



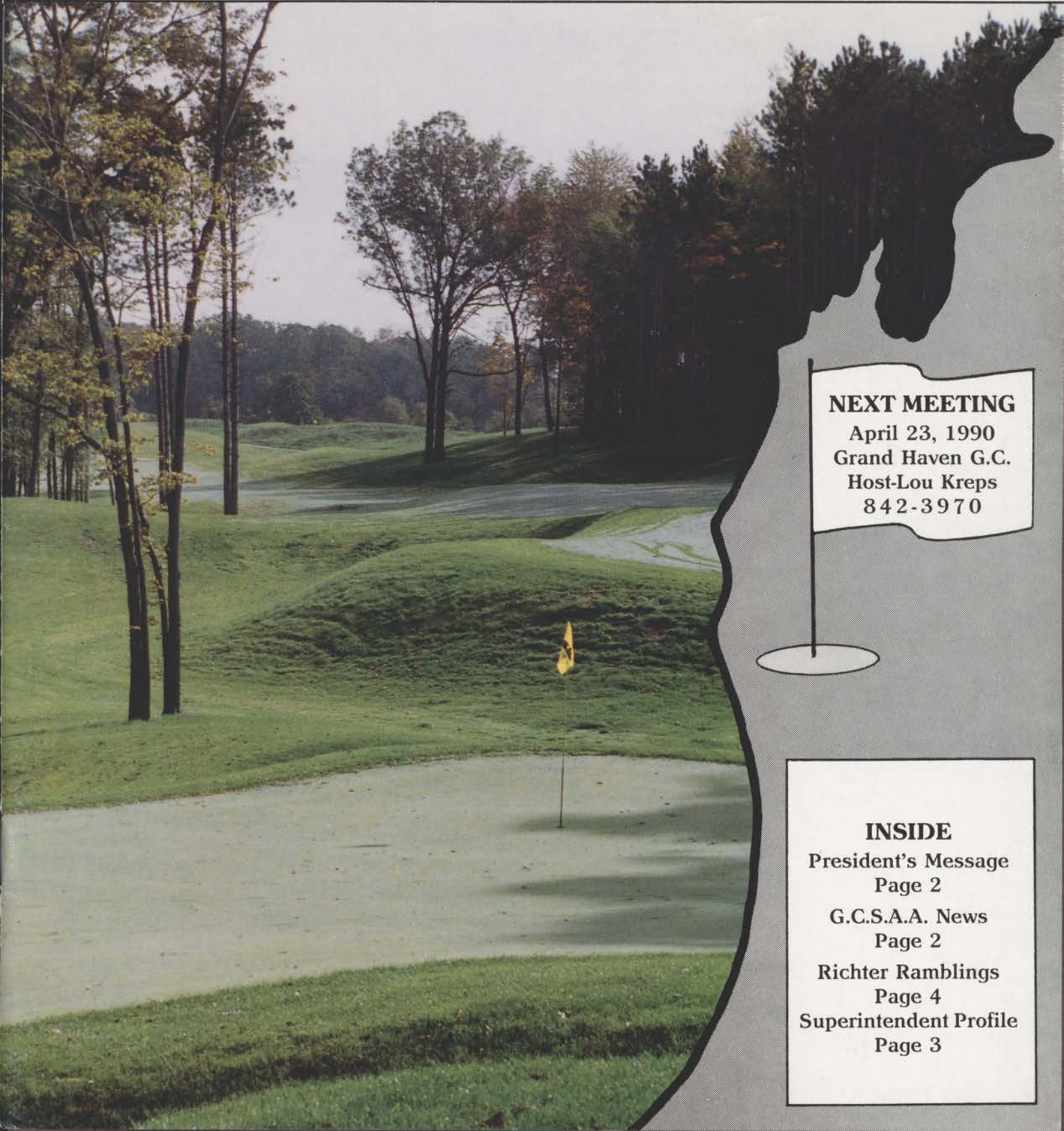
# WESTERN VIEWS

Official Publication of the  
W.  
M.  
G.  
C.  
S.  
A.

Editor — Paul Richter

Winter 1991

Photo courtesy of Jan Janson



## NEXT MEETING

April 23, 1990  
Grand Haven G.C.  
Host-Lou Kreps  
842-3970

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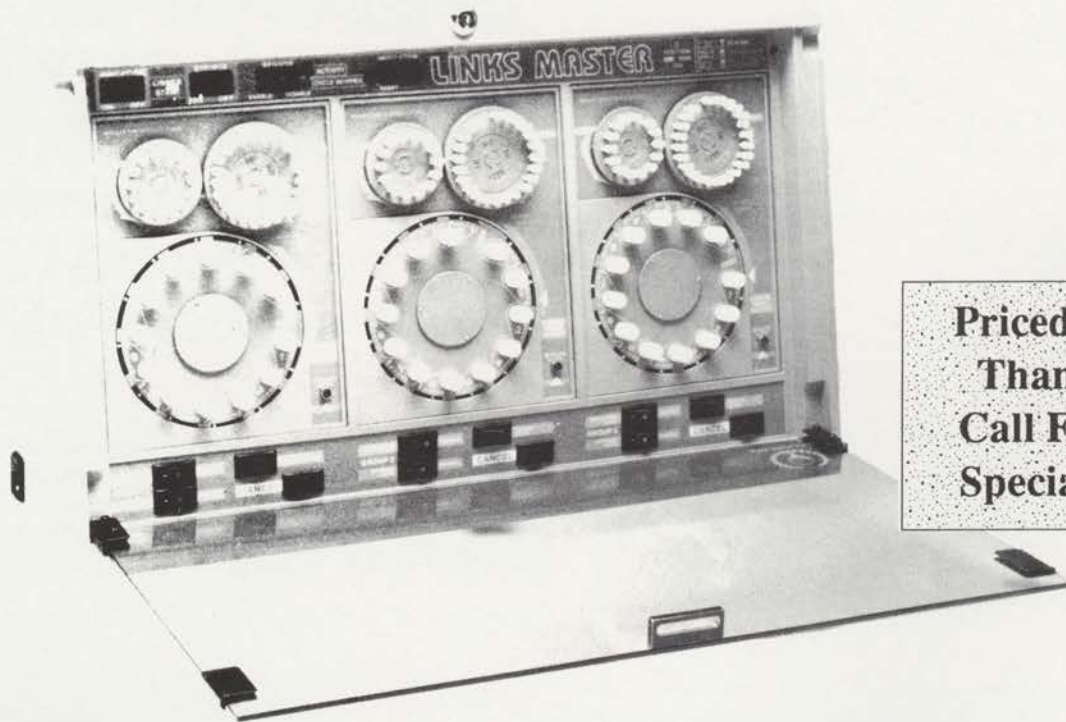
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## WESTERN NEWS

The W.M.G.C.S.A. contribution to the Michigan Turfgrass Foundation for the 1990 Golf Day at The Highlands in Grand Rapids was \$8,000. This donation brings the total to \$56,277 contributed to the M.T.F. since the inception of the W.M.G.C.S.A. Golf Day 10 years ago.

The Hancock Center's ten acre expansion project has been earmarked as the recipient of a \$1,500 contribution presented to the Michigan Turfgrass Foundation by the W.M.G.C.S.A.

Harry Schuemann, C.G.C.S., of Crystal Springs Golf Club was elected to his first term on the Michigan Turfgrass Foundation Board of Directors as the W.M.G.C.S.A. representative. Re-elected to the M.T.F. board was Jim Bogart of Turfgrass, Inc. At present Jim is the vice-president of the M.T.F. Lon Anderson and Bruce Wolf from were also elected to terms on the M.T.F. board.

The 1991 Golf Day will be hosted by Charlie Scott of Gull Lake View Golf Club on Wednesday, September 4, 1991. The alternate course is Gull Lake Country Club where Glen Hokenmaier is the superintendent.

W.M.G.C.S.A. committee chairmen for 1991 are:

G.C.S.A.A. Liaison - Chris Fochtman C.G.C.S.

Notification - Paul Schippers

Education - Bill Madigan, C.G.C.S. & Charlie Scott

Newsletter - Paul Richter

M.T.F. - Harry Schuemann, C.G.C.S.

G.A.M. - Bill Madigan, C.G.C.S.

Scholarship - Harry Schuemann, C.G.C.S., Bill Fountain & Paul Hoag

Nominations - Roger Barton

Golf Day - Bill Fountain

Golf Events - Paul Hoag

Fall Party - Chris Fochtman, C.G.C.S.

## RICHTER RAMBLINGS

In this issue of *Western Views* the theme is the environment. I realize that we are beating the proverbial dead horse, but just as light weight mowing, faster greens and increased ornamental plantings were the emphasis of the 80s in golf course management, environmental awareness is the emphasis for the 90s. By having all the articles in this issue focus on the environment, after this I won't have to mention the environmental issue, at least in 1991. So read on and enjoy.

With the increased play on golf courses, the superintendent is under increased pressure to accomplish tasks such as mowing and spraying without interfering with the golfers. Are any superintendents spraying, mowing, or performing any other work at night with the use of lighting systems? If you are, would you please contact me at (616) 842-4840. I would be interested in talking to you and possibly writing an article in the future about this subject.

Congratulations to Bill and Kay Fountain on the birth of Manny Fountain on November 29 . . . and to Kim and Bob Olsen on their new son Brant Olson delivered on

December 1.

Gary Peters is the new superintendent at The Highlands (formerly G.R. Elks) in Grand Rapids . . . Muskegon Country Club's new superintendent is Jeff Pack, formerly the assistant at Saginaw Country Club . . . Larry Murphy has moved back into the Kalamazoo area from Indiana, and is now the superintendent at Thornapple Creek Golf Club. Congratulations to these gentlemen on their new positions.

Welcome to new members Tom Goodwin, Assistant Superintendent at Crystal Springs Country Club; Kevin Barton Assistant Superintendent at Forest Hills Country Club; and to Bob Hope, C.G.C.S., Superintendent at Kalamazoo Country Club.

Remember to mark Wednesday, September 4, on your calendar. That is the day of the 1991 Golf Day hosted this year by Charlie Scott and Glen Hokenmaier at Gull Lake View and Gull Lake Country Clubs.

Western Views is still looking for articles. If you have an idea for one please send it in.

The new cover was designed by Kip Weirsma, a summer employee at Spring Lake Country Club, who also happens to be a commercial artist.

## DATES TO REMEMBER

### MARCH 21

U.S.G.A. Meeting . . . . . Saginaw Country Club

### MARCH 23

G.A.M. Meeting . . . . . Detroit Golf Course

### MARCH 25 & 26


G.C.S.A.A. Integrated Pest Management Seminar  
Indianapolis, Indiana . . . . . 1-800-GSA-SUPT

### APRIL 23

W.M.G.C.S.A. Meeting and Golf  
Grand Haven Golf Course

### APRIL 29

Michigan & Border Cities G.C.S.A. Meeting and Golf  
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## GCSAA NEWS

### GCSAA HEADQUARTERS WILL HAVE NEW ADDRESS

As of February 1st, GCSAA headquarters has a new address:

GCSAA  
1421 Research Park Drive  
Lawrence, Kansas 66049-3859

Members are asked to take note of the new address and use it on all correspondence mailed to GCSAA after February 1st. Correspondence mailed to the 1617 St. Andrews Drive address will be forwarded to GCSAA's new headquarters, but may be delayed.

GCSAA headquarters' telephone number will remain the same, (913) 841-2240.

### REGULATIONS

#### EPA Conducts Well-Water Survey

EPA recently released results of the *National Survey of Pesticides in Drinking Water Wells*. The two-year survey estimates that 10 percent of community and 4 percent of rural drinking water wells have detectable levels of at least one pesticide. Less than 1 percent, however, have residues above levels considered to be a health concern. The survey found that about 1.2 percent of community wells and 2.4 percent of private wells contain nitrate levels that exceed EPA health limits. Synthetic fertilizers, septic systems, animal feed lots, industrial effluent and

landfills are some of the sources of nitrate pollution.

For the survey, 1,347 randomly selected wells were tested for 126 pesticides and their metabolites. Although the survey did not cite sources of contamination, a majority of the sites were located in rural areas. Atrazine, bentazon, simazone and DCPA (dacthal) were the only pesticides found that are labeled for turfgrass use. Only atrazine was sometimes found at levels above those considered to protect human health. A metabolite of DCPA was the most frequently detected residue; however, it was never detected at concentrations higher than one-tenth of 1 percent of the level of health concern.

#### EPA and OSHA Will Conduct Joint Inspections

EPA and OSHA have announced that they will combine inspection efforts to more effectively enforce national workplace and environmental statutes. Even though EPA inspectors will not perform OSHA inspections, they will refer worker health and safety issues to OSHA. The agencies are developing a 1991 fiscal-year workplan for the joint inspection activities. The likely results will be more routine OSHA citations.

#### Proposed State Regulation Would Limit Turf Chemicals

A regulation proposed by the Massachusetts Department of Agriculture, (333 CMR 12.00 Protection of Public

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40	.43	7.0
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70	.21	19.3
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Drinking Water Supplies) may ban approximately 21 products from use in areas within a one-half mile radius of any drinking-water supply well. Some of the proposed products include chlorothalonil, alachlor, bentazon, metolachlor, simazine, fenamiphos, disulfoton, lindane and terbufos. The Department may grant exceptions (which must be renewed annually) when there is no other viable alternative. After filing paperwork for a variance (exception), the Department has 60 days to make a decision. The Department held public hearings in November and is waiting for a report before submitting the regulations to the Pesticide Board. Because of the comments from the Massachusetts Green Industry Council during the hearing, they expect to make some changes.

#### JUDICIAL

##### Golf Course Permit Denied

After reconsidering a permit for a golf course development near Miami, the Army Corps of Engineers said "no" to building on 12 acres of mangrove swamp. The Corps said when "practicable" alternatives exist, a developer will not receive a permit to destroy wetlands. The developer argued that using the wetlands was necessary to realize a profit. However, the Corps decided that a smaller golf course was a reasonable alternative.

##### RCRA and OSHA Set Criteria for Penalties

New penalty formulas for environmental violations and worker safety cases are expected to improve punishment effectiveness and consistency. In the past, OSHA and EPA—under the Resource Conservation and Recovery Act (RCRA)—issued fines on a violation-by-violation basis.

Recently, both agencies re-evaluated their systems and set up formulas for determining penalty amounts. EPA realized that some companies had been saving money by paying the fines rather than complying with RCRA. Because of these new policies, stronger penalties will probably be issued and less negotiating will occur.

#### LEGISLATIVE

##### EPA Toughens With More Investigators

Amidst the budget cuts and imposition of higher taxes, the 101st Congress passed legislation to increase the number of EPA criminal investigators. The Pollution Prosecution Act of 1990 directs the agency to increase, in steps, the number of investigators to total at least 200 by Oct. 1, 1995. This new legislation is designed to increase inspections—with a particular focus on small business violations.

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## ENVIRONMENTAL SPECIALIST APPOINTED

Frank S. Rossi, currently a PhD candidate at Cornell University, has been appointed to the newly established position of Environmental Education Specialist in Turf at Michigan State University. Following interviews with and seminars by three outstanding candidates the selection committee, which included three representatives of the Michigan Turfgrass Foundation, settled on Mr. Rossi.

In his new position Frank Rossi will be responsible for the development and teaching of material concerning safe pesticide use and application as well as concepts of integrated pest management. He will also develop and coordinate week-long seminars dealing with environmental stewardship and turf management, in addition to teaching courses as part of MSU's Lifelong Education program.

One factor that influenced committee members in their selection of Frank Rossi was a time schedule that he proposed for undertaking these various job aspects. It is expected that he will be on campus ready to begin in early February.

A New England native, Frank Rossi received his BS and MS degrees from the University of Rhode Island. He also attended the State University of New York Agricultural and Technical College at Cobleskill, NY, where he majored in turfgrass management. He is currently finishing his PhD dissertation on the influence of moisture stress on fenoxaprop (Acclaim) performance.

As a graduate student at Cornell, Mr. Rossi served as both a teaching assistant for weed science classes and as a 4-H instructor to elementary students, through the Cooperative Extension Service. Frank has also made presentations at Field Days and grower meetings on the safe handling, application and disposal of pesticides. He is an active member of numerous professional organizations, having made presentations at society meetings as well as having written articles for their publications.

Quoting from Frank's letter of application, "Turfgrass management has been a part of my life since my youth." Such a statement is well founded as he has a widely diversified background in turf management. His career began as an employee of Scarsdale Landscaping, Inc. of Scarsdale, NY. After two seasons in the landscaping industry Frank became acquainted with all aspects of golf turf management during stints at several courses. Among those courses was the Greenwich Country Club of Greenwich, Connecticut, where he served two years as assistant superintendent. In that position he was responsible for the training of personnel as well as the design and maintenance of tree, shrub and flower plantings.

Frank Rossi is described by his major professor as a very likeable individual, a trait that will serve him well as he develops new environmental programs at Michigan State University.

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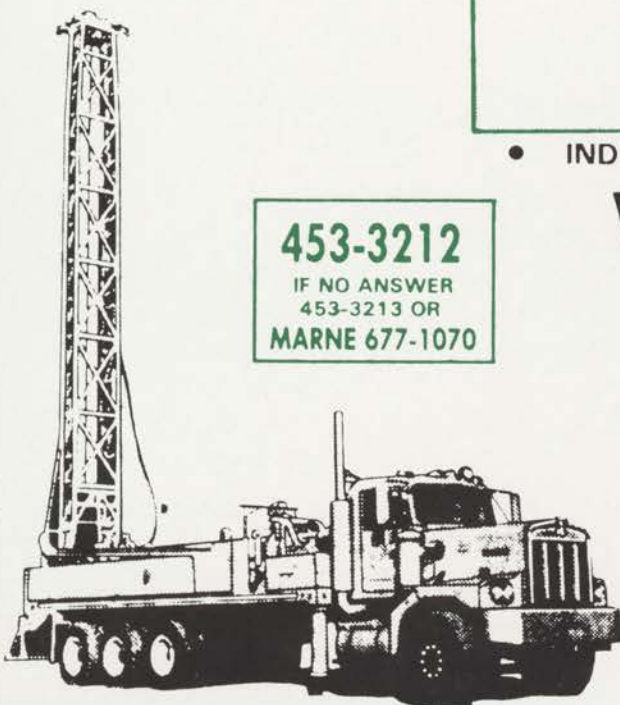
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# MICHIGAN TURFGRASS FOUNDATION CREATES RESEARCH ENDOWMENT AT MSU

The Michigan Turfgrass Foundation (MTF) has pledged \$1 million to Michigan State University's turf program, creating an endowment to fund faculty and graduate student research.

The gift supports MSU's first university-wide Capital Campaign, MSU 2000: Access to Opportunity, a five-year effort launched in May 1988.

"This gift continues a longstanding partnership between the university and the state's turf industry" said MSU President John DiBiaggio. "We are extremely grateful to the Michigan Turfgrass Foundation for this gift and for the support of its members over the past 60 years."

The foundation's gift, it's largest ever to MSU, will establish the Michigan Turfgrass Research Endowment Fund. Annual income from the new endowment will enable MSU to attract more graduate students. "Because our research is so labor-intensive, bright, dedicated graduate students are absolutely vital," explained Joseph M. Vargas, professor of botany and plant pathology whose work in turf management is world renown.

Vargas is investigating alternative pest management strategies, using biological methods to control pests and diseases and to minimize pesticide use. Developing environmentally safe methods is both time-consuming and expensive, he said. "The endowment will give us the flexibility to pursue this type of research."

MTF will solicit contributions to the endowment from its 1,000 members and from others interested in turfgrass research. Members include golf course superintendents, landscapers, lawn sprayers, sod growers, parks and recreation directors, schools, and cemeteries throughout Michigan. Gordon LaFontaine, executive secretary of the foundation, reported that 10 percent of the \$1 million goal has been raised so far.

"Our members see this as a sound investment in the state's fast-growing turfgrass industry," he said. Groups such as the Michigan Lawn Sprayers Association and the

Michigan Cemetery Association have also joined the effort.

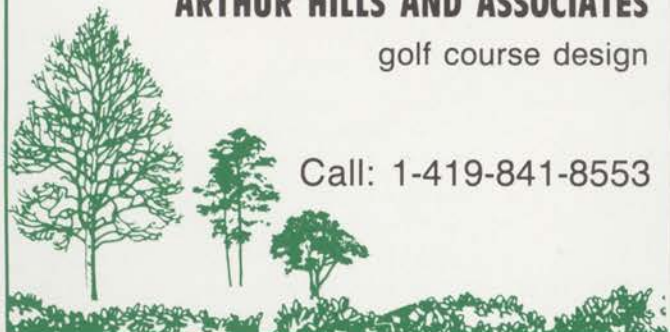
Since its founding nearly 60 years ago, the Michigan Turfgrass Foundation has provided more than a half million dollars to support faculty and students at MSU's College of Agriculture and Natural Resources. Foundation members played a major role in the development of the Hancock Turf Center, a research and educational facility on MSU's campus.

"The foundation offers not just financial support, but expert advise and guidance to our turf studies," said James H. Anderson, vice provost and dean of the College of Agriculture and Natural Resources. "Their involvement is a prime example of a state industry and the university working together to benefit students, faculty and ultimately, Michigan's economy."

MSU's \$160 million Capital Campaign has raised more than \$130 million to date for student and faculty endowment, building projects and program enhancements.

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## BLUEBIRDS OF HAPPINESS

Once a common Michigan songbird, the Eastern Bluebird needs help. Over the last 10 years, the bluebird population has dropped by 75%. Providing artificial nesting opportunities for bluebirds is one way to help bring them back.

Michigan forest edges once contained many old or dead trees with cavities - a favorite place for bluebird nests. Wooden fenceposts, which also contained many cavities, lined farm fields and roads. Today, the old trees have been removed and fence posts are metal.

This loss of important nesting habitat has been compounded by another problem facing bluebirds - competition from house sparrows and starlings. These European birds were introduced to North America, where they have quickly adapted to both city and countryside. There are few natural controls here on these adaptable birds. Both species drive bluebirds away from their homes, often destroying the eggs or killing the young. As if these problems were not enough, several years of severe weather in the bluebirds' wintering grounds have caused recent dramatic decreases in their population.

Knowing all this, you, the golf course superintendent, can help bring back the bluebird by supplying nesting boxes that will help restore part of their habitat needs. Bluebirds are a species of the open grassland. Meadows, pastures, cemeteries, highway right-of-ways and **golf courses** are all suitable for their nesting.

Bluebirds hunt for food by sitting on an elevated perch and watching for caterpillars, grubs, and grasshoppers in the summer. During fall migration and on its winter range, the bluebirds subsist primarily on wild berries such as elderberry, dogwood and sumac. Many of these berries grow on and around a golf course and there are most certainly an abundance of grubs, caterpillars and other insects on the golf course.

With plans that are available from the Michigan United Conservation Club (P.O. Box 30235, Lansing, MI 48905 (517) 371-1047), you can build nesting boxes to provide the bluebird some nesting sites. It would be nice to expect that every box would be occupied by a successful pair of bluebirds. However, in reality only some of the boxes will have bluebirds in them. The other boxes will provide homes for a variety of wildlife, which is what we are attempting to nurture.

## UNDERSTANDING UNDERGROUND STORAGE TANK REGULATIONS

by

Rena M. Pomaville, Ph.D., R.E.M.  
Envirotherm, Inc.

The recent implementation of legislation that required upgrading of underground storage tanks (UST) has many people confused. The regulations require that a UST system have the following:

1. Leak detection phased in depending on the age of the tank according to the following schedule;

25 years old +	December 1989
20-24 years	December 1990
15-19 years	December 1991
10-14 years	December 1992
under 10 years	December 1993

2. Corrosion protection by December 1998.
3. Spill/Overfill protection by December 1998
4. Financial assurance to remediate a release by October 1990.

If a new tank is installed, the owner/operator must have the aforementioned protection devices incorporated in the new UST system. For an existing tank, the aforementioned upgrades to the tank must be made by the specified dates.

Many small owners are choosing to remove and replace their existing tanks, due to the high cost of upgrading an old tank to the required status. A removal project should be managed by a person familiar with the state regulations governing the removal process. The tank must be registered with the State Fire Marshall before removal, thirty day notification before removal must be given to the Fire Marshal and if a release is detected at the time of removal, the owner/operator is required to submit a number of notifications and reports within designated time periods to the State Fire Marshal and the Department of Natural Resources (DNR) to qualify for reimbursement from the Michigan Underground Storage Tank Assurance (MUSTFA) Fund.

The MUSTFA fund can serve as a mechanism of financial assurance to UST owners and operators. This fund provides reimbursement for remediation expenses which exceed \$10,000 up to \$1 million dollars. However, many people are disqualified from this program, due to tanks not being registered before removal, late report submittals and inability to demonstrate that resources are available to pay the first \$10,000 of the remediation expenses.

An underground storage removal project can be an expensive endeavor. Most excavating companies charge approximately \$2500-\$2800 for the removal of one tank. If an owner wishes to retain a consultant, to assure he follows the state

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guidelines and collect samples, this could cost \$1000-\$1500. These prices are base prices without a release. If a release occurs, additional excavation and consultant services are usually billed on a time-and-materials basis. In addition, contaminated soil must be transported to a Type II landfill for disposal and the landfill prices are \$26-\$30 per cubic yard.

The alternatives to underground fuel storage are generally few. Many townships are banning above ground fuel storage. One of the options a small operator has is to negotiate a contract with a nearby service station and place the burden of compliance on a larger owner/operator.

Penalties for non-compliance are high. For each act of non-compliance with the Michigan UST act, \$5,000 per day may be assessed against the owner/operator. This act covers the upgrading, removal and registration of tanks. If an owner/operator violates the Leaking UST Act, by not providing the required notifications, \$10,000 per day may be assessed as a penalty.

Copies of a "Guide to Compliance for Owners and Operators of Underground Storage Tank Systems" can be obtained by writing to the Department of Natural Resources-Environmental Response Division, LUST Unit, P.O. Box 30028, Lansing, Michigan 48909. Forms for registering a UST system and qualifying for MUSTFA can be obtained from the State Fire Marshal by calling 1-800-MICH-UST.

## THE FACTS ABOUT GOLF AND THE ENVIRONMENT

As someone involved with the game of golf, you may already be aware that golf courses are being criticized for "damaging the environment". The use of turf chemicals, the impact on water and soil quality, and the amount of irrigation water used are cited most often as public concerns about the golf industry.

Although most authorities agree that the maintenance of golf courses has comparatively little negative impact on the environment, we at the Golf Course Superintendents Association of America (GCSAA) believe that these issues must be addressed. And, through a comprehensive effort combining research, education and communications, GCSAA is leading the golf community's efforts to minimize the potential for ecological harm resulting from course maintenance.

However, the biggest problem we have is public perception—or, more accurately, public misperception—about the environmental impact of courses. These inaccuracies, if left uncorrected, could pose a serious threat to the vitality and integrity of the game.

You can help GCSAA change perceptions about our industry by reviewing the following Overview and sharing this information with elected officials, decision-makers and others with whom you have contact. Please do not hesitate to pass this information to others who share our belief that golf is good for the environment.

### OVERVIEW

1. Research has shown that golf courses do not contribute significantly to groundwater contamination. Several university and government studies (in Massachusetts, New York and Florida) indicate that, when properly applied, pesticides and fertilizers used today on golf courses do not leach into groundwater in any significant amounts.

2. Modern turfgrass management practices (such as the use of slow-release nitrogen formulations) can greatly reduce the potential for nitrogen leaching or run-off into water supplies. The organic (thatch) layer in healthy turfgrass also significantly reduces the potential for nutrient "movement."

3. An 18-hole golf course averages 140 acres. Pesticides and fertilizers are used only on portions of the golf course. The majority of the property often consists of natural areas that are not maintained with chemicals. These unmaintained areas are usually a home for wildlife, a diverse variety of native plants and large stands of trees.

4. Golf course superintendents are among the best-educated and most judicious users of chemical management tools. Today, most superintendents have university degrees in agronomy, horticulture or a related field. More than 3,500 superintendents also pursued continuing professional education through GCSAA last year. Although most golf courses do not apply "restricted-use" pesticides, virtually all courses with GCSAA members have a least one staff person who is state-certified in the safe handling and use of these chemicals.



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5. Because turf chemicals are often expensive, golf course superintendents have an economic incentive not to apply them. What's more, many superintendents entered the profession because of a love of nature and the outdoors and are strongly committed to conservation. In a recent survey, superintendents said they give extremely high priority to selecting maintenance practices that do not have a negative impact on the environment.

6. Golf courses do not contribute to the "yard waste" problems at America's landfills. Grass clippings and leaves are virtually always composted in unmaintained areas of the course. In some cases, the compost is recycled for use as a natural soil amendment.

7. The water used on golf courses is an excellent investment in both economic and environmental terms. Irrigated golf courses generate billions of tourist and property tax dollars for state economies. (America's golf courses are also bringing an increasing number of international tourists to the United States, thus helping to counter the foreign trade imbalance.)

When effectively irrigated, healthy turf provides numerous environmental benefits. Properly maintained turfgrass;

- \* produces oxygen (carbon dioxide exchange)
- \* removes pollutants from the air
- \* cools the atmosphere (acts as a heat-sink)
- \* absorbs sound and glare
- \* prevents erosion
- \* filters natural and synthetic contaminants from rainfall and irrigation
- \* recharges critical groundwater supplies
- \* provides crucial "greenspace" in urban settings.

Beyond these benefits, computerized irrigation systems and improved turfgrass varieties now allow courses to use less water more efficiently to achieve the same level of conditioning. Continuing research will provide even more "low-water" turfgrass varieties in the future.

8. In addition to turf-related benefits, courses provide other important ecological and community assets. Golf courses are:

- \* key sanctuaries for birds and other wildlife
- \* disposal and treatment sites for wastewater (effluent)
- \* attractive and environmentally sound "covers" for closed landfills and other ecologically damaged locations
- \* sites for non-golf recreational activities, such as jogging, walking, birdwatching, cross-country skiing and fishing
- \* businesses that provide hundreds of thousands of skilled and semi-skilled jobs
- \* places for social interaction and community events
- \* civic benefactors that fund major contributions to charities
- \* the keystone of a multi-billion dollar industry nationwide
- \* community improvements that add value to land, thus increasing local tax bases.

9. On golf's behalf, GCSAA has developed a strong and cooperative relationship with the U.S. Environmental Protection Agency and other major regulatory groups. Through governmental affairs, professional education and

public information, the association strives to make environmental responsibility a basic precept for its members.

10. GCSAA and the entire golf community are firmly committed to seeking answers through research. The United States Golf Association, in partnership with GCSAA, is funding a three-year, \$3 million research program that will provide a number of those answers.

Unlike most industries, golf has the motivation, the resources and the willingness to address the issues now, before environmental questions seriously impede the growth of the game. By pursuing this enlightened path, it is hoped that golf will be increasingly perceived as a model environmental industry of the 1990s.

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*CREDIT: Pest News Alert  
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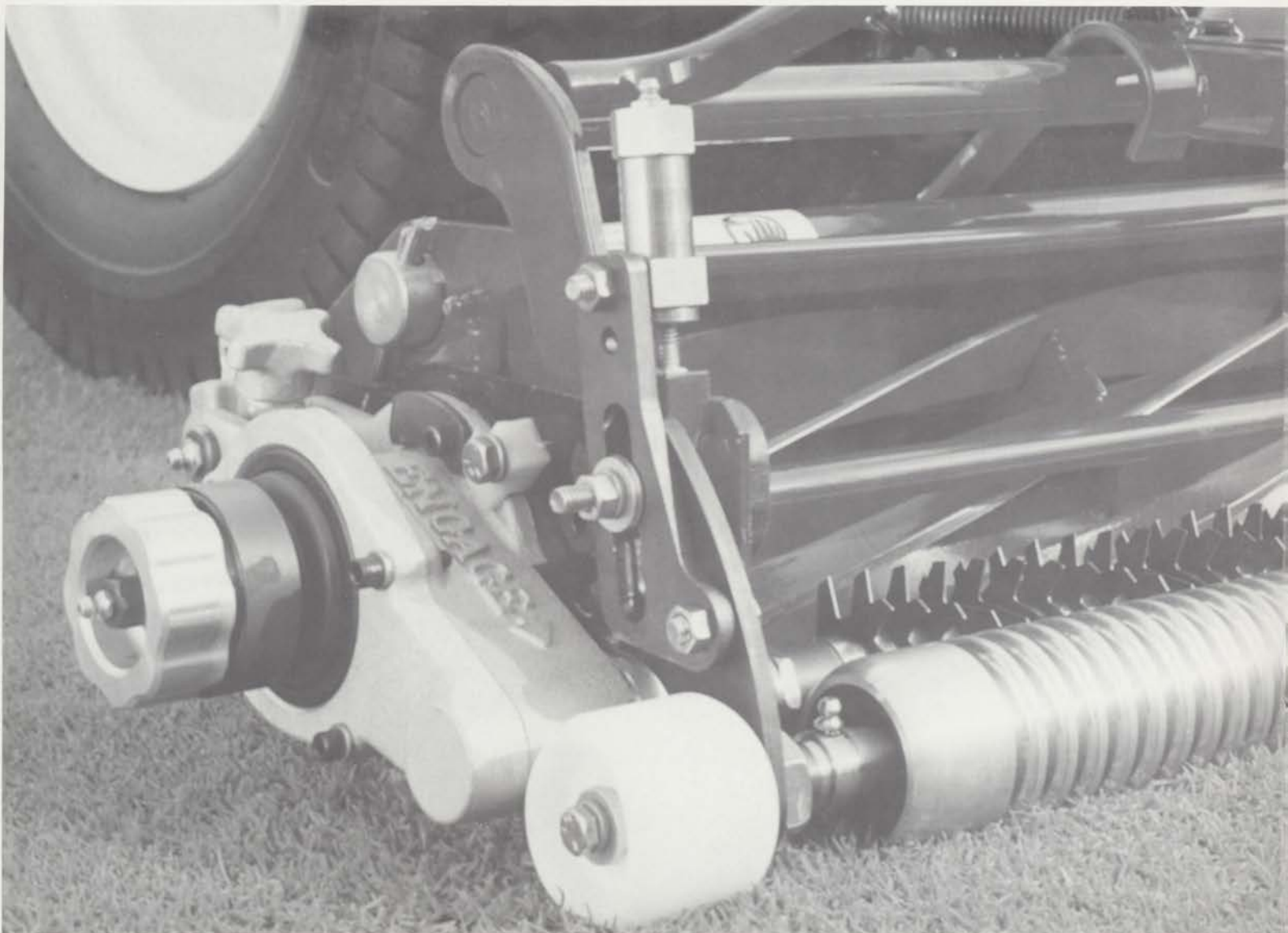
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# ENVIRONMENTALLY FRIENDLY PESTICIDE APPLICATION

by

R. Barry Rogers, MSc., P Eng.

Every year, more limitations are placed on pesticide usage and application by legislators reacting to the fears of a concerned public. The question is not whether the fears are justifiable; they exist and must be dealt with. As an Oregon politician said, "Perception is political reality" and, as every lawyer knows, it can also be a legal reality. It is essential that steps be taken to make pesticide usage more environmentally-friendly.

The concerned public is deluged with information on the toxicity of pesticides and fertilizers.  $Ld_{50}$  numbers are quoted and, though they mean very little to most people, they initiate an underlying fear that pesticides and chemicals are extremely dangerous and must be avoided. Yet when pesticides are compared to foods and their natural contaminants, they are not the most toxic substances we ingest(1). An open boom sprayer, with a trail of drift floating behind it, initiates these fears in their minds. They see toxic pesticides in the air they breath. Drift is a fear-initiator, similar to a dogs' teeth. A dog with teeth exposed is feared, whereas with its mouth closed it is usually ignored or considered friendly. Pesticide application needs a safer, more friendly image.

When the public sees spray, they assume that it is a pesticide, that toxic stuff on television, especially when the driver is wearing what looks like a World War II gas mask that they associate with chemical warfare. This brings human death to their minds, not the necessary elimination of weeds or bugs to make a quality golf course. When they see a sprayer on the course they wonder why they are being exposed to a similar danger. Soon the operator finds himself before the board, being told to resolve the problem! Caught in the middle, he has little room to maneuver. If he reduces the pesticide or fertilizer usage, he will soon be before the board again, because the course is not up to standard. Biological control methods, still in their infancy, need to be developed more before they can even partially replace chemicals. His only choices are in the means of application. The first is to apply pesticide and fertilizer in the irrigation system, which will work for most fertilizers but few pesticides. Secondly, he can spray in the very early morning while it's still dark and no one is on the course. This approach works for some, but most courses have residences bordering them and the noise and lights result in complaints. Spraying early also raises labor costs and risks, plus heavy dews increase the drying time, thereby increasing the time for re-entry.

The advent of the shrouded sprayer gives the superintendent a new tool to work with. A shroud placed over the spray boom encloses the spray inside, containing drift and increasing safety. A curtain seals the shroud to the turf surface, stopping the wind from blowing underneath and picking up drift. This results in positive drift control that significantly increases safety and protects the operator, public and environment from pesticide exposure. Contained beneath the shroud, the spray does not initiate fear in the minds of the concerned members,

joggers, or residence owners. Simply put, there is not a trail of drift to excite or alarm them.

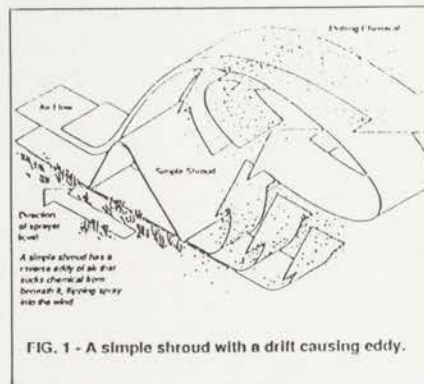


FIG. 1 - A simple shroud with a drift causing eddy.

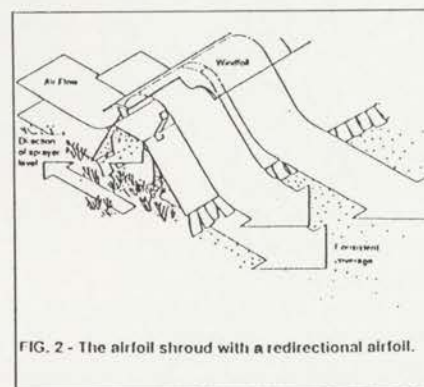


FIG. 2 - The airfoil shroud with a redirectional airfoil.

Shrouded booms are not new. In 1950 the British Institute of Agricultural Engineering tested a simple shrouded sprayer and found that drift from it approached the same as that from an open boom in winds of around 12 mph (2). Recent research in a wind tunnel identified a low pressure area behind a simple shroud (3). This low pressure zone creates an eddy that lifts drops up from the sprayed area and flips them up into an air stream racing over the top of the shroud (See Figure No. 1). A similar eddy lifts dust behind a station wagon. To eliminate the drift-causing eddy, an airfoil was installed on top of the shroud to redirect the air stream racing over the top into the low pressure area (See Figure No. 2). Subsequent drift studies with shroud/airfoil sprayers have shown that off-target spray deposits were kept to less than .5 percent (3) even as the wind speed was increased. To achieve this degree of drift control, the shroud's seal to the turf's surface must be maintained. If wind blows underneath the shroud, drift will be carried out. The drift control of the shroud/airfoil/curtain combination make it practical to spray in the wind, thereby reducing the uncertainty of day-to-day management on the course while increasing safety. Timely application will also increase pesticide reliability. Studies in agriculture with mist-sized drops and ultra low carrier volumes indicate that carrier volumes can be reduced to as low as 2 gal/ac with most herbicides, as long as drop size is reduced to maintain coverage. Ultra low volume application increases most pesticide's reliability, plus without the wind limitation it can be applied at the

optimum time. Research is required to transfer this information to turf. Low carrier volumes reduce the cost of applications and resulting compaction from heavy sprayers while being environmentally-friendly. This provides financial motivation for environmental protection.

But do not forget the World War II gas mask. The concerned public will wonder why the man driving that harmless looking machine is wearing a gas mask. They remember that soldiers wore them in the war for protection from deadly gas!

Several companies market a safety helmet resembling a motorcycle helmet. They blow filtered air over the head and face of the operator. It is much more comfortable to wear; plus it eliminates the skin/mask interface where pesticides can be trapped and absorbed into the operator's skin. Perception is also reduced because the helmet appears to be a driving-related safety device and is not perceived as a threat by members. A tractor or truck cab pressurized with filtered air will also create less anxiety, as well as improve operator protection and comfort. Next, the applicator must dress his people in either blue, green or brown. Other colors have a negative danger connotation, especially white, yellow and red. Finally, excess noise and odor also raises public anxiety; everything possible should be done to eliminate the anxiety initiators.

Kapalua Golf Course uses 15 and 20 ft. Windfoil shrouded boom sprayers. It is located on the north shore of Maui where the weather is often windy. This limits the ability of groundskeepers to maintain a professional golf course. A tournament course like Kapalua means turf managers

must be on top of their maintenance at all times. Between rain, wind, and traffic the course must be kept in tournament shape at all times and still maintain a good relationship with the public and the local residents. Use of the Windfoil removes the wind limitation, improving groundskeeper's ability to keep on schedule, plus the residents are more comfortable with the improved drift control, safety and reduced environmental impact. Short Honma, superintendent, says, "The Windfoils have increased operation efficiency and reduced jogger and residential complaints." Being able to spray in the wind lets Honma schedule spraying at the most optimum time. In addition, it reduces carrier (water) from 100 gal/ac to 25 gal/ac. Honma also found that he could sometimes obtain the same results by using half the dosage of some pesticides. This also reduces the environmental impact of the pesticide while maintaining the course.

To mitigate the pesticide issue, it is not enough to simply apply pesticides in a safe manner in compliance with regulations. There are two components to this issue: (1) safety; and (2) the public's perception of that safety. Public perception must be considered in everything that is done on the course to ensure that it does not initiate fear. Drift, noise, odor, and World War II gas masks initiate public anxiety and contribute to the perception of danger just like the show of a dog's teeth. Application and usage of pesticides must be shown positively, with emphasis on improvement of course quality and the environment. Follow all the safety regulations and only use pesticides when they are required to maintain course quality.

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# SUPERINTENDENT'S BEST FRIEND

by

Gordon Witteeen, Ontario, Canada

Early morning golfers are a Superintendent's best friends. They understand through firsthand observation all the effort and hard work required to create a finely manicured golf course. Early morning golfers get up with the birds, trod through the dew, play under sprinklers, putt on half-mown greens and tee off with the markers to the side. They put up with fertilizer spreaders on the fairways and chemical sprayers in the rough. They don't mind the buzz of rotary mowers or the whirr of greensmowers nor the clanging of aerifiers. Early morning golfers don't mind any of these deterrents because, besides their love for golf, they also enjoy the rising sun over the sparkling brook, reflections in still waters, the stealth of a scurrying rabbit, and, occasionally, a bounding deer seeking shelter in a thicket.

There is a common bond between greens staff and early morning golfers: they share the knowledge that all this beautiful environment is theirs while the rest of the world toils in air conditioned offices, dank factories, or is still asleep under musty covers. This is the real joy of the early morning on the golf course: to be alive and to be surrounded by all this beauty.

The second group of golfers who come to the course in the morning are the ladies. With the husbands off to work and the kids on the way to school, the spouses and mothers head for the links to play their round of blind bogey, to beat the pro or to participate in the throw-out tourney. Although Ladies Day is officially on Tuesday, (Thursday would be better - less chance of rain, better conditioned golf course) in practice every day is ladies day with the exception of Saturday and Sunday when men's play dominates the schedule. Now, as we all know, ladies take their golf much more seriously and they are far less tolerant of maintenance equipment than the unorganized early morning golfers. Lately we have had some concerns expressed by the Ladies about the chemical drifts from sprayers as we treat the turf for weeds, fungus disease or insects. Spraying is generally done early in the morning to stay ahead of the golfers as much as possible and to apply the chemicals before it gets windy. Unfortunately, this is precisely the time when most Ladies play golf.

Picture a spray rig coming down the fairway, bellowing a great cloud of mist, with the strange looking operator dressed in disposable white overalls, rubber boots and gloves, goggles to cover his eyes and a respirator to protect his breathing. The average golfer quickly concludes that this is a dangerous place to be golfing in bermuda shorts and open necked shirts. It must be explained that exposure to chemicals, just like radiation at Chernobyl, is a matter of degree. The operator on the spray rig may be enveloped in a cloud of spray for most of eight hours and for several days at a time, whereas a golfer may only catch one or two whiffs during an entire round of golf. I venture to say that the air on golf courses, in spite of spray programs, is much less hazardous than the air in a smoke filled clubhouse grill. Last year 35,000 persons in Canada

died from lung cancer, over 80% of it caused by either primary and secondary cigar and cigarette smoke. To the best of my knowledge, no deaths were reported as having been caused by either the drinking, eating or breathing of Killex, Daconil, Benomil, Round-up or Diazinon, all common chemicals used regularly on our turf. Just the same, golfers should take precautions because it is always better to be safe than sorry. Stand aside when the sprayer passes and try to be on the leeward side and, for heaven's sake, don't lick golf balls. If pregnant women have been advised by their physician not to smoke or drink during their period of child bearing, I would advise them to stay off the golf course while turf is being sprayed. I would give this advice to my wife, although I hope she is not pregnant.

Golfers should have faith in their Superintendents and their green staff. Many Superintendents are now college graduates with degrees and diplomas in agriculture. They are just as concerned as their fellow men about the environment, perhaps even more, because they are aware of the mistakes that can so easily happen and that can be so disastrous. Superintendents and their assistants must be licensed to apply pesticides by the Department of the Environment. We cannot purchase or apply chemicals unless we are licensed. We apply chemicals only when it is absolutely necessary and usually well below the recommended rate. We try to spray early in the morning when there is no wind and before the golfers get to the course, but you arrive so early now. Sometimes we get caught in a sudden breeze but we have to empty the tank in case the liquid solidifies. This may cause a little drifting, but the job has to be done and we can't close the course. Our ultimate objective always remains — to provide the best possible golfing conditions at a reasonable cost for the great majority of our golfers. At the same time, we want to continue to protect the beautiful environment which surrounds us, even for the golfers who come out later in the day.

## MOBAY SPECIALTY PURCHASES KAW VALLEY

Mobay Specialty Products Group has purchased the federal registrations that pertain to the production and sale of trichlorifon from Kaw Valley, Inc. in Leavenworth, Kansas. Trichlorifon is the active ingredient in DYLOX® insecticide, which is used to control a wide spectrum of pests.

According to Mobay Specialty Product Manager Dan Meek, turf professionals will benefit from the acquisition by having a single strong company backing an effective product.

Prior to the acquisition, Mobay offered an 80 percent soluble powder DYLOX. Now Mobay is able to offer both the 80 percent soluble powder and DYLOX 6.2 granular to the turf care professional under the Mobay label. DYLOX 6.2 granular will also be available within the consumer insecticide market.

## CONSTRUCTING AN INEXPENSIVE AG CHEMICAL RINSE PAD

Simple, every-day solutions often exist to questions about proper agricultural (ag) chemical storage, mixing/loading and application. However, state and federal regulations are rapidly becoming more complex and restrictive, and more intricate solutions may be needed in the very near future to comply with changing surface and ground water protection requirements.

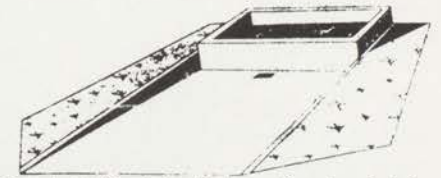
Faced with this prospect, many farmers and other ag chemical users are asking what they can do to be prepared for the new laws and regulations. Of course, no one has a crystal ball, but some areas of ag chemical use seem more vulnerable to change than others.

For example, ACRE has cautioned not to repeatedly load and rinse equipment in the same location and certainly not directly next to wells or surface water. Yet, it's a mistake commonly made, since that's where the water for mixing and rinsing is located. It is important to protect areas where loading or rinsing of sprayers and spreader equipment occurs.

What can golf superintendents do? Golf superintendents may want to construct a cement rinse pad to prevent inadvertently spilled chemicals from leaching into ground water or contaminating streams or ponds, and endangering the water that you, your family and neighbors drink. Designed properly, it can also serve as a secure ag chemical storage area and permit easy cleanup of spills incurred during ag chemical handling.

### SIMPLE, EFFICIENT DESIGN:

There are many possible ways to design and build a cement rinse pad, but one we like was designed by Ronald T. Noyes, Extension Ag Engineer at Oklahoma State University. His standardized, modular design



This sketch illustrates the type of ag chemical rinse pad/storage and containment facility you can build at home.

uses input from numerous engineers, researchers and regulators. A key feature is that it provides size flexibility, allowing golf superintendents (as well as dealers) to scale the construction to their needs. Professor Noyes estimates construction costs for a 20x25 foot rinse pad, including professional labor, to be about \$900 to \$1300, excluding equipment such as sump pump and tanks.

Professor Noyes can provide detailed design specifications and cost information in his publication *Modular Farm-Sized Concrete Agricultural Chemical Handling Pads*. His address is: Cooperative Extension Service, 224 Ag Hall, Oklahoma State University, Stillwater, OK 74078.



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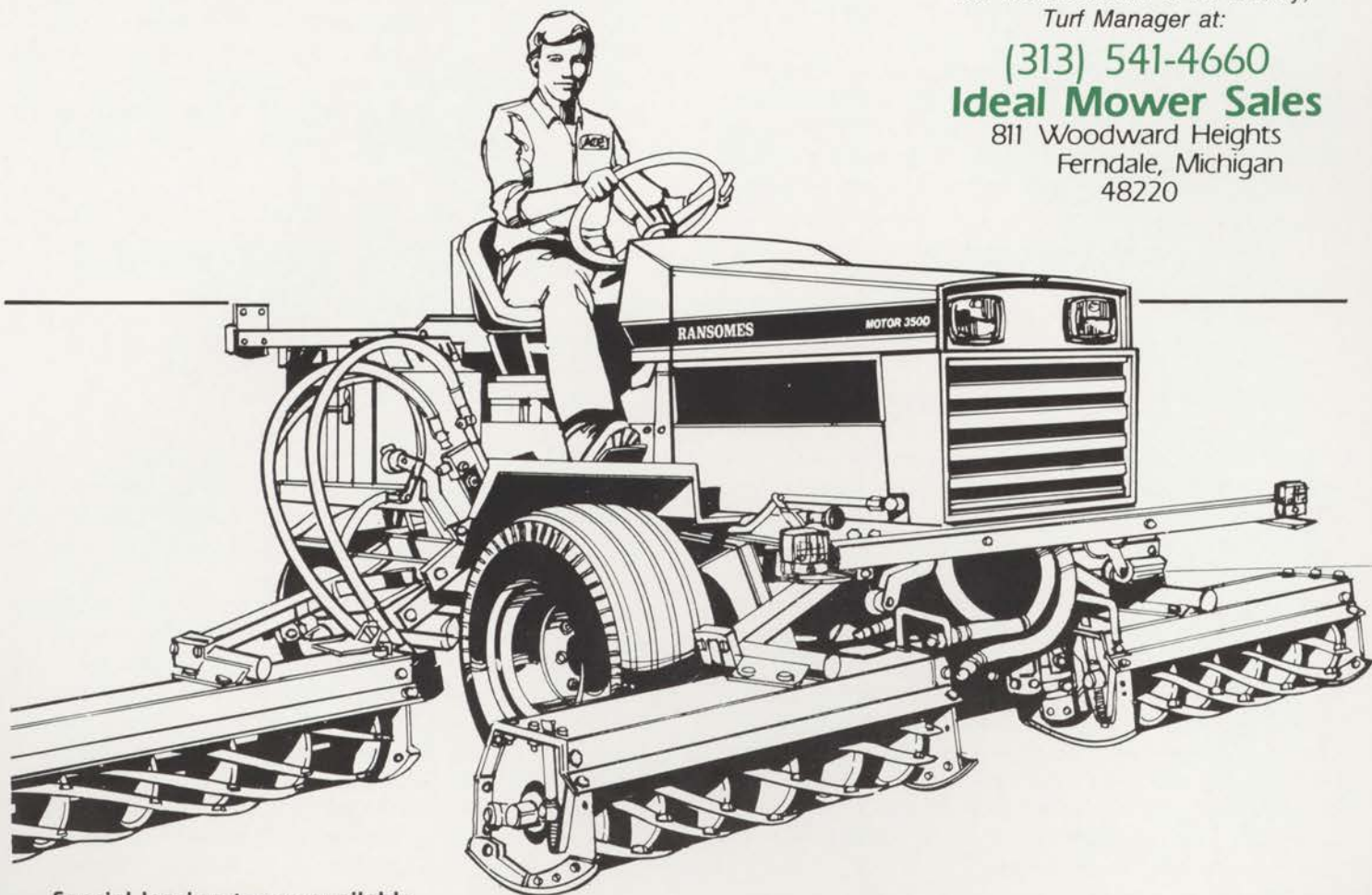
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The basic design for the Noyes' system guides the construction of a watertight, reinforced, concrete pad large enough to hold the largest application vehicle you use, plus containment areas dedicated to rinse-water storage tanks, mixing and loading equipment and for ag chemical storage.

The pad is sloped to the center and contains floor drains to sumps for easy cleanup. Steel-grated, shallow concrete collection sumps serve as sediment settling basins and are designed to collect spills and rinse water for transfer to above-ground rinsate tanks. A pump can also be used to move solutions directly from the drain valve on your sprayer into rinsate storage tanks.

#### **CAPTURING WASTE WATER:**

To use the rinse pad, a golf superintendent drives his sprayer onto the concrete pad and makes sure that the sump drain valve (if installed) is locked in the closed position. Any leftover field strength chemical and rinse water from the sprayer drain valve is pumped into a marked rinsate tank. Any spills can be hosed into the sump for later recovery.

Rinse water or rinsate can be stored temporarily in various types of holding tanks, including mobile nurse tanks. A good choice, however, is one or more 300-gallon, cross-linked polyethylene or fiberglass tank(s). Liquid levels can be easily seen through these types of tanks. Noyes recommends that the rinse-water storage tanks be mounted three to five inches above the concrete floor so leaks can be spotted easily. Pumps and piping should be above ground, too, and contained within the rinse pad area.

Probably more than one rinse-water tank will be needed. By separating rinse water by use into different tanks, it can be used later as makeup water the next time the product or a compatible chemical is sprayed. Caution should be used to follow label instructions and mix only

label-compatible ag chemicals.

Storage tanks are mounted on a level area at the back of the concrete pad, within low concrete walls high enough to contain an amount 10% greater than the volume of the largest rise-water tank should a severe leak occur. A separate sump in the containment area is needed to handle rainfall and potential rinse-water spills. It's important to keep sumps pumped dry so rain water and snow won't become a handling problem. Sumps should be checked and rinsed regularly.

#### **STORAGE OF FULL-STRENGTH CHEMICALS:**

When designing a rinse pad, it may be useful to consider adding extra convenience and greater environmental protection by including an area for storage of full-strength ag chemicals. For security as well as safety, this area should be designed to include security fencing and a locked gate. A weatherproof shed would be useful for those products that need weather protection.

Full-strength crop protection chemicals and rinse-water tanks can be stored in the same containment area, but they must not be stored in the same containment area as fertilizers and the rinse waters from them. Keeping crop protection chemicals and fertilizers separate within the containment area is accomplished by building a concrete subdividing wall. Separate sumps are needed within each subdivision.

#### **SITE SELECTION:**

Selection of a suitable site for the rinse pad is also important. It should not be in a location where the water source can be contaminated by an accidental spill. If possible, pick a site that hasn't been used for chemical storage, mixing/loading or equipment rinsing. If not possible, take precautions to remove contaminated soil or otherwise decontaminate the site before constructing a rinse pad.

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## **NEW STATE REGULATIONS LIMIT COURSE PESTICIDES**

*Tough new regulations, mounds of paperwork face superintendents  
at 54 public and private Vermont golf courses.*

*by  
Jim Hudson*

A series of landmark regulations in Vermont will severely restrict which pesticides may be used on each of the state's 54 public and private golf courses.

Spurred by public outcry, the new rules adopted by the Vermont Pesticide Advisory Council (VPAC) late in 1990 may serve as a prototype for regulatory measures elsewhere in the nation as environmental concerns grow.

within the next few months, every course must submit a pesticide risk assessment form to the Vermont Department of Agriculture for review. Based on forms, the Commissioner of Agriculture will determine which golf facilities will come up for review this year. Approximately 12 golf courses each year will be required to submit for review a detailed Pesticide Management Plan, to the Vermont Pesticide Advisory Council.

If the plan is approved, the course receives a permit

to apply the approved pesticides in the approved manner for five years. If any part of the plan is not approved, the golf course superintendent must devise another means of controlling the target pest and resubmit his plan for approval.

"All of this got started in Vermont when a group of environmentalists developed the notion that golf courses are a threat to the environment," said Michael O'Connor, CGCS, Basin Harbor Club, Vergennes, VT. O'Connoe has served on a subcommittee charged with developing a means of assessing the risk individual golf courses pose to Vermont's environment.

Also on the committee are Tim Massucco, CGSC, Stratton Golf Course, and representatives of the Department of Agriculture, the Department of Health, the Vermont Public Research Interest Group (VPRIG), the Vermont



Pesticide Advisory Council, and a student from the University of Vermont.

"I got into a lion's den and I got an education," O'Connor said. "This long ago stopped being a pesticide issue and became a political issue. All the golf courses have had to pull together to hire scientists and government relations specialists to help us develop a plan of action. These regulations have been written and rewritten and VPRIG is still not satisfied. They have appealed to the governor to hold more public hearings and to make further changes.

"I believe we can live with the regulations as they stand. But they are going to be expensive for some clubs and at least inconvenient for others. Some of the regulations VPRIG was requesting initially would have put some clubs out of business," O'Connor said.

One proposed regulation would have required each course to install groundwater monitoring wells and to submit water samples for analysis several times throughout the year, specifically following pesticide applications. That requirement would have cost some courses up to \$50,000 a year.

The Vermont Golf Course Superintendent's Association formed an Industry Policy Board to study the issues and to formulate an industry-wide approach. Most courses paid a voluntary fee of \$500 per 9 holes, up to a maximum of \$1,000 per course to support the committee.

"We knew it would take money to pay for the expertise we needed to draft reasonable regulations," O'Connor said. "We hired the former government relations director

from the Golf Course Superintendents Association of America to help us put forth a plan of action. We hired a former EPA scientist to help us review the risk assessment information to see that it was scientifically sound. We hired a former governor of Vermont to help us deal with the politics involved.

"We went in with open minds. We sincerely want to make certain our fertilization and pest control practices are not detrimental to the environment. When they are not, we will change. When they are, we want our plans approved. VPRIG and others did all they could to make our testimony sound like it carried an industry bias.

"The environmental groups took the approach that everything that was put down on a golf course eventually wound up where it was not supposed to go," O'Connor said. "We knew that turf was one of the best possible filters. We had extensive scientific studies showing that the properly applied fertilizer and pesticides stay with the sod and very little, if any, moves through to the groundwater or runs off to surface waters. But it was not simple to get those facts across to the environmental groups. We had a lot of educating to do. We still do."

By February, every golf course in Vermont must submit a completed form to the commissioner of agriculture. This form, according to the new regulations, will contain the course name, address, location and information identifying surface water, private water sources of abutting landowners, public water sources, private or public source protection areas and environmentally sensitive areas present on the golf course. The form must also show the type

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of pesticides used on the course over the last 3 years.

Based on this information, the commissioner will determine which courses will be the first to file applications for a pesticide use permit.

In addition to all the information previously described, each course must provide the name of the course superintendent who is responsible for completing the application and another officer of the course. The application must include all pre-screened pesticides to be used on the course, listed by common and trade name and by EPA number. Any pesticide not on the pre-screened list must be listed along with a current EPA pesticide fact sheet, and data showing the KOC, solubility, and half-life in the soil.

Extensive data on each course must also include a site plan (which may be an orthophoto map) marked with the following: 1. Tees, greens and fairways, by hole number and supporting operations; 2. Areas irrigated and source of water for irrigation; 3. All surface waters identified by name if known; 4. All known groundwater; 5. Private water sources of abutting properties; 6. Public water sources and source protection area; 7. Identification and location of any environmentally significant areas; 8. Property boundaries; 10. Legend, scale, north designation.

The application must also include a topographical map showing all course boundaries and features, including a written description with maximum and minimum slopes and other distinct topographical features.

The square feet of each green and tee must be shown and any green or tee within 100 feet of any surface water must be marked.

Owners must show the acreage of each fairway divided between closely mowed areas and rough.

Other information required includes; 1. The square miles of drainage area for flowing waters at the point of exit from the golf course property; 2. The surface acreage and average depth of any ponded surface waters and the location of its primary source of supply; and 3. A soils map and key as mapped by the U.S. Soil Conservation Service, or other reliable source, including identification of soils of high erodibility.

Each course must also develop and present a pesticide management plan showing how pests and weeds, insects, diseases and rodents will be managed. This plan will include a general statement of the policy and goals of the pesticide management plan.

It will describe pest problems associated with turfgrass and ornamentals during the past 5 years, locations and the extent of infestation. Proposed golf courses must describe anticipated pest problems and the control rationale for each.

The application will describe the pest management strategies that will be employed, including biological, chemical and cultural controls. It will include a description of pest-monitoring practices that will be used.

The commissioner of agriculture wants a description of

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pesticide storage location, handling and mixing areas, a spill response plan and proposed measures to prevent accidental releases. He requires a description of irrigation practices, including type of system used, rates and intervals of irrigation. And he wants a description of buffer zones established to protect surface waters, private and public water supplies and environmentally sensitive areas. If a pesticide not on the pre-screened list is to be used, or if the commissioner decides the information should be provided for any pre-screened pesticide, the golf course must provide extensive data on expected pesticide concentrations in various water sources. These concentration levels must be compared to Vermont water quality standards. The application must also include extensive data on other hydrogeologic features detailed in the new regulations.

All pesticides used once the permit is granted must be recorded and made available to the commissioner yearly. These records must include problems encountered, control methods used, their effectiveness, type and amount of pesticide used, and other information.

"As an industry, we should not have any problem putting our plans down on paper and illustrating that there are no problems," O'Connor said. "Our concern comes when the commissioner of agriculture gets out of the pesticide regulatory business and into golf course management. He may not know how high to cut grass or how wide buffer strips should be or even when pesticides should be applied. We are the specialists in that area, and we hope these new regulations are not used to keep us from using our expertise.

"We will do our best to give them the information they want. It's going to cost 30 days of my time and probably \$1,500 to complete the reports they want. But we will not know if our information is sufficient to satisfy them until they review our plans. They could require us to set up a monitoring system that could cost us another \$50,000 to test all the water around here after each pesticide application.

"We are concerned that the prescreened list of pesticides is so short," O'Connor continued. "We need to rotate pesticides to keep diseases and insects from building resistance. If the VPAC will not approve the pesticides we need, even for occasional use, we're going to have trouble controlling pests on our courses."

He stresses that most golf course superintendents are already following a basic integrated pest management approach. He uses an Envirocaster, which constantly monitors temperature, humidity and other factors, to help him determine when to treat for specific pests, especially disease.

"We have let 65 acres of rough go natural on this course. We have 25 to 30-foot buffer strips around any area where runoff could potentially get into any water. Most golf course superintendents in Vermont are already doing what should be done because of economics and a real concern for the environment. In many cases these new regulations are going to be an unjustified burden," O'Connor said.

For now, O'Connor and members of FBCSA Industry Policy Board are meeting and helping each other develop proposed management plans to be presented to the

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regulars. The goal is to develop a unified approach to the new regulations.

"We have been involved in this since 1988," O'Connor said. "It has taken more time and money than most people realize, and we are still faced with these restrictive regulations. The only thing I can see that we could have done better is getting started earlier.

"We have learned that if something of this nature is in the public hearing stage, it's probably already a done deal. If you learn that a committee is being developed to study something you are involved in, that's the time to get involved. We have to stay informed and active or some of the environmental interests will get things done before we have a chance to speak out," O'Connor said.

CREDIT: Northern Turf Management



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## TURF INDUSTRY HAS ROLE IN CLEAN WATER

by  
Scott A. Harrison

Our nation is obsessed with the quality of its drinking water, and rightly so.

Clean, potable water is essential for all life on our planet, including the multitudes of humans that inhabit it. Entire civilizations have blossomed and disappeared with their water resources. It's precious stuff, to say the least.

In the United States, over 50 percent of the population depends on groundwater (from wells and springs) for its drinking requirements, and that number increases to over 95 percent for the nation's rural population. The other half of U.S. citizens depend on surface water highly vulnerable to contamination. The management of these precious resources is as important to the health and prosperity of our country as the air we breathe, the food we grow, and the businesses that we depend on for our livelihoods.

Is there a problem with the quality of our water? Maybe.

Certainly there are localized areas with specific problems, but to date, the evidence suggests that our nation's water supply is in pretty good shape overall. So what's the big deal?

The big deal is that once these valuable resources become contaminated, they can be extremely expensive (if not impossible) to clean up. In areas with a sole-source water supply, its contamination can mean economic or health disaster for an entire community. Therefore, the value of the resource and the level of "purity" necessary to maintain it is a community decision based on economics, health guidelines and ethics.

In the past 10 years, pesticides have begun to appear in our water supplies. As you would expect, lots of debate has ensued over the significance of these findings, especially with regard to the health impacts of the levels of pesticides being detected.

We are constantly being bombarded with reports that use terms such as *parts per million* or *parts per billion*, *maximum contaminant level*, *lifetime risk of cancer*, and others that are either inadequately defined or otherwise difficult for the average reader to conceptualize. The bottom line,

though, is that the residues are there in detectable levels and we need to decide what, if any, actions we should be taking in response.

Pesticide and nutrient contamination of water resources was largely attributed to conventional agriculture until quite recently. Over the years, various agencies within the U.S. Department of Agriculture have diligently worked with farmers to improve their productivity while minimizing their environmental impacts. Hence, when pesticides and nutrients began to attract the attention of environmentalists and regulators, agriculture was in a reasonably good position to react and develop corrective *best management strategies*.

As a result, virtually all of the emphasis on improved pesticide handling and use practices was directed at conventional agriculture while less traditional uses, such as landscape management and urban pest control, were largely ignored.

In the 1980s, several developments that occurred simultaneously brought chemical applications for turf into the public eye. First was the enormous growth of the lawn service industry. From the founding of ChemLawn in the 1960s had grown a multibillion-dollar, multiservice lawn care industry that appeared to be centered around the application of pesticides and fertilizers to home lawns and institutional and corporate grounds.

This activity was occurring right in people's yards, instead of out in the rural farm areas. No longer were pesticides out of sight or out of mind.

Further, the pesticide and fertilizer industries, which has also experienced tremendous growth during the 1960s and 1970s, were faced with a maturing agricultural market and were aggressively developing specialties like landscaping and urban pest control products.

Finally, environmental groups, whose numbers and influence had been growing since the 1960s were turning their attentions and their multimillion-dollar budgets to the pesticide issue and found a ripe fruit in the form of an un-

suspecting landscaping industry.

Since no water quality or human health research had been conducted in this particular area, the industry was hard-pressed to defend itself.

The situation sparked a flurry of research activity in the mid-1980s to address the concerns. A number of well-equipped and forward-thinking researchers began to investigate the potential impacts of turf management, especially chemical applications, on environmental quality. Institutions such as the University of Rhode Island, Penn State, Ohio State, Cornell, and U.S. Golf Association and the Environmental Protection Agency initiated work in the turfgrass water-quality area and began to collect data. Only recently has this data begun to develop into a coherent picture. Interestingly, much of the public controversy over this particular aspect of pesticide use has died down (unless, of course, you are trying to build a golf course.)

The Penn State and Rhode Island studies were somewhat similar in their objectives and findings. Both were designed to represent home lawn conditions and to examine the pesticide and nutrient content of runoff and leachate leaving the plots. Both utilized common lawn care chemicals such as 2,4-D, dicamba and soluble nitrogen fertilizers.

In each instance, runoff from natural rainfall was a rarity and large amounts of irrigation were necessary to produce the bulk of the samples. Movement of pesticides and nitrate was minimal, and concentrations in both leachate and runoff samples were generally within federal drinking water guidelines. Two of the pesticides included in the

Penn State study, pendimethalin and chlorpyrifos, were never detected.

Researchers at Ohio State University have observed high levels of absorption and rapid degradation of pesticides in the thatch layer of established turfgrass.

Accelerated degradation of organophosphate insecticides was first observed in corn several years ago. The cause was determined to be a rapid increase in the population of microbial organisms which consume the pesticide as an energy source. The Ohio State turfgrass researchers suspect a similar but even more pronounced effect due to the high level of microbial activity that occurs in thatch.

The end result is that very little pesticide residues remain to leach out of the thatch into the soil and potentially the groundwater.

Dr. A. Martin Petrovic of Cornell University recently reviewed the literature pertaining to *The Fate of Nitrogenous Fertilizers Applied to Turfgrass*. In his article, Petrovic suggests that most of the factors controlling the leaching of nitrate to groundwater—such as the source and solubility of nitrogen, the season of the year in which the application is made, irrigation practices and rainfall patterns and soil type—are manageable. Conditions that favor solubility, low plant uptake and excessive water percolation will also favor nitrate leaching. Nutrient management that avoids these conditions lessens the likelihood of unreasonable nitrate losses.

Finally, in a major field investigation of the impact of golf course pesticide use on groundwater, the EPA and four Cape Cod golf courses cooperated with a private con-

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sulting firm to conduct a groundwater monitoring study for pesticides and nitrate. Sixteen pesticides were included in the analytical procedure, seven of which were never detected. With the exception of chlordane, which has been banned and had no record of use at the golf course where it was noted, none of the pesticides occurred in concentrations approaching established maximum contaminant levels or recommended health advisory limits.

This all sounds like pretty good news, right? Turf appears to be "clean."

That would have been a reasonable assumption until Nov. 13, 1990, when EPA released the first phase of their National Survey of Pesticides in Drinking Water Wells. While the overall results were encouraging, the most commonly detected pesticide residue in the country was the diacid metabolite of Dacthal.

Dacthal is a pre-emergence crabgrass herbicide that was popular in turf before the introduction of the now-predominant dinitroanilines (e.g. pendimethalin).

Dacthal's use is now limited mostly to fruit and vegetable production. It would be convenient (and inappropriate) to lay the blame for the contamination of fruit and vegetable growers, except that some of the Dacthal-positive wells were located in urban areas such as West Orange, N.J.

It turns out that Dacthal's second breakdown product is highly soluble and incredibly stable in groundwater. Granted, the levels detected are low and not toxicologically significant, but the residues are there.

The bottom line is that predicting the behavior of these materials is tricky and challenges some of the best minds in science. The average small business that happens to apply pesticides is not going to be able to evaluate every chemical and environmental variable to evaluate the impact on groundwater. So what can we do?

Lots of things.

First and foremost, clean up your act.

From the simplest task in your shop to the handling of dangerous substances, be aware of the hazards and be in control of your operation. Assess the safety of your

operation and start making improvements—*now*.

- Do you carry emergency cleanup equipment when transporting pesticides? Even a shovel and a small drum of Kitty Litter are better than nothing.

- Are you storing, mixing and disposing of pesticides and containers safely and responsibly, or is your shop yard a small Superfund site waiting for your state inspector to stop by?

- Do you know the location of the wells on your property and take proper precautions to protect them from pesticides and fertilizers?

- Have you installed backsiphoning devices on your fill hoses?

- Do you collect and re-use rinsates?

- Does the fire department know what chemicals you are storing?

There are no easy or cheap answers to these questions.

But while we may not be in a position to custom design each spray application we make, we can make a big difference if we take the time to weigh our options and do the best we can.

Your professional organizations and Cooperative Extension Service can help you with the decisions.

Don't let the negative publicity of the past few years unnerve you or, worse yet, make you insensitive to the public's concerns. Let your customers and neighbors know that you have thought about your choices and are applying the safest effective option available to you.

We've all got a stake in this. If you can't live up to the challenge, not only does your business suffer, but so does your industry and its counterparts in production agriculture and pest control.

One of the biggest mistakes you can make is to point fingers and place the blame somewhere else. There are no good or bad guys here. The smartest thing you can do is to recognize your common interests and work together to protect them through smart management, responsible behavior and effective communication. Don't wait for the other guy—*JUST DO IT!*

*CREDIT: Northern Turf Management*

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Snapshot 80 DF provides up to eight months control of 86 broadleaf and grassy weeds before they emerge, which greatly reduces the cost and labor of hand weeding. Snapshot 80 DF can be applied directly over the top of established labeled ornamentals without injury and can be applied to wet foliage. It shows excellent tolerance to

174 labeled species of ornamentals.

Snapshot 80 DF can be used alone or tank mixed with other herbicides to control additional weeds. Because it is a preemergence herbicide, applications should be made in the spring or fall before weeds emerge, preferably one to two weeks before germination of targeted weeds. For best results, the herbicide must be activated by at least 1/2 inch of moisture within 2 days of application.

Snapshot 80 DF carries a caution human hazard signal word. It can be used in commercial and residential landscaped areas and commercial nurseries.

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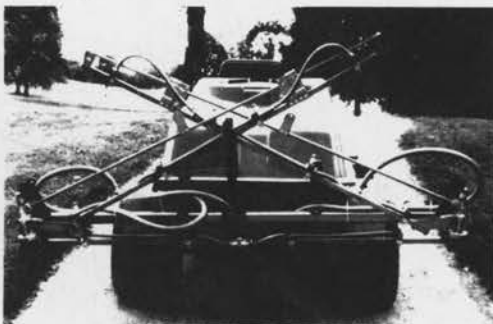
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