens, tees, fairways) in New Jersey to a voluntary reduction of water use in Delaware. Pennsylvania's restrictions stated that all fairway irrigation be eliminated and that green and tee irrigation be limited to hours between 5 p.m. and 9 a.m. These restrictions, imposed in haste during a critical water shortage, were formulated without consulting anyone responsible for maintaining courses.



Philadelphia Association of Golf Course Superintendents Board Meeting on Drought Emergency Planning.

When the drought regulations were made public, early in 1981, a coalition of the New Jersey Green Industry was the only group able to mount a successful campaign to modify restrictions affecting irrigation. Responsible people in other affected states made no concerted effort to effect changes in the regulations.

Fortunately, 1981 was a year of above average precipitation, and as summer approached, it became obvious that, in most areas, irrigation restrictions would not be rigidly enforced. The restrictions did prove to many area superintendents that they had in fact been overwatering for many years, and that they could

reduce irrigation without compromising the quality of their golf courses. Time passed and drought regulations and our close call with turf disaster were forgotten. Several superintendents did, however, continue programs of reduced irrigation and planned changes in maintenance operations to provide quality playing conditions and aesthetics while using less water.

Late in 1983 drought emergency regulations again cropped up. The Delaware River Basin Commission (DRBC), in an effort to be prepared for the next emergency, required member states to draw up contingency plans, providing reasonably uniform regulations throughout the region. In Pennsylvania, public hearings on the proposed regulations were held in February, 1984. Representatives of the PAGCS attended these hearings to present our viewpoint and learn what could be done to modify the proposed regulations.

Proposed regulations divided a drought condition into three stages of severity; drought watch, drought warning, and drought emergency. During a drought watch, education to increase public awareness of the need to conserve water and general voluntary water use reductions were the only guidelines set

forth by the DRBC. Proposed regulations, affecting golf courses during a drought emergency did not vary from the 1981 regulations: No fairway irrigation and restriction of green and tee irrigation to between 5 p.m. and 9 a.m. However, during a drought warning, golf courses would be asked to abide voluntarily by drought emergency regulations. When asked how often we could expect drought warning and drought emergency conditions to occur, DRBC officials estimated a drought emergency would occur every seven to 10 years, but a drought warning would occur every two to three years. Potentially, this could mean that golf courses would be asked to restrict their irrigation voluntarily every other year.

It became clear after the public hearings that a concerted effort would be needed to modify these regulations before they became law. The PAGCS board of directors began looking for ways to approach this problem effectively.

IN MARCH 1985, the board of directors of the PAGCS unanimously passed a resolution to commission a study of "The Impacts of the Drought Contingency Plan on Golf" by the Greely-Polhemus Group (GPG), a consulting firm that specializes in industrial and municipal water use and hazardous material handling. The purpose of the study was to pinpoint the economic impact of the drought regulations affecting golf in the Pennsylvania portion of the Delaware River Basin and identify the impact of the golf course water use on Delaware River Basin water resources.

To gather the information, the GPG, with PAGCS guidance, developed a questionnaire that was distributed to a randomly selected group of golf clubs in eastern Pennsylvania. The results provided us with the information needed to present an alternative to the proposed regulations.

The GPG divided its report into four objectives: 1. Address the inequity of the proposed percentage depletive water use

(water that is lost from the system by evaporation or other means) reduction by golf courses; 2. Establish the economic significance of the golf industry; 3. Identify the regulations' economic impact on golf; 4. Propose revisions to the DRBC drought contingency plan consistent with the golf industry's willingness to do its fair share to conserve water during drought.

1. Water Use

The DRBC drought emergency plan established as a goal to reduce depletive water use by 15 percent in each member state. In Pennsylvania, this goal is to be reached by reducing the depletive use of the four user classifications by certain percentages.

The figures in *Table 1* illustrate that golf is being asked to bear a disproportionate share of the depletive use reduction, even though it is the smallest depletive user classification. Of the 5,974.9 mgd water use withdrawal in the Pennsylvania portion of the basin, golf courses account for only 0.2 percent, and account for only 3.7 percent of the 327.3 mgd depletive use total. It will become clear that the water savings gained from such a severe reduction of golf course irrigation is insignificant compared to the potential economic impact of the reduction.

The survey figures also showed that by following proposed restrictions, depletive golf course water use would actually be reduced by 77 percent, not 54 percent, the DRBC target listed in *Table 1*.

As you can see, figures in *Table 2* show a 77 percent reduction in water use by eliminating fairway irrigation. This strongly suggests that DRBC arbitrarily chose water use reduction figures for golf courses, due to their lack of information about golf.

2. Economic Significance

Pennsylvania drought regulations categorize golf courses as institutional non-essential water users. This category also includes playgrounds, hospitals and industrial landscapes, and college campuses. In New Jersey, the golf industry was able to have its user classification changed from institutional to industrial by demonstrating its economic impact within the state. After we studied information gathered from our survey and other sources, we established changing the golf business classification from institutional to industrial as one of the primary goals of the GPG report. By grant-

TABLE 1.

Category	Total Depletive Use 1980	Depletive Use Reduction Objective	% Reduction
Public Water Supply Users	66.0 mgd*	25.0 mgd	39
Golf Courses	11.2 mgd	6.0 mgd	54
Thermal Electric	24.5 mgd	2.5 mgd	10
Industrial/ Commercial	122.4 mgd	4.0 mgd	4

*Million gallons/day

TABLE 2.

Golf Course Water Use in Pennsylvania Delaware River Basin

Area	MGD Used	% of Total
Greens	1.7	14
Tees	1.1	9
Fairways	9.5	77
	12.3	100

TABLE 3.

Drought Incurred Losses Significant Losses Likely

Area	% Yes	% No	% Loss	Renovation Cost
Fairways	87	13	50	\$18,800
Tees	36	64	16	6,000
Greens	43	57	10	8,200
Shrubberies	64	36	28	5,500
				\$38,500

ing the industrial classification to golf courses, DRBC would be obligated to distribute depletive water use reductions more equitably throughout all industries, the largest depletive users.

Here are some facts and figures to support our contention that golf qualifies as an industry in Pennsylvania.

- The average annual revenue for golf clubs responding to our survey was \$1.414 million.
- Based on the estimated 150 golf clubs in the Pennsylvania portion of the Delaware River basin, golf produces \$212 million per year in primary economic activity.
- Employment represents approximately 2,000 full-time and 3,000 part-time employees combining to earn \$60 million per year.
- *The Standard Industrial Classification Manual* and the *1977 Census of Service Industries* both classify golf courses as industries.

These facts support our contention that the DRBC grossly underestimated the impact of golf in Pennsylvania when it classified it as an institutional non-essential user.

3. Impact of Drought Regulations

Response to the GPG questionnaire indicated that 80 percent of the golf clubs in the Pennsylvania portion of the basin had suffered previous occurrences of drought damage and resultant renovation costs. Table 3. shows the estimated percent damage and restoration costs that the average club would incur by following the proposed DRBC irrigation restrictions.

Projected throughout the affected area in Pennsylvania, the direct economic impact to golf amounts to nearly \$6 million per drought emergency.

Estimating loss in income caused by a drought emergency proved more difficult. Respondents generally agreed that revenue would decrease as course conditions deteriorated; the average reduction falling between 11 and 14 percent. Using the previously mentioned average gross revenue of \$1.414 million per club, losses would total \$200,000 per club, \$30 million through the Pennsylvania portion of the basin. These figures would be very sensitive to the length and severity of a drought emergency. The average club member is more often than not as interested in the aesthetics of the golf course as the playing conditions. Many members of private



(Left) "We are a non-polluting, smokeless, industry."

Drought loss.



clubs would probably rethink their membership costs as course conditions deteriorated during a protracted drought condition.

4. Conditions and Recommendations

After the survey data was compiled, representatives of the PAGCS held several meetings with the Greely-Polhemus Group to formulate modifications to the portions of the DRBC Drought Emergency Plan that affect golf course operations. The following recommendations were made to the DRBC:

- Classify golf in Pennsylvania as an industry.
- Establish a depletive water use reduction of 25 percent (or other percentages as may be applied in all industry), and do not prohibit irrigation practices (grant the industry flexibility to determine where irrigation is needed to protect its economic investments in turf and ornamental plantings, and maintain a playable golf course to protect revenues).
- Set time of day restrictions, for example 5 p.m. to 9 a.m., to prevent irri-

gation during peak evaporation periods, including greens, tees and fairways.

d. Assist the industry in developing projects where recycled municipal wastewater can be used.

e. Assist in research of drought resistant grass, and demonstrate the use of tensiometers and improved practices for optimal irrigation.

The PAGCS feels that these recommendations are consistent with our desire to do our part during a drought emergency. It was obvious after reviewing the DRBC plan that golf was singled out to bear a disproportionate share of the drought burden because of lack of knowledge of the game and its high visibility. Other non-essential industries (candy and ice cream manufacturers, car wash establishments) were not singled out, or else they had lobbied successfully to modify rulings that affected them. If our study accomplishes nothing else, we hope that it results in a more careful study of the impacts of the drought regulations and that it produces more equitable depletive use reductions.

TURF TWISTERS

IT'S NOT A SAINT ELSEWHERE

Comment: I can't agree with your answer to last January/February's query about velvet bentgrass for greens. Golfers love velvet! It thrives on neglect and is still beautiful. It has low fertility, low water, and minimum fungicide requirements. I've seen velvet greens over 50 years old and they are great! (Rhode Island)

Response: Well, we only said "velvet bentgrass should be on the endangered species list." We didn't advocate annihilation. Obviously it has its admirers and good points. But the fact remains that velvet is difficult to obtain today. It does have severe thatching characteristics, requires a strong topdressing program, is slow to recover from damage, and is prone to disease. It seems velvet is best adapted and accepted in New England. It is not a "Saint" elsewhere!

BUT WHAT'S IN A NAME?

Question: Why are turfgrass pathologists always changing the scientific and even our common names for turfgrass diseases? I find it frustrating, confusing and difficult to keep up with them! (Michigan)

Answer: If you're talking about *Drechsleria Poae* for Helminthosporium Melting Out; *Lanzia Sp.* or *Moellerodiscus Sp.* for Dollar Spot; *Bipolaris* Leaf Spot for Helminthosporium Leaf Spot; Necrotic Ring Spot for Fusarium Blight, and about a half dozen others in the past few years — we can only agree with your conclusion. However, at the recent American Photopathology Meetings, the scientists tried to standardize their terminology and the renaming of diseases. It appears to be a case of the more one learns — the less one really knows. For example, what once was Fusarium Blight may now be *Fusarium roseum*, *Fusarium tricinctum*, Fusarium Blight Syndrome, Summer Patch, Fusarium Crown & Root Rots or Necrotic Ring Spot! But what's in a name?

EXCEPT ON TELEVISION

Question: Tournament golf, especially as shown on TV, has had a tremendous impact on golfer's demands for ultra conditioning our course. Do USGA Championship courses maintain that level all year long? How? (Wisconsin)

Answer: It is virtually impossible to indefinitely sustain the ultra high turfgrass conditions developed for the major U.S. golf championships today (the U.S. Open, The Masters, the PGA, etc.). These courses, and we suppose all others scheduled for viewing on television, are the result of long (up to three years in some cases), careful planning, high, if not unlimited, maintenance budgets, and with the entire focus to bring course condition to its peak for one week. The era of having a golf course continually in modern U.S. Open condition is over!

But this doesn't mean high expectations and high standards of playability, day in and day out, are unreasonable and beyond us. Not at all. It just means the peaks cannot be turned into plateaus. Well, except on television!