

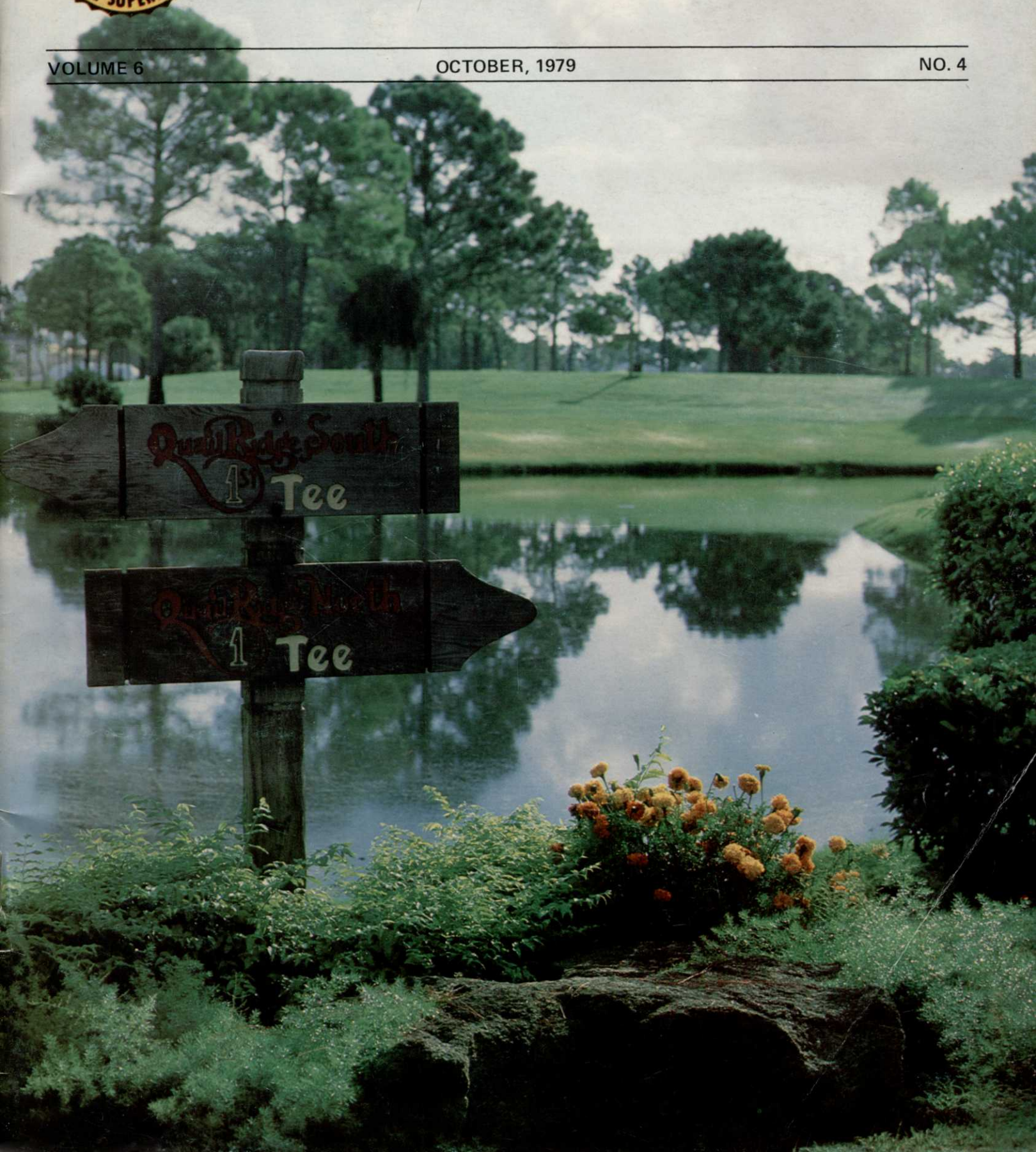


# ***THE SOUTH FLORIDA GREEN***

VOLUME 6

OCTOBER, 1979

NO. 4



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## President's Message



The past year as Vice President of The South Florida Golf Course Superintendents Association has not been an easy one. In September of 1978, outgoing President Leroy Phillips warned that The South Florida Golf Course Superintendents Association was too large and that the Board should address this problem before it became too late. The new President, Dan Jones, was faced with the problem of resolving this controversial issue. Little did he know that this would engulf the Board as well as the general membership in a year long debate. Feelings were strong on both sides, but finally an agreement was reached to divide The Association at the Broward - Palm Beach County line effective January 1980. Did we make the correct decision? Only time will answer that question.

For The South Florida Golf Course Superintendents Association to retain its stature as a leading professional association of golf course superintendents, we need the support of all the superintendents in the area as well as their participation. Your Board is enthusiastically working toward this goal but we need everyone's help to succeed. I, for one, am dedicated to see that we do.

*Alan Witzel*

# The South Florida Green

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## COVER PHOTOGRAPH

*Early morning view of Quail Ridge Country Club, Delray, Fl., Superintendent, Fred Dickson.*

Photo by Harry McCartha

(See descriptive article on page 25)

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# WATER WATER WATER WATER WATER WATER WATER WATER WATER WATER

*Editor's Note: David T. McLaughlin, chairman and chief executive officer of the Toro Company, addressed the Los Angeles Rotary Club recently on the subject of water, something we can't do without but take for granted. I'm certain you'll find his remarks interesting and provocative; perhaps disturbing.*

Something very serious is happening to water that should be causing widespread concern.

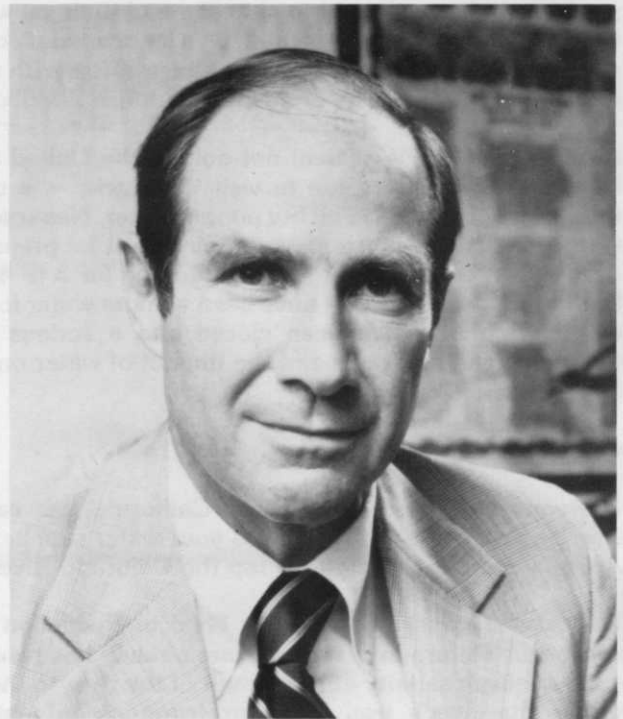
The availability of fresh water — our access to fresh water — is rapidly diminishing.

It is diminishing because more and more people in our society are finding more uses for it. We are using it, wasting it and polluting it on a scale unprecedented in the history of man.

It is diminishing because the total amount of water available on earth is the same today as it was at the beginning of time. Fresh water amounts to less than one percent of the total water supply. The balance — the other 99 percent — is in the oceans or locked up in the polar ice caps.

**While I do not want to cast myself in the role of alarmist, a convincing case can be made that a crisis is building.**

It is unfortunate, but true, that our society has become crisis oriented. It takes some catastrophic event or some action that deeply affects large numbers of us in a personal way before we react with sufficient collective force to cause something to happen.



By DAVID T. McLAUGHLIN  
Chairman & Chief Executive Officer  
The Toro Company

And then our reaction tends to be hasty and impatient — demanding quick solutions.

A case in point, of course, is the recurring energy crisis. In spite of severe disruptions caused by the 1973 oil embargo and in spite of repeated admonishments to curtail use, we continue to act as though the supply of fossil fuel were unlimited.

That same kind of attitude followed the disastrous drought three years ago that disrupted lives and livelihoods here in Southern California, in the Bay area of northern California and many other parts of the U.S., including my home state of Minnesota.

We have blithely fallen back into our old wasteful ways of water use.

There are other similarities between the energy crisis — which is real — and potential for a water crisis — which is not yet with us but which could be far more disruptive and hurtful.

Both have deep-seated implications. We experience the consequences of conflict with respect to oil almost every day. Conflicts over water reach much farther back into history — to Biblical times — but the forces of conflict continue unabated to this day, as you well know.

The U.S. News Washington Letter, published by U.S. NEWS & WORLD REPORT, warns in a recent edition that insufficient snowfall in the Cascade Mountains this past winter threatens to reduce the harvests of fruit, seed grains, vegetables and other crops in Oregon, Washington, Idaho and California.

*(Continued on Page 6)*

I am sure that a number of people in Chicago last winter would have been pleased to ship some of their snow to the Cascade Mountains rather than have it accumulate on their streets, sidewalks and driveways. The problem with respect to water is not only one of quantity but also distribution.

And the problem is evident not only in the United States: Last week I had occasion to visit Venezuela — a country that ironically is rich in oil but poor in water. Newspapers in Caracas carried reports that the city must be prepared to deal with a water shortage and rationing for 3 to 4 years. Some sections of the city have been without water for 2 to 3 weeks. Schools have been closed and a serious health hazard threatens because of the impact of water on urban sanitation.

Closer to home:

Everyone who lives in southern California has cause to worry about what will happen to your water supplies when Arizona exercises its right to tap the Colorado River.

That also is causing concern in Mexico. Reduction in the flow of the Colorado in recent years already has resulted in an increase in salinity at the mouth of the river to the point where the river's usefulness for irrigation in Mexico is threatened.

Rapid population growth in Colorado has resulted in huge increases in demand for surface water in that state. This has resulted in bitter conflict and numerous lawsuits between rural and urban interests. The repercussions can be expected to spread to all of the states downstream from the major rivers that flow out of Colorado — the Rio Grande, the Arkansas, the South Platte, the North Platte and, the one I just mentioned that's most important to you — the Colorado.

So, while there are similarities between the energy crisis and the threatening crisis over water, there are important differences. The big difference is that mankind could survive without mechanical energy but we could not survive without water.

**We are not, at this point, talking about survival. We are talking about the potentially crippling consequences of water shortages on a local, regional, national and international scale.**

While I cannot present myself as an expert on the subject of water, I have felt compelled to acquire sufficient knowledge about water science and water management to understand how this complex infrastructure works.

From that learning process I have become convinced that we are headed for trouble if we continue our wasteful use of water. Also there are atmospheric anomalies and phenomena occurring that no one seems to understand fully but which could further compound all of our water problems and disrupt historic distribution patterns.

In a natural state, water that is taken away is soon replenished by the hydrological cycle. But we have upset the natural balance to such an extent that the hydrological cycle cannot replenish or purify our water at the rate we are using and polluting it.

Prior to the invention of mechanical energy, most water utilized for beneficial use was drawn from surface waters — rivers, lakes and streams — from rainfall or from shallow underground lakes.

In more recent times, we have literally mined many of the great aquifers; for example the Ogallala Aquifer that underlies much of the Central Plains.

Water is being pumped from the aquifers and other underground water sources for residential, industrial and agricultural purposes at rates far greater than they are recharged, resulting in subsidence — the sinking of the land. That is happening at a frightening pace in many parts of the U.S.

In addition, of course, we have contrived countless ways to impound and collect water and to divert it for various purposes.

All of this upsets the normal hydrological cycle.

Precipitation on land and sea and the melting of the glaciers and snowcaps that produce fresh water that enters the watersheds, recharges the groundwater tables and flows into the sea and then the condensation, evaporation and transpiration that send moisture back from the land and the oceans into the atmosphere to produce more precipitation — that entire cycle is driven by solar energy.

*(Continued on Page 7)*

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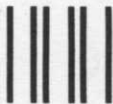
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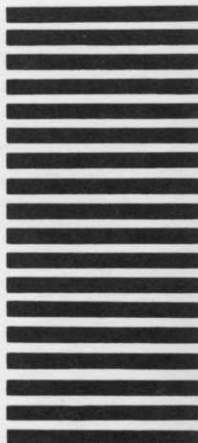
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**Beyond man's practice of depletion and contamination, the scientific community now warns that something more fundamental may be happening to distort the normal hydrological cycle.**

The Food and Climate Forum of the Aspen Institute for Humanistic Studies — which my company is financing along with 8 other U.S. corporations — is attempting to determine, among many other related objectives, to what extent and in what ways the world's climate is responding:

- To changes in the sun's radiative intensity.
- To changes caused by man's injection of carbon dioxide into the atmosphere, thereby creating a "greenhouse effect".
- And by changes caused by irregular solar patterns and sunspot activity such as those suspected of diverting the jet stream and disrupting the flow of moisture-bearing air masses over California in 1972 that resulted in drought and huge losses to farmers.

The Forum has urged, and I quote from a recent report:

"Agencies responsible for water allocation in California must take a hard look at their priorities. Increased availability of water will not ameliorate a future drought if the additional resources are employed wastefully or are used as a means of justifying further urban growth."

**What all of this means is that the potential for crisis based upon our waste and misuse of water and based upon baffling occurrences in the solar system that affect weather and climate is ominous.**

What should we do about it?

All sorts of solutions have been proposed:

- Iceberg towing.
- Cloud seeding
- Construction of new dams, canals and reservoirs

Some of these proposals are feasible but most are not without controversy.

There is cause for cautious optimism that we'll find ways to desalinate the oceans economically. The consensus in the scientific community, however, is that that day — when desalination on a large scale will be practical — is a long way off.

Until that day comes the most viable alternative, in my judgment, is to concentrate on making do with what we have, which means we must:

- **Stop wasting water.**
- **Stop polluting it so we don't have to spend so much time and money repurifying it.**
- **And learn how to use it and reuse it, over and over again.**

(Continued on Page 8)



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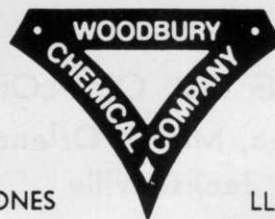
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I'm not going to take your time to suggest ways to reduce waste in our personal use of water. Nor am I going to discuss the importance of reducing the number and variety of pollutants introduced into our fresh water supplies. Others are doing that quite effectively.

I would, however, like to suggest that since agriculture accounts for approximately 80 percent of water consumption in the U.S. today, it is an obvious place to look for opportunities to improve water use efficiency.

Historic practice in farm irrigation has been to apply water in large amounts relatively infrequently. This not only wastes enormous amounts of water but, if continued over time, can reduce the productivity of the land. Modern equipment makes it possible to control the application of water so that the total amount needed to produce a crop and to protect the productive potential of the soil is much less on a seasonal basis, resulting in conservation of both water and soil and reduced consumption of energy.

Another very important method of water conservation is recycling. It is my personal belief that that approach is one of the most effective ways we have for expanding the availability of our finite water resources to meet the growing needs for sustenance and economic sufficiency of a growing world population.

There exists today the expertise and the technology to take wastewater from virtually any source — municipal, commercial, industrial, or agriculture — purify it and use it again for any purpose: to swim in it, bathe in it, even drink it.

The most common use of recycled wastewater in this country today is for irrigation — especially on golf courses.

When wastewater is used for irrigation:

- **The cost of treatment is reduced. Tertiary, or third-stage treatment, now required for effluent discharged into receiving waters, becomes unnecessary.**
- **The soil provides the third-stage treatment and returns the wastewater — thoroughly cleansed — back into the watertable.**
- **In the process nutrients in the effluent fertilize the turf and other vegetation supported by this on-land disposal site.**
- **And the amount of "used" potable water discharged into the oceans is significantly reduced.**

There are more than 30 golf courses that are irrigated with wastewater in California. Others are in Arizona, Florida, Colorado, Texas, New Mexico, Nevada and several other states.

Probably the first course to use waste-water for irrigation was Sharp Park Golf Course near San Francisco, which used treated effluent from the San Francisco County Jail in San Bruno, beginning in 1932, when the jail was built.

(Continued on Page 9)

One of the finest effluent irrigation systems is at the Air Force Academy in Colorado Springs. Every drop of effluent generated at the Academy is recycled to irrigate the Eisenhower Golf Courses, the cemetery, parade grounds and roadsides.

**As with everything in our complex world, there are some pitfalls associated with recycled effluent. It must be properly managed. That's a small price to pay for the advantages gained, the most important of which is the conservation of a priceless indispensable, very limited resource.**

All of us can help by treating that resource with the respect it deserves.

We can stop wasting it and stop polluting it unnecessarily.

We can urge those government authorities that manage our treatment plants to recycle the effluent — at least a few times before it is dumped into the oceans.

While I am not a proponent of more government regulation, I do believe there are some instances where a properly informed higher authority must oversee the protection of limited resources and resolve jurisdictional disputes.

If you are in a business where process water is used in large amounts, keep in mind that it can be cleansed and re-used, disposed of on-land to provide irrigation for recreational turf and other vegetation, stored for fire protection or utilized in many other beneficial applications.

Whenever there is talk of water invariably those famous lines from the Ancient Mariner are recalled: "Water, water everywhere, nor any drop to drink."

There is no large scale threat right now of anyone dying of thirst anywhere in the world that I know of. But I do feel that a false sense of plenty is inspired by the vast amounts of water that surround us.

We look at the oceans and we see water. But it is not water that we can drink or use for irrigation.

**It could well be that it is the appearance of plenty that deceives us into believing that our water supplies are more than adequate. Evidence to the contrary is abundant. We do not have access to sufficient quantities of fresh water to allow us to waste it and abuse it the way that we have.**

We must treat it with respect. If we don't several other famous lines about water might become appropriate. Are you familiar with these words?

"Hold me up, mighty waters,  
Keep my eye on things above."

They're from an Episcopal hymn that was played by the band of the Titanic as the ship was sinking.



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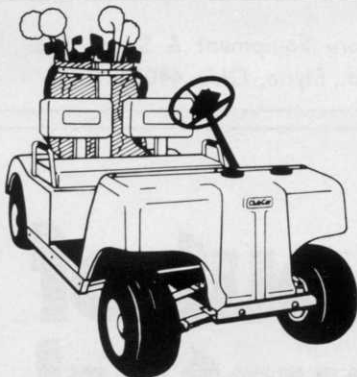
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# TEE TO GREEN

By DAVE BAILEY

The following is an interview with B. J. Johnson. He is an associate professor of agronomy with the University of Georgia. He was the education guest speaker at the July meeting of our association.

Question: What area is your research work?

Johnson: I deal primarily in herbicide treatment.

Question: What is the best new herbicide chemical in the last ten years?

Johnson: The best product researched and now on the market in recent years is Metribuzin. (4-Amino-6-(1,1-dimethylethyl)-3-(methylthio)-1, 2, 4-triazin-5(4H)-one

Question: This active ingredient translates into what product trade name?

Johnson: Mobay Chemical Corporation calls their product SENOR. Dupont Chemical Corporation calls their product LEXON.

Since only Mobay is actively selling their product from this point on in the discussion only Sencor will be referred to. Sencor is a 50% wettable powder herbicide.



Dr. B. J. Johnson

Question: When did you first start working with Sencor?

Johnson: In 1973, it was labeled in Florida and Georgia in 1978.

Question: Where has your research been done?

Johnson: On test plots and at seven golf courses over a three year period of time. The location is about forty miles south of Atlanta.

Question: Upon what weed is Sencor most effective?

Johnson: Your greatest problem weed, goosegrass and crowfoot.

Question: What application rate is giving the best results?

Johnson: Remember the best rates mean weed killing with as small amount of damage as possible. To achieve this goal the best test results are as follows. Mix MSMA (monosodium acid methanearsonate) and Sencor. On a one acre basis use 2.0 pounds active ingredient MSMA and 1/8 pound active ingredient Sencor.

(Continued on Page 12)

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Remember this means ACTIVE ingredient. That will become a tank mix of 1-2/3 quart per acre of MSMA if you use 6.0 active MSMA. The total ingredient of Sencor product from the bag would be 1/4 pound or 4 ounces per acre. Higher rates of Sencor have been used in the past when not mixed with MSMA. If EPA takes MSMA off the market we may be left with Sencor as our base material.

Question: Do you use a sticker?

Johnson: If you can afford to do so. The work I have done shows no improvement with a sticker since MSMA has some. But I never get a Florida style summer rain. The important time factor is to get about four hours absorption after the spray application.

Question: What is the time interval between applications?

Johnson: Seven to ten days works best.

Question: How many applications?

Johnson: Generally two applications will be sufficient.

Question: After the weeds are killed off and the next generation occurs when should you spray?

Johnson: As soon as the turf is healthy. Here you will need to make your own good field judgement for south Florida. Fertilize weak areas then spray once and evaluate timing from there. Remember herbicide programs are only effective if you continue to keep your turf healthy. Dead areas do no one any good.

Question: Another product of great interest in south Florida is BASAGRAN herbicide, can you give us any data on this subject?

Johnson: Yes, I started working with it also in 1973 and like Sencor it received a label in 1978. Basagran is the trade name for BASF Wyandotte Corporation. The active ingredient is sodium salt of bentazon.

Question: Upon what weeds is Basagran most effective?

Johnson: Basagran is aimed at the nutsedges with better results on yellow than purple.

Question: What rates give best results?

Johnson: One to one and half quarts per acre.

Question: How many applications?

Johnson: Many times two applications are needed.

Question: When can Basagran be applied?

Johnson: Basagran is very selective on sedges in bermuda greens. It can be used all year with no bermuda damage.

Question: What is the best herbicide for Poa Annua in our area?

Johnson: Kerb 50% wettable powder gives the best results on bermuda grass and is very selective. It is a product of Rohm and Haas, the active ingredient is 3, 5-dichloro-N-(1,1-dimethyl-2-propynyl)-benzamide.

(Continued on Page 13)

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Question: We often criticize researchers for working only on test plots what is your comment?

Johnson: We do hear that often, that is why I worked with Sencor for three years on seven golf courses.

Question: What is your main message to us?

Johnson: Often chemical salesmen are to influential on rates and not on purpose. Always use test plots yourself. Do not spray the entire golf course and then be sorry. It is very important to keep good records on all your spraying. Local people need a good current education on weed killing. Always understand your rates and keep good calibration of application. Our work is only as good as your application.

## PALM BEACH GCSA



George Cavanaugh is shown giving a check of \$500.00 to Palm Beach Association Treasurer Billy Wright. This check was a donation from the South Florida Chapter to the newly formed Palm Beach Chapter to further their establishment.

## PALM BEACH ELECTS OFFICERS



Newly elected officers of Palm Beach Golf Course Superintendents Association. Left to right: Tom Burrows, Kevin Downing, Bill Kriegel, George Cavanaugh, David Bailey and Billy Wright. Not present when photograph was taken, Otto Schmeisser, President and Bill Wagner, Vice President External Affairs.

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CALL US, WE WILL SHOW YOU WHY  
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JOYCE ENVIRONMENTAL CONSULTANTS INC

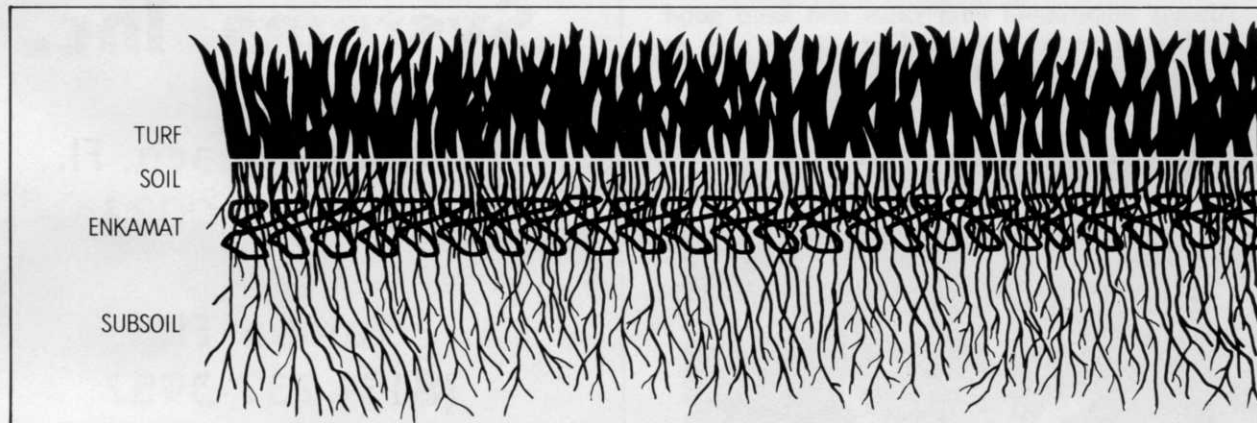


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# PROBLEM: **MAINTAINING TURF ON INTENSIVE USE AREAS.**

## SOLUTION: **ENKAMAT.<sup>®</sup>**



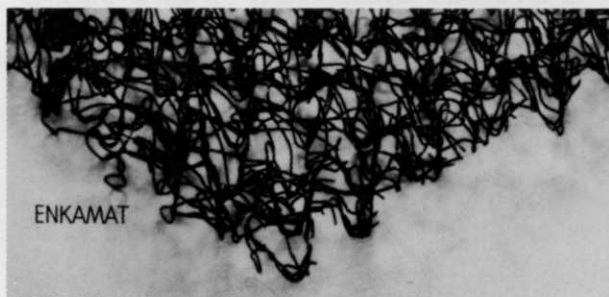
Enkamat is a turf reinforcing webbing for intensive use areas. It can be used effectively on tees and approaches. Cart traffic damage in line-of-play areas and around greens can be minimized.

Enkamat can be installed quickly and easily. Simply lift the sod, lay down Enkamat and then replace the sod over Enkamat. Once in place, the continuous three-dimensional Enkamat webbing will: (1) increase the structural strength of the sod; (2) distribute weight of traffic, minimizing compaction; (3) al-

low air, water and nutrients to move freely into the soil, minimizing maintenance costs.

Make traffic and golf spikes work for better turf, rather than destroy it. Install Enkamat. Call or write for full information:

### **TURFIBRE PRODUCTS**



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TOM MASCARO MANAGER

ENKAMAT IS A REG. TM OF AMERICAN ENKA CO., ENKA, INC. A PART OF *Arizona* INC., AND IS THE SUBJECT OF A NUMBER OF U.S. PATENTS.



# UNITY IN SOUTH FLORIDA

The golf industry had tremendous growth in the past decade. No area in the nation can match the growth of the southern three counties of Florida's east coast. Dade, Broward and Palm Beach counties are now nearing the three hundred mark for number of courses. For decades South Florida GCSA was the only local association. But as the area grew, needs and desires changed. In 1976 the Tri-County GCSA was founded. Both associations are now affiliated chapters of the national GCSAA. The national GCSAA does not establish defined areas for a local organization. The overlapping of territory between the two local associations was a matter that needed to be resolved. Both groups were functioning in Palm Beach, Martin, and St. Lucie counties. Thus diluting the effectiveness of both associations.

A review of events in recent months is in order. South Florida GCSA suggested to its members in November 1978 that a decision was needed about a defined boundary line. South Florida GCSA would be located in Monroe, Dade, and Broward counties. Tri-County changed its board of directors in January to comply with national standards. Now all officers are golf course superintendents. February saw Tri-County become an affiliated chapter of the national GCSAA. In May Tri-County voted to change its name. The new name is Palm Beach Chapter GCSA. The word "chapter" was included to show support and affiliation with the state association. Also defined was a territory of Palm

Beach, Martin, St. Lucie, and Indian River counties. In June South Florida GCSA officially approved their territory as the three southern counties previously mentioned. This becomes effective January 1980 for South Florida GCSA, the end of their fiscal year.

Now that you understand what happened let's evaluate it for you individually. You as a golf course superintendent have been assigned a local association to be a member of. Which one depends upon where your club is located. Your home residence has no bearing. You can vote and hold office only in your local association. Anyone can always attend any meeting no matter where it is located. Commercial members can join any association they desire with no voting privilege. Any superintendent that joins either local association automatically becomes a member of the state association.

The decade of the 80's will see the golf course superintendent continue to be a proud profession. Management assignments will continue to broaden beyond our previous duties. The leadership displayed of a smooth mutual division of local territory by the two associations will be a successful kickoff for the future. Now we all know where the term "grassroots politics" comes from. We are all ready to move forward together and concentrate on just the "grassroots".



Participants in serious presentation of division of South Florida Golf Course Superintendents into two associations. Shown above left to right top row: Dan Jones, Leroy Phillips, Phil Amman, Bill Wagner. Second row: David Bailey, Tom Burrows and Alan Weitzel, Dick Lemmel and Fred Klauk.

# WHAT'S INSIDE IT A BET

If you're hardnosed about business decisions, you want to get the in-depth facts on a product before you buy. That's why we've put together this head-to-head comparison between the insides of an E-Z-GO and a Cushman. We took comparable top-of-the line models, E-Z-GO's GT-7 and the Cushman Turf Truckster. Here's what we found.

---

**Power Source:** 18 horsepower OMC engine, tightly compartmentalized. Ground speed 0 to 22 mph.

---

**Braking:** Hydraulic internal expanding.

---

**Payload:** 1000 pounds.

---

**Suspension System:** Torsion bars, leaf springs, front and rear shocks.

---

**Dump Construction:** Single wall.

---

**Headlights:** Single.

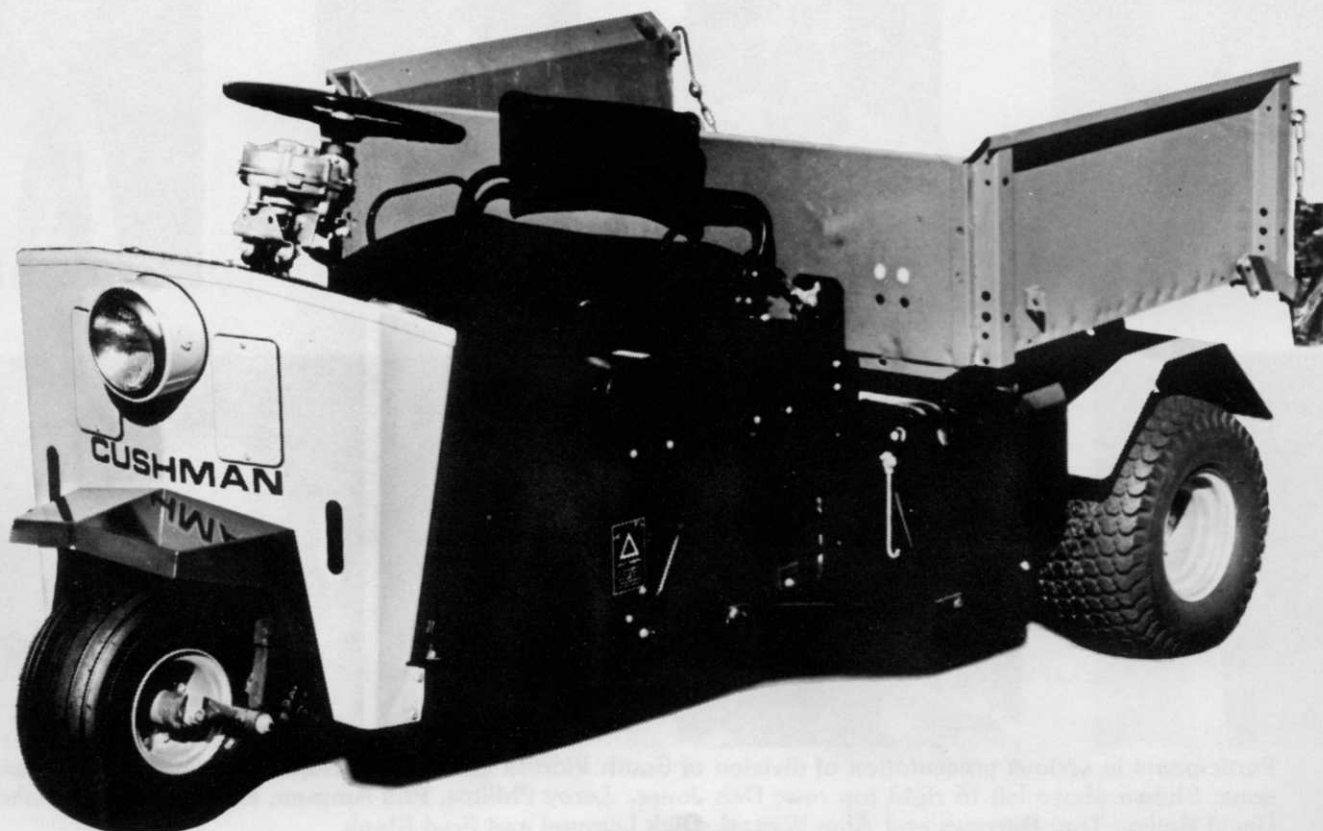
---

**Seating:** Single seat for one passenger with back rest and hip restraint.

---

**Price:** Virtually the same.

---



# AN E-Z-GO MAKES TER BUY.

---

**Power Source:** A rugged, reliable 18 horsepower Onan engine with the power to carry a full payload up to 24 mph. Substantially larger engine compartment for easier maintenance.

---

**Braking:** Improved hydraulic internal expanding.

---

**Payload:** 1500 pounds. A massive 50% greater carrying capacity than Cushman. More cubic space for greater material volume.

---

**Suspension System:** Heavy duty torsion bars, leaf springs, front and rear shock absorbers, designed to support the bigger payload.

---

**Dump Construction:** Heavy duty diamond plate steel with rugged rear bumper for heavier loads and longer life. Easily convertible to flat bed.

---

**Headlights:** Dual lights for greater night vision.

---

**Seating:** Dual seats for two passengers with individual back rests and hip restraints, constructed for larger men, greater comfort.

---

**Price:** Virtually the same.

---

**Summary:** E-Z-GO carries a greater payload, is easier to maintain, is larger, more durably built, and safer with a wider wheel base. E-Z-GO uses top quality components from companies such as Bendix, Borg Warner, Dana, Onan, and Rockwell International.

For the complete story on the E-Z-GO GT-7, a demonstration on your course, contact your E-Z-GO distributor. For his address check your Yellow Pages or call or write Mr. William Lanier, E-Z-GO, P.O. Box 388, Augusta, Georgia 30903, at (404) 798-4311.



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Polaris E-Z-Go Division of Textron Inc.

# FRESH WATER

By DEBORAH ERICKSON  
Staff Writer  
Fort Lauderdale News and Sun Sentinel

Southeast Florida's fresh water supply won't meet the demands of residents, agriculture, and industry in the next 25 year if the area continues to grow at its present rate.

This projection by the South Florida Water Management District came only months before the release of an area water-use management plan.

The plan — the result of five years of research — examines alternative ways of providing a balance between increasing consumption, steady supply, rising consumer costs and the environmental impact of various storage facilities.

Although the final results of the study are not available yet, some details on consumption and storage alternatives in the past and their effects on the environment are.

Over the past 15 years, the amount of water consumed in Fort Lauderdale has doubled. In Hollywood, the amount has increased 310 per cent; in Pompano the increase has soared to 365 per cent; and in Boca Raton consumption has increased 285 per cent in one decade.

While the amount of consumption steadily climbs each year — often surpassing population increases — the amount of available fresh water has remained the same.

Florida depends solely on rainfall for its fresh water.

"We receive an average annual rainfall of 60 inches, but are only able to use 12 to 18 inches. The rest is lost through evaporation or into the ocean because we have no way of storing it," Stan Winn, water-use plan manager, said.

Water management district figures show that during the past decade, Fort Lauderdale experienced the largest amount of rainfall, 79 inches, in 1966, and smallest amount, 38.7 inches, in 1971.

Currently, all of the area's fresh water is stored in Lake Okeechobee, three conservation areas covering half the original Everglades and the Biscayne aquifer which lies 2 to 100 feet underground.

According to Winn, Southeast Florida's future water shortage problems can be solved now by developing new methods and facilities to capture, store, treat and transport all the rainfall the area receives.

At present the most economically and environmentally feasible alternatives are:

● Desalinization which would involve forcing brackish water in the Floridian aquifer 1,000 feet below the ground through a tightly woven plastic membrane, allowing only water molecules to pass through and keeping bacteria, fungi and salt out.

Until recently this process was considered too costly, but studies have shown the cost would be comparable to that of a chemical treatment plant, Winn said.

This process is not the same as the distillation plant in Key West which takes salt water from the ocean and purifies it. Such plants are more costly to construct and require more energy to complete the purification process than desalinization.

Desalinization is not used by any public water plants. But one West Palm Beach company manufacturing the facility has sold it to area condominiums unable to hook up to city water lines.

Bill Wigglesworth, general manager of the basic water division of Basic Technology, Inc., said the process can produce thousands of gallons of fresh water daily from otherwise unusable water by removing all of the chlorides, chemicals and organics at a cost ranging from 20 to 80 cents per 1,000 gallons.

● Deep well injection, which would require the water management district to pump fresh water into the Floridian aquifer for storage. Because the water in this aquifer is brackish and denser than the fresh water being pumped in, the fresh water would form an impermeable bubble and float on top of the aquifer similar to the way oil floats on water.

The water would remain in the aquifer for a period of up to one year and would be used during Florida's dry season in late fall and winter. One official said there would be some mixing of the waters at the bubble's perimeter, but that the bulk of the water would remain pure. He added that because the water would be pumped into the aquifer under pressure, the water could easily be retrieved by relieving the pressure and letting the water flow freely upward.

● Backpumping, which would allow the water management district to pump rainfall from urban areas to the conservation areas. The main drawback is that it would allow urban nutrients such as chemical sprays and fertilizers to enter the Everglades, possibly causing damage to wildlife and vegetation there.

*(Continued on Page 19)*



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**TURF & GARDEN, INC.**

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**TORO**<sup>®</sup>  
present...

**Safe, playable turf  
the easy way...**



**for parks and schools.**



## Beautiful grounds say it best.

Lush, green turf and beautiful landscaping in parks, school grounds and around public buildings say a lot to the people of a community.

For example, they invite people to enjoy their facilities.

They tell them that the public administration wants to help make their community a nicer place to live.

And the more beautiful the grounds the more beautifully they say it.

### Grow grass better and save money, too.

The most positive single step you can take to assure that the grass is always greener at your facilities is to install a TORO automatic sprinkler system designed expressly for public areas.

#### Here's why:

**A TORO automatic system puts total irrigation control at the grounds superintendent's fingertips.**

TORO offers a variety of components to meet the exact requirements of any size automatic irrigation system.

- Series 170 Monitor II is a 23-station controller for systems employing up to 92 electric valves. Dual programming for watering some areas more frequently than others. Also available in an 11-station version—electric or hydraulic.

- Solid state controllers are also available from TORO. The IC 1200, which is fully solid state, controls up to 12-stations. It can be programmed to water up to 6 times per day on any combination of days in a 14 day schedule.

With TORO automatic systems you can control the days in a two-week period and the time of day your sprinklers come on.

You can also control the running time of each group of sprinklers. Or, with our valve-in-head sprinklers, you can exercise the same degree of control over each individual sprinkler.

Dual programming features let you water one area more often than another. Like heavily used areas vs. lightly traveled ones. Or sunny areas vs. shady ones.

- If the area you wish to water is large and spread out, then a central Satellite system may give you the control you need from one location. The solid state VT II and the Vari-Time 4000 provide the features you need for this application.

- Series 216 heavy duty Brass Valves in sizes 1" through 3" are available for the most demanding applications.

- Series 232 Plastic Valves ranging in sizes 1" through 2", built from tough glass-filled nylon and Cyclocac®, are perfect for residential and commercial systems.

- With TORO valves, TORO sprinklers, and a TORO automatic controller you have the combination that will provide the exact amount of water at the exact time for more beautiful lawns and landscaping.

### Plants grow better and you save water.

TORO total sprinkler control means you can regulate watering precisely for even distribution, according to need. That produces vigorous growth and beautiful expanses of healthy, green turf.

But of equal importance, precise control also means never over watering. For example, you can water low spots less than high ones and slopes with short bursts to minimize runoff. You also can accurately reduce watering by small percentages when shortages require it. And when you add it up you have real water savings. An important consideration today.

#### • You water at night and get maximum utility.

Your automatic system normally is set to turn on in the early predawn hours when the air is still and the rising sun will soon dry grass and leaves. So sprinkler water doesn't blow away, moisture-induced plant diseases are minimized and your facilities are ready to go when the first users of the day arrive.

#### • You save time and money.

With a TORO automatic sprinkler system you can forget about quick couplers and other manual watering methods. And this lets you virtually eliminate night crews and use that manpower more efficiently.

TORO systems also cost less to maintain than other sprinkler systems. Because of features like surface serviceability, long-life components and vandal-resistant design.

The rising cost of water makes water savings an important cost consideration, too.

And the improved vigor of your landscaping means big down-the-road savings in grounds maintenance.

Now you can see why the cost of a TORO sprinkler system is amortized so quickly.



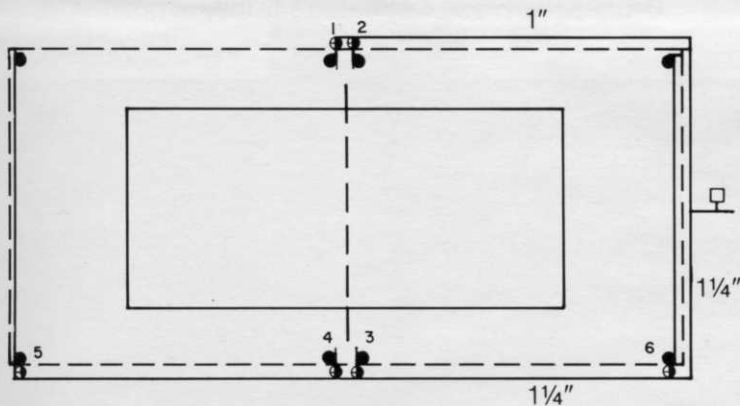
# Examples of athletic field installations.

Tough TORO 640 sprinklers are the ideal choice for athletic field irrigation. They hide below ground level where they can't cause accidents or interfere with play. Then they pop up to water the field with the kind of precise, even distribution that helps grow thick, healthy turf.

TORO athletic field systems are installed quickly and easily, too. Facilities are back in full swing before you know it and within a few weeks you'd never know a sprinkler system had been installed except for that beautiful, healthy turf. What's more, a TORO system is easy to operate. Follow the simple programming instructions to set it. Then forget it.

The drawings shown here are some examples of automatic system installations in typical athletic fields. However, there are many other designs that can be developed to suit your individual needs.

All sprinklers on the drawings are 640 Series and the TORO model number for each type of sprinkler required is listed along with pipe sizes, valves, recommended controller and other details. The number beside each sprinkler (or valve in the case of the tennis court) is the controller station controlling that sprinkler. One station operates at a time.



## Tennis Court

- 641-02-42 TORO GEARED ROTARY POP-UP
- ⊕ 216-06-04 TORO ELECTRIC VALVE
- 153-56-14 TORO PEDESTAL MOUNT CONTROLLER

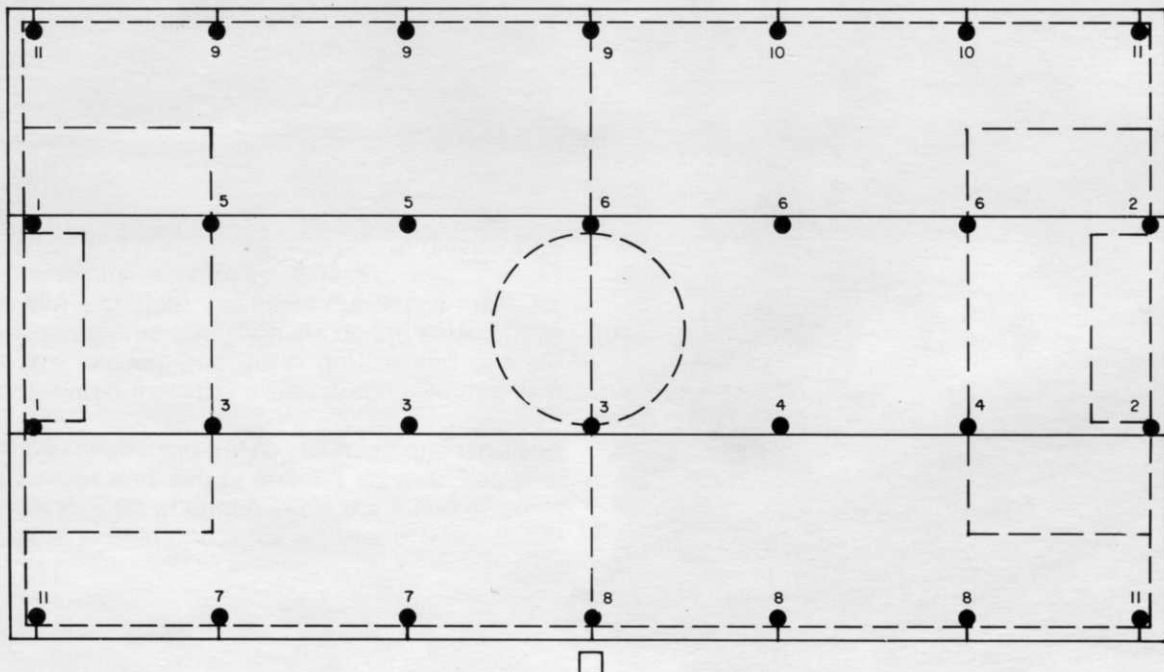
- ALL PIPE SIZED AS SHOWN
- WATER DEMAND 30 G.P.M.
- PRESSURE REQ'D 60 P.S.I.
- OPERATE ONE VALVE AT A TIME
- INSTALL ANTI-SYPHON DEVICE ACCORDING TO LOCAL CODES

## Soccer Field

- 641-01-42 TORO GEAR DRIVEN ROTARY POP-UP
- 642-01-42 TORO GEAR DRIVEN ROTARY POP-UP
- 644-01-42 TORO GEAR DRIVEN ROTARY POP-UP
- 176-51-01 TORO MONITOR II CONTROLLER

- WATER DEMAND 60 G.P.M.
- PRESSURE REQ'D 60 P.S.I.
- OPERATE ONE STATION AT A TIME

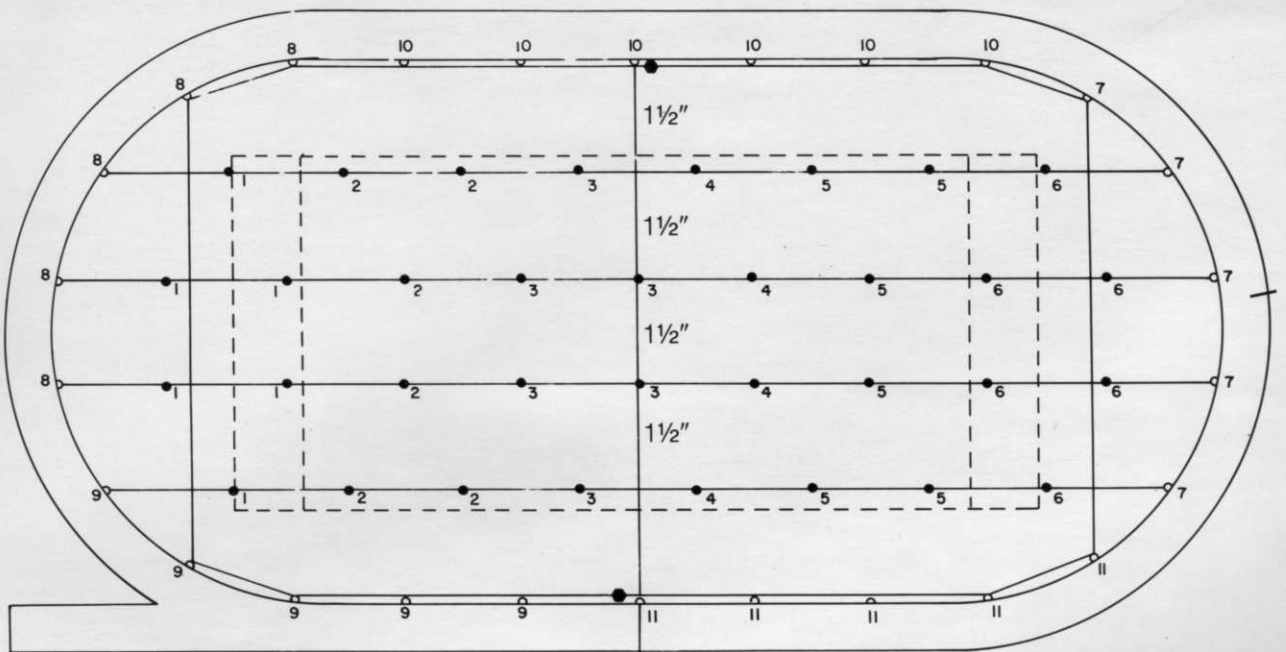
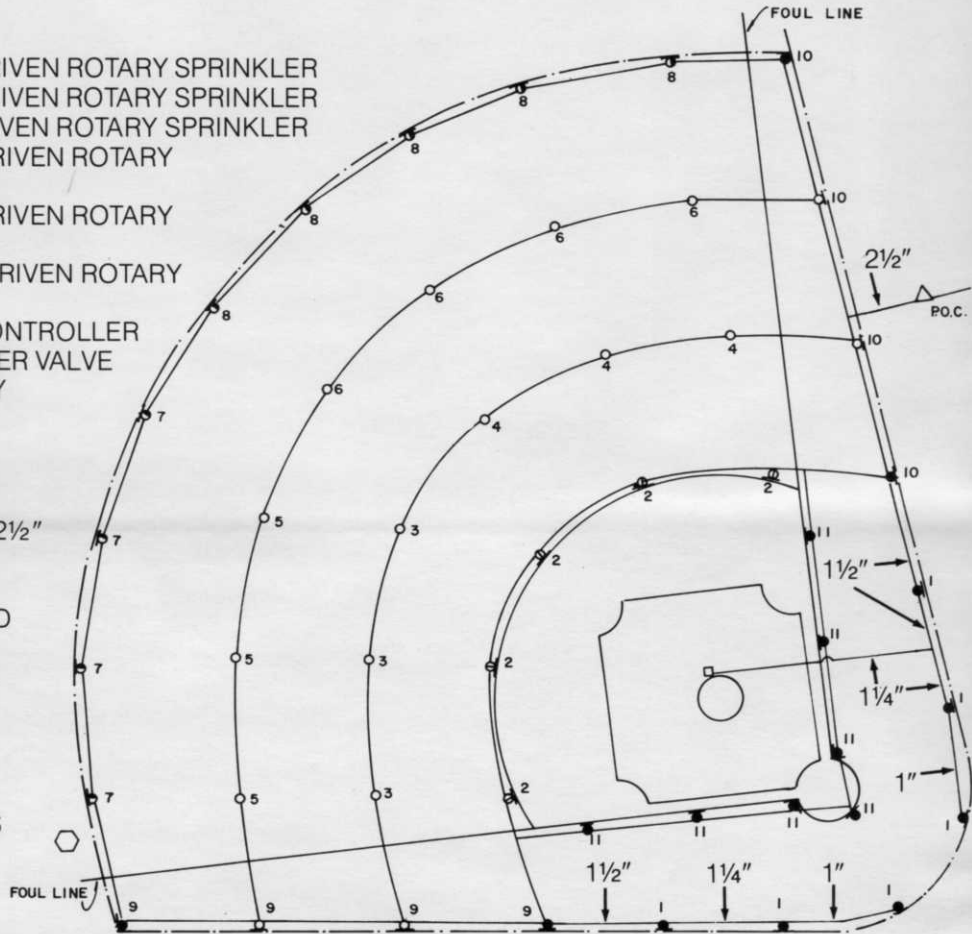
- NUMBER BY EACH HEAD IS THE STATION ON THE CONTROLLER
- TAP ANY PLACE ON THE LOOP WITH A 2 1/2" P.V.C. FEEDER LINE
- INSTALL ANTI-SYPHON DEVICE ACCORDING TO LOCAL CODES
- ALL OUTSIDE ROW OF HEADS CAN BE CHANGED TO PART CIRCLES
- ALL PIPE SHALL BE 1 1/2" P.V.C. LOOPED AS SHOWN



## Baseball Field

- 640-01-42 (173°) TORO GEAR DRIVEN ROTARY SPRINKLER
- ⊕ 640-01-42 (192°) TORO GEAR DRIVEN ROTARY SPRINKLER
- 641-01-40 (90°) TORO GEAR DRIVEN ROTARY SPRINKLER
- 642-01-40 (180°) TORO GEAR DRIVEN ROTARY SPRINKLER
- 642-01-42 (180°) TORO GEAR DRIVEN ROTARY SPRINKLER
- 644-01-42 (360°) TORO GEAR DRIVEN ROTARY SPRINKLER
- 176-51-01 TORO MONITOR II CONTROLLER
- 474-00- TORO QUICK COUPLER VALVE
- NOT SHOWN 900-14 TORO POLY CONTROL TUBING

- WATER DEMAND 75 G.P.M.
- PRESSURE REQ'D 70 P.S.I.
- TAP TO OUTSIDE LOOP WITH A 2½" FEEDER LINE
- ALL P.V.C. PIPE SHALL BE 2" UNLESS OTHERWISE INDICATED
- NUMBERS NEXT TO HEAD INDICATE THE STATION ON THE CONTROLLER
- DO NOT OPERATE MORE THAN ONE STATION AT A TIME
- INSTALL ANTI-SYPHON DEVICE ACCORDING TO LOCAL CODES



## Football field

- △ 642-01-40 TORO V.I.H. GEAR DRIVEN ROTARY POP-UP SPRINKLER
- 644-01-40 TORO V.I.H. GEAR DRIVEN ROTARY POP-UP SPRINKLER
- 474-01 TORO QUICK COUPLER VALVE, 1"
- 176-51-01 TORO AUTOMATIC CONTROLLER
- ⊗ P.O.C. 1½" GATE VALVE

- 900-14 TORO POLY CONTROL TUBING (NOT SHOWN)
- #14 U.F. WIRE (NOT SHOWN)
- P.V.C. PIPE, 1"-1½"
- PRESSURE REQUIRED AT P.O.C. 60 P.S.I.
- WATER DEMAND 40 G.P.M.
- PIPE SIZE NOT SHOWN SHALL BE 1" P.V.C.

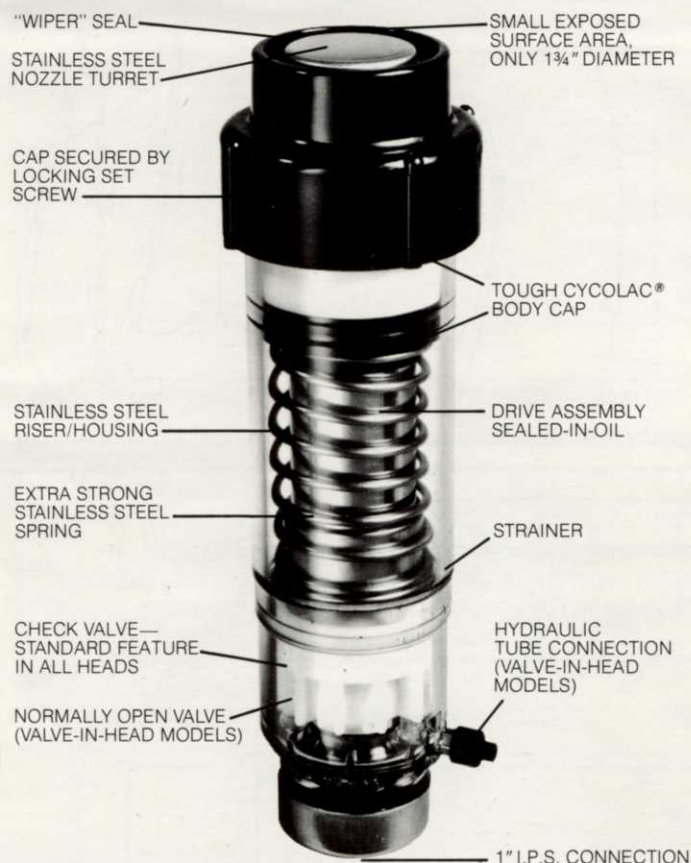
# Out of sight... out of mind.

The TORO 640 head is designed expressly for public grounds with features that make it highly vandal-resistant. In this respect it has no equal among sprinklers designed for park and school applications.

The 640's turret, sheathed in a stainless steel armor jacket, pops up 2 $\frac{3}{8}$ " to operate.

Then when the job is done it ducks for cover—a full  $\frac{1}{2}$ " below turf level where normally it is covered with grass and virtually invisible.

What's more, the turret is held there by a stainless steel spring with such power a tamperer would find it next to impossible to pry up. Even if he did find it.



## Better safe than sorry.

Consider, too, that while 640 sprinklers are hiding from tamperers, they're also ducking out on accidents. A TORO 640 sprinkler-equipped park or athletic field is for all practical purposes just as safe to use as the same area without sprinklers. And you can't say that about other sprinkler systems.

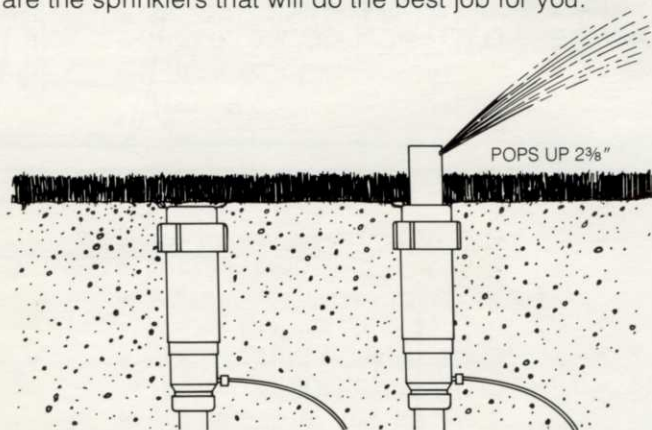
## 600 variations on a good theme.

TORO 640 sprinklers will handle most of the irrigation jobs for parks, school grounds and public building landscapes. And for those the 640 can't handle there are over 600 other TORO sprinklers to choose from.

The versatile 640 comes in either a valve-in-head model for individual control of each sprinkler or in the Checkomatic version for block systems that features a built-in check valve. Both stop over watering and puddling caused by low-head drainage.

Five nozzle designs give the 640 radii up to 65 feet. And 10 arc patterns can fit most grounds configurations.

In all, TORO makes 80 variations of the remarkable 640 sprinkler. Among them and the 600 other TORO heads are the sprinklers that will do the best job for you.



640 sprinklers can be installed as much as  $\frac{1}{2}$ " below grade for maximum security and freedom from accidents. The heads are specially designed to flush dirt out during operation and to seal dirt out the rest of the time.

## Built tough to last.

The 640's casing is made of almost indestructible Cylolac®. This engineering plastic has tremendous impact resistance and it won't rust, corrode or disintegrate because of time or water-carried minerals.

Features like a strainer that filters out debris make for long, maintenance-free operation. As do the sealed drive gears that are vacuum-packed in grease and operate completely isolated from the water stream. So they last and last.

And with 640 heads you get no low-head drainage and the wasted water and soggy areas it causes. Valve-in-head models shut off when the job is done and all other models feature built-in check valves that prevent drainage.



# Easy, painless installation.

Your TORO system can be installed with a minimum of fuss and bother.

In fact, utilization of your facilities can be kept high throughout the operation.

Special equipment installs pipe leaving only an incision instead of trenches.

And sprinkler heads and control lines go in with what seems like surgical skill.

So in a few weeks you can't tell by the turf that the system was installed. Except for that healthy green color.

## Conversions are easier yet.

If a manual quick-coupling sprinkler system is already in the ground, there is a good chance all or most of the

existing pipe can be used by your new TORO system. Each quick-coupler valve can be replaced with a TORO valve-in-head sprinkler. Then we install control lines and controller and the job is done. Before you know it.

## We back up what we say... for seven years.

In addition to our normal limited one-year warranty on all TORO equipment, we offer a 7-year sliding limited warranty on each body, spring retracted drive and valve assembly in 640 rotary sprinklers. Under this pro-rata plan TORO pays from 100% of replacement costs (first year) to 10% (seventh year).

Because we mean it when we say they're good.



The TORO Company  
Irrigation Division

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Dwight Goforth, a fisheries biologist with the Florida Game and Fresh Water Fish Commission, said pumping such nutrients into the area would cause an algae boom.

According to Goforth, the algae would draw on the water's dissolved oxygen supply needed by fish, clams and other aquatic species and vegetation.

Winn said any positive or negative effects of backpumping would depend on how the rain water was distributed and how long it remained in the area.

Too much additional water over the breeding grounds of fish could reduce or result in a change of species of fish living in the conservation areas. Vegetation also could be affected depending on the plants seeding and germination periods, Winn said.

Goforth warned that if the water level were not allowed to naturally fluctuate between dry and wet periods, a thick, oozy sediment called detritus would accumulate at the bottom of the water. Detritus is made up of deposits of the remains of dead animals and plants on the floor of the body of water, and the only way to prevent it is to let the area dry completely so that the deposits harden.

If the area is not allowed to dry out, Goforth said the detritus would have to be removed by dredging.

Another drawback of backpumping may be its effects on land animals.

According to Goforth, many Everglades animals such as deer, roundtail rats and snakes depend on the area for food and breeding grounds. A change in the vegetation and a decrease in dry land could kill many of these animals in as little as two or three years.

Also, reducing the amount of fresh water that reaches the ocean may affect bay areas.

"The increased salinity of the water might be good for some species while damaging to others. Fish that don't like the change will migrate to other areas. Bottom sediment and vegetation unable to migrate will either adapt or die," Winn explained.

- Forward pumping, which would bring water east to the coast to be stored in wells and fresh waters canals. If stored in canals, the water would be prevented from entering the ocean by salinity dams. Such dams also would block all boat traffic between the canals and the ocean.

Keeping this high "fresh water head" near the ocean would also help prevent salt water intrusion. Currently, most wellfields are located near the coast to serve populated areas more easily and cheaply. But such a location poses a daily threat of salt water contamination of the fresh water wells.

Because sea water is heavier than fresh water, it tends to move inland below the ground unless balanced by a fresh water head. When an increased demand is placed on a well that is not being replenished either through groundwater

seepage from the Biscayne aquifer or from direct rainfall, the salt and fresh water mix, making the water unfit for human consumption or agricultural use.

Wells in Pompano Beach and Dania currently are experiencing salt water intrusion. When this happens, the amount of water removed from the well must be reduced. Sometimes the well must be shut down until it can rebuild its fresh water supply.

All wells are checked for salt water intrusion twice a month during the dry season and once a month during the wet season by the United States Geological Survey.

According to a geological survey spokesman, Dania has been constantly plagued by the problem.

Julian Allen, Dania utilities superintendent, said the city was forced to shut down two wells at its treatment plant in 1973. Of two wells being used since that time, one has been closed and the other will be as soon as two new wells are built further inland at a cost of \$275,000.

Winn said an important question that will be answered by the wateruse management plan is: does the amount of water control growth, or does growth control the amount of available water?

Peggy Volke, chief planner in charge of Broward County's comprehensive land-use plan, said the water problem in Broward could be managed. "It just depends on how much money people want to put into various facilities," she said.

While the land-use plan was being drafted, Mrs. Volke said it was presented to the water management district for comment.

The district indicated it would approve one draft which set the county's ultimate population at 1.8 to 2 million.

"Beyond this level it would be necessary to augment existing supplies through importation of water from other sources," the district wrote Mrs. Volke.

South Florida Regional Planning Council member Dorothy Bergamaschi agreed that water plays an important role in area planning.

"We have to be careful that we don't seal up a large portion of the land surface with construction so that water can't penetrate and replenish the aquifer.

"Also, if we strip away too much land and replace it with concrete, we won't have the soil to filter out many of the chemicals and wastes before the water reaches the aquifer," Miss Bergamaschi said.

Dick Clark, Florida Industrial Board member, said that before the board contacts industries to invite them to relocate in southeast Florida, it investigates how much water, electricity and space the company would need and whether it would pollute the environment.

*(Continued on Page 20)*

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Pollution both by individuals and industries also has contributed to the decrease in the fresh water supply.

Despite strict pollution laws, the county's health department warns against bodily contact with any inland waterways.

"Wastewater is dumped into the canals and stormwater runoff carrying pesticides, chemicals and animal droppings also enters canals and lakes. In most cases there is not enough fresh water to dilute the wastewater," said Tom Mueller, a sanitary engineer with the department's environmental division.

Mueller said bacteria counts are taken monthly in the waterways, but "one day the bacteria count could be normal and the next day it could be different. Bodily contact with inland canals poses a risk, especially with hepatitis."

Winn warns that even with all the in-depth planning, a water shortage similar to Southern California's could occur here if the state experienced a drought lasting more than a year.

"The California shortage occurred from a lack of rainfall, not inadequate planning," Winn said.

## WATER USE MAY TRIPLE

WEST PALM BEACH — Southeast Florida residents must be willing to make financial and environmental tradeoffs to ensure themselves an adequate supply of fresh water for the future.

The first draft of the South Florida Water Management District water use plan explained several water storage alternatives and costs — both to the consumer and to the environment.

Although no specific recommendations were made, staff members indicated increased water storage in Lake Okeechobee, back-pumping water from coastal area canals to conservation areas, and increased wellfield development are the most viable alternatives.

The district is responsible for water control and management of 16 South Florida counties, including Broward and Palm Beach.

By the year 2020 the district has predicted fresh water consumption will triple from its current rate, requiring 1.6 billion gallons of water to be pumped daily to individuals, industries and farmers.

All of the area's fresh water is stored in Lake Okeechobee, three conservation areas covering 50 per cent of the original Everglades, and the Biscayne aquifer. District officials said these areas won't be able to store the additional water in future years unless some structural changes are made.

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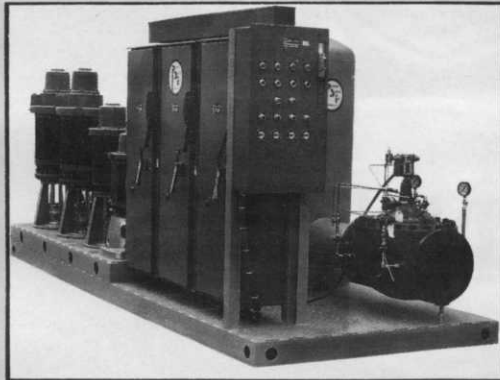
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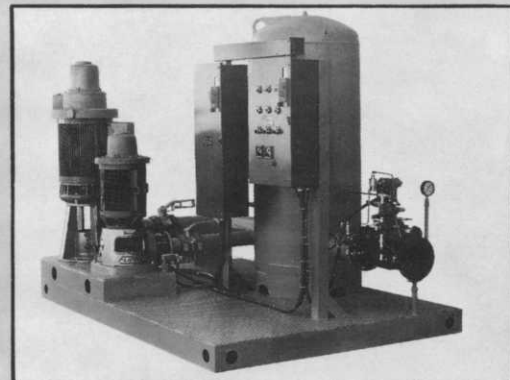
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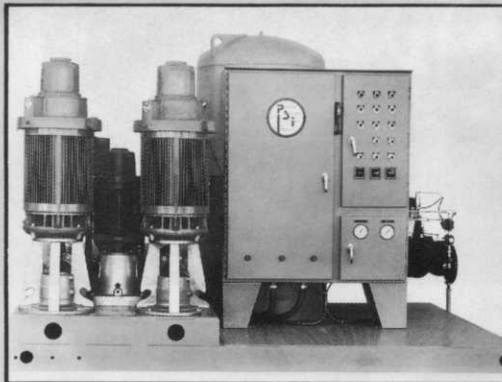
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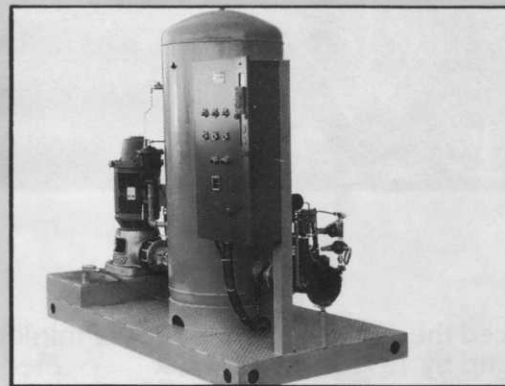
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Because Florida depends solely on 60 inches of rainfall annually for its fresh water supply, the only way to prevent a drought similar to southern California's is to build adequate storage facilities now, the report stated.

Pete Rhodes, deputy director of resource planning, said desalination — purifying brackish water in the aquifer — and deepwell injection — forcing fresh water into the aquifer for temporary storage — also are viable solutions.

The draft indicates that controlling the amount and periods of rainfall by cloud seeding is not being considered because of various economic and legal problems. Use of recycled wastewater for anything except irrigation purposes also was ruled out.

The plan in final form will be presented to the state Department of Environmental Regulation in October to be forwarded to the State Legislature.

## Golf Turf Symposium

The 14th Annual Wisconsin Golf Turf Symposium will be held in Milwaukee on October 24 and 25, at the Marc Plaza Hotel, 509 W. Wisconsin Avenue. **Please note the hotel change.**

The subject is "Better Golf Turf Through Research", and will be centered around nationwide research reports. Speakers will illustrate the benefits gained from past research as well as projects underway now.

For further information contact Bob Welch, Milwaukee Metropolitan Sewerage District, 735 North Water Street, Milwaukee, Wisconsin 53202, (414) 278-2036.

**Happy Birthday Ray**



Ray Gerber, Editor of The BULL SHEET, Official Bulletin of the Midwest GCSA, recently celebrated his 80th Birthday. Our congratulations Ray and we wish you many more happy and healthy years.

# FLORIDA GOLF IN THE TALL PINES

(Featured This Issue on Our cover)

By DAVID BAILEY

Nestled in the southern slash pines of Delray Beach is Quail Ridge Golf and Tennis Club, a planned residential community started in 1973 and now in the final stages. Two championship golf courses give its resident members an enjoyable golfing challenge.

The south course opened in the fall of 1973 is two years older than the north course, both are creations of architect Joe Lee. Each September Quail Ridge is host for the sectional qualifying of the USGA Seniors Tournament.

Fred Dickson is golf course superintendent. Fred planted the hybrid bermuda turf at Quail Ridge when he was employed for Patten Seed and Turfgrass Company of Tifton, Georgia. After planting the grass Fred stayed and is the only superintendent Quail Ridge has ever had. His previous eleven years experience with Patten made Fred well qualified for his position. He planted courses from Washington D.C. to Arkansas and south into the islands. Under the direction of noted turf specialist, Bill Roquemore, Fred maintained the 1,000 acre nursery and grew-in countless courses. A ten handicap golfer, Fred says he has a unique situation at Quail Ridge with his bermuda greens. "We have Tifgreen 328 on one course and Tifdwarf on the newer course and the putting difference causes problems. The Tifdwarf is the superior surface, with it I can achieve the speed and texture our members desire. We hope to replant the Tifgreen 328 next summer to Tifdwarf." The tees and fairways are Tifway 419 bermuda.

When you stray from the fairway if the pine trees do not cause trouble the sand traps will. The total traps on the two courses number 203, all big and deep. The average green size is 6,000 square feet. All the tees have a high elevation giving a nice panorama of each golf hole.

Quail Ridge is owned by Quail Ridge Limited, and the corporate president is John Dodge. In the near future the residents will assume ownership of the golf courses. Les Frisinger is the director of golf and club manager.

Visiting Quail Ridge leaves the lasting impression of a development done with the natural beauty left as it was found . . . one of the best in South Florida. The exquisite homes and choice villas are beautifully landscaped to fit the charm of the environment. The landscape design and constant maintenance of the villas, club house and roadways is under the direction of Sathena Cabler, Ph.D. Her total staff numbers forty people.

Golfing at Quail Ridge is relaxing in a natural setting and that is the purpose of the game.



*Fred Dickson, Quail Ridge Superintendent, Sathena Capler, Ph.D., landscape designer and Les Frisinger, director of golf.*

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# SOUTH FLORIDA ELECTS OFFICERS



Newly elected officers and directors of the South Florida GCSA are (from left) Ken Nicholson, Woodlands CC, director; Dick Lemmel, Doral, vice president; Brad Kocher, Inverrary, director; Alan Weitzel, Metro Dade golf courses, president; Dan Jones, Aventura, past president; Fred Klauk, Pine Tree, secretary-treasurer; and Phil Amman, Bonaventure CC, director.

## AL WEITZEL ELECTED PRESIDENT

Alan Weitzel was elected president of the South Florida Golf Course Superintendents Association at a July 10 meeting at Pine Tree GC.

Weitzel, 29, is superintendent of golf courses for Dade County's five courses: Key Biscayne GC, Greynolds Park GC, Haulover GC, Palmetto GC and Briar Bay GC. He has held that position since April of 1977. Before that he worked

at Crooked Creek G & CC and Palmetto.

Also elected at the meeting were Dick Lemmel of Doral CC, vice president; Fred Klauk, Pine Tree CC, secretary-treasurer. Elected as directors were: Phil Amman, Bonaventure CC; Brad Kocher, Inverrary CC; and Ken Nicholson, Woodlands CC. Also to serve on the board will be past president Dan Jones of CC Aventura.



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## Scientists Warn . . .

# Gasohol And Small Engines May Not Mix

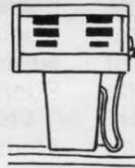
Now that Gasohol has been appearing in service station pumps and receiving widespread publicity, the handyman naturally asks, can I use Gasohol in my lawn and garden equipment? Should I use it?

Scientists at the Tecumseh Research Laboratory, Ann Arbor, Michigan, have issued a cautionary warning regarding its use in small engines. The lab is operated by Tecumseh Products Co., a firm with sales of \$750 million annually in small engines, air conditioning and refrigeration compressors.

In 1974, the company developed a blend of 10% anhydrous isopropyl alcohol and 90% gasoline (labelled IPA) to stop corrosion caused by tiny fuel residues that remained in every one of its engines after factory-testing.

Use of this mixture successfully cured problems associated with the condition commonly referred to as "sour gas." But, warn the scientists, there's a difference between Tecumseh's test fuels and Gasohol, and a difference between automobile engines and small engines for outdoor power equipment. Anhydrous isopropyl alcohol reacts with the peroxides which develop in fuel because of the water content in the gasoline, it neutralizes them, and in the process gets converted to acetone, which is harmless to engines. However, Gasohol generally contains grain or methyl alcohols that are not anhydrous. These alcohols react with the water content present in Gasohol and tend to form strong acids which can corrode metal parts, even eat rubber and plastics.

This is particularly evident in cases of off season storage of lawn and garden equipment where the fuel supply is likely to be stored for a long time.



There's also a significant difference between automobile and lawn and garden equipment engines. Except in cold starts, a car does not run with rich fuel/air ratios. Government-required efficiency and emission controls preclude consistent rich operation. However, in small engines the situation is different. They *do* run rich, and they *are* stored for long periods. Here, the potential for corrosion is very real, and this corrosion comes from the acid formations.

Tecumseh's scientists advise you to play it safe. Decide for yourself the pros and cons of Gasohol in your automobile. But, save potentially expensive repairs and parts replacement costs by using only unleaded regular gasoline or leaded regular gasoline in your outdoor power equipment.



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# A SCARCE AND PRECIOUS RESOURCE: WATER

By Richard Nugent, Golf Course Architect

Probably the most important concern of golf course architects, course superintendents and other turf grass managers in the world today is water — its availability, its quality, its application.

Fresh water is a scarce and precious resource. There is a great deal of water on the earth but little of it is available to us as "fresh water." We are reminded of lines from Samuel T. Coleridge's *The Rime of the Ancient Mariner*, "Water, water everywhere, nor any drop to drink."

The drought prevailing in California during the recent PGA championship at Pebble Beach brought forcibly to our attention, through the medium of television, the situation faced by many water-poor areas in the world. If existing courses are to continue to be maintained to today's standards, and if new golf course development is going to occur to meet the growing need of our population for recreational facilities, new water sources must be found.

**It was this problem which brought together** the American Society of Golf Course Architects' Foundation, the Golf Course Superintendents Association of America, the United States Golf Association and the National Golf Foundation, as allied associates in golf, to sponsor their first joint seminar to address an industry-wide concern. This was the Wastewater Conference held in Chicago last November. The proceedings of this seminar are available through the offices of each of the participating organizations.

The Wastewater Conference highlighted many of the opportunities, as well as some of the problems, in the current state of the art of using recycled water for irrigation purposes.

The Federal Government is interested in recycled water — so much so that up to 85 percent government financing can be available for golf course construction, should the golf course be used also as a primary on-land disposal system for effluent water. Recycled water is a promising solution to two problems. First, as the source of water for irrigation and, second, as a method of effluent disposal which will serve to recharge ground water tables.

As with any such new technique, there are inherent problems. Sewage disposal plants discharge effluent 365 days a year, winter and summer, rain or shine. The irrigation needs will obviously not always mesh with the disposal needs and the water will have to be recycled through construction of temporary holding ponds or other types of reservoirs.

**Many people are apprehensive about this type of water re-use** and if the program is to be successful, the public must be convinced that use of waste water is not only desirable but is safe as well. The quality of waste water going through treatment plants is not always consistent, nor is the level of pollutants. There are times when the water treatment plants may receive more disposal water than can be adequately treated and will have to discharge a more raw product, or a product with higher levels of contaminants.

There are a number of projects in the United States where recycled water is currently being applied successfully.

In Muskegon, Michigan, waste water is being applied in a large agricultural project where it meets EPA and

FDA standards in the production of food safe for human consumption. This project was instituted after a number of legal ramifications where the state successfully prosecuted a lawsuit against local groups attempting to block the project.

This particular project is important for two reasons — first, the legal precedent is established for the use of recycled water, and second, this water is used to grow crops for human consumption — a far more critical usage of recycled water than when employed for turf grass irrigation.

**Another instance is in the Caribbean area** of heavy tropical rainfall and insufficient fresh ground water supplies. The golf courses at the Dorado Beach Hotel in Puerto Rico are irrigated with recycled water.

Last year our firm did a feasibility study for a golf course development in the Virgin Islands. On the site was one well which had the greatest capacity of any on the island (50 gallons per minute) and several other wells capable of producing five gallons per hour. Obviously, this is an insufficient supply of fresh water for a golf course/housing development. Golf course irrigation in such a situation is feasible only through the use of recycled water, or other more expensive forms of desalinization of salt water.

The golf course feasibility depended on the use of fresh water for the housing development, as potable water, and use of the water again, recycled, for irrigation of the golf course and landscaped areas. This was at St. Thomas where much of the fresh water for the entire island is brought in by barge from other areas in the Caribbean.

In our own western states there is a successful project at Los Alamos, New Mexico, where a golf course constructed during the second World War has had about 35 years of successful operation, using recycled water.

The Air Force Academy at Colorado Springs is another golf course recreational turf facility which is successfully irrigated with recycled water.

**The Sharp Park golf course near San Francisco** operated successfully from 1932 through 1976 with effluent from the county jail. In 1976, the flow from the county jail was tied into a new sewer system. However, recent drought developments have caused the local officials to consider re-establishing their use of the effluent water for irrigation purposes. The only complaints at this golf course came from a few players who objected to the odor at the beginning of each season, after the ponds had been sitting for most of the winter.

Another example is Innisbrook Golf Course near Tarpon Springs in Florida. There are 63 holes completely irrigated with effluent water on all the tees, greens, fairways and roughs. An effluent treatment plant was built in 1975 by the Pinellas County Pollution Control Department. To dispose of the effluent, the county would have been required to build an expensive waste



## A SCARCE AND PRECIOUS RESOURCE: WATER

(Continued from Page 28)

water disposal system which would carry the sewage effluent far out into the Gulf of Mexico to avoid potential shoreline pollution problems.

Meanwhile, Innisbrook was having a problem with salt infusion into their fresh water wells. Therefore, the use of the golf course as an on-land disposal area for the county's effluent was an answer to problems of both parties, and the county contracted with Innisbrook to deliver 3 million gallons per day by underground pipeline, constructed by the county, to Innisbrook, where this water is fed into five pumping stations located throughout the golf course properties.

The golf courses along the north branch of the Chicago River are known around the world as some of the finest in existence. These courses have been irrigated for over fifty years with water drawn out of what is in essence a drainage ditch.

Recent studies have shown that in periods of low flow, these waters tend to contain more pollutants which may be detrimental to the development of fine turf grass; consequently, during these periods the golf courses have been supplementing their irrigation water from the canal with fresh water from the city water lines.

The North Shore Sanitary District is in the process of completing a new water treatment plant in Highland Park, Illinois. The Sanitary District's engineer, John P. Kottcamp, Jr., is working with the local golf course superintendents and the University of Illinois to develop some test plots to determine the feasibility of using the effluent for turf grass irrigation. Should the tests prove positive, as anticipated, the North Shore Sanitary District will install a water main to carry the effluent water along its right-of-way to supply water for irrigation purposes to the golf courses, parks and other recreational facilities within its jurisdiction.

According to Kottcamp, the situation in the area is becoming critical. As the population of Chicago's northern suburbs continues to increase, so do water needs increase. However, they are limited by law as to the amount of water that can be drawn from Lake Michigan, as this water does not return to the lake but through the Chicago River system feeds to the west into the Mississippi basin.

With this limitation in the amount of available water, the Sanitary District is looking for alternate sources for irrigation use, to supplement its supplies and meet the growing demand.

The turf plots at the new Clavey Road sewage treatment plant will be maintained by the staff of the Northmoor Country Club and tests will be made and evaluated by the University of Illinois. We were privileged to assist in the design of the plots and local contractors and suppliers have volunteered their services to assist in the project. We feel that this research being done by the local people at the grass roots level is the type of thing that all communities should be doing.

Probably the greatest achievement in the history of mankind has occurred in our lifetime. Man has gone out into space, walked on the moon, and returned to tell about it. And we have had the privilege of watching the whole thing on our television sets. One of the most stirring things to come out of the space program was the picture of the planet Earth taken by the astronauts

from space. It has made us realize that this beautiful and fragile sphere on which we exist is really Spaceship Earth and its care has been entrusted to us. Our responsibility is to use it, enjoy it and leave it better than we found it. But water is the primary source of life on this planet — there is no new water; only recycled water.

NOTE: Richard Nugent is a member of Killian and Nugent, Inc., a golf course architectural firm located in Long Grove, Ill. This article is based on a presentation made by Nugent at the GCSAA Turfgrass Conference in Atlanta in February 1979.

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*Editors Note: This article was found in the April 1979 issue of "National Golf Foundation Golf Market Report" and we wish to thank The National Golf Foundation for permission to reprint.*

## Everglades Elects Officers

The Everglades G.C.S.A. has elected officers for 1979-80. Elected were: President, Bob Sanderson, C.G.C.S., Port Charlotte Golf Club; Vice President, Clint Smallridge, C.G.C.S., Royal Poinciana C.C., Naples; Secretary-Treasurer, Virgil Petty, Golden Gate Golf Club, Naples.

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A small illustration of a golf course scene, showing a green, a flag on a pole, and a golfer in the distance.

# NGF FIELD STAFF NOTES SECTION

Edited and Compiled by Harry Eckhoff

Director Information Services

## FEDERAL FUNDING SPURS WASTEWATER IRRIGATION FOR RECREATIONAL TURF

By Lorraine Abbott

NGF Great Lakes Region Director

Golf course builders and operators who are seeking ways to cut irrigation costs may discover the answer by meeting with their local municipality or independent sanitary district — for two reasons. First, the use of low-cost wastewater as an irrigant for recreational turf is steadily increasing, as more and more research bears positive results where such irrigation is properly managed.

Secondly, to provide the sanitary district with an on-land source of wastewater disposal would be helping the district meet its obligations to the federal government, in a manner that conceivably could be eligible for major government funding that would benefit not only the water providing source (the district) but the water receiving source (the golf course) as well. Here's why.

**The Federal Water Pollution Control Act** of 1972 requires that a zero degree of discharge of pollutants to the land surface be achieved by 1983. In response to this charge, municipalities have had to find alternate methods of wastewater disposal.

Recreational turf has proven to be an effective filter for tertiary treatment while at the same time the effluent water, properly managed, has provided the soil the nutrients it needs **without** harmful effects and **without** the displeasurable odor customarily attributed to wastewater treatment plants.

When the Federal Water Pollution Control Act was implemented in 1972, government funding, for community-engineered treatment projects, was elevated from 55% to 75% of the eligible capital costs. December 1977 found even more incentive incorporated into regulations, whereby a 10% "bonus" to the funding level would be available if the sanitary district met certain criteria; namely, that there was evidence of:

- Consideration being given toward using particles in the wastewater "for agronomic purposes" (which can include recreational turf),

- New advances in wastewater treatment technology would be achieved in the proposed project.

In essence, then, government funding for wastewater treatment projects that provide low cost soil irrigation while cutting pollution in our streams and lakes is higher than ever before, with eligible projects capable of being granted up to 85% of their capital costs. Such incentive will turn the ears of municipalities toward inquiring golf facility and recreational turf managers, given conditions of need.

**Currently, more than 75 golf courses** in the United States are using wastewater irrigation, with public understanding and acceptance increasingly being assured through informative public relations efforts by course owners and treatment authorities. Tertiary stage effluent appears to the eye to be no different than a glass of drinking water.

### CONFERENCE PROCEEDINGS

In mid-November 1978, the United States Golf Association Green Section, the National Golf Foundation, the American Society of Golf Course Architects Foundation and the Golf Course Superintendents Association of America jointly sponsored a conference on Wastewater Irrigation of Recreational Turfgrass in Arlington Heights, IL.

For information on how to receive a copy of the proceedings of the meeting write USGA, Golf House, Liberty Corner Road, Far Hills, NJ 07931 ph: 201/234-2300.

The actual number and identity of courses indirectly benefitting through government-funded municipal treatment projects in given regions of the country can be determined by contacting your regional Environmental Protection Agency (EPA) office (list follows). This number may be small as yet, because funding regulations regarding disposal did not specifically use the words, "recreational turf" until 1977.

Municipalities considering upgrading of their wastewater treatment systems should investigate nearby recreational turf sources of disposal and then contact their state EPA office to determine eligibility for federal funds.

Congress allocates varying amounts to each state according to population and existence of water pollution problems. Once allocated, monies are subject to the state's own priority list of recipients, the final decision being based upon population density, urgency of pollution problems and the degree to which new equipment construction needs are seen to exist.

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## NGF FIELD STAFF NOTES SECTION

Edited and Compiled by Harry Eckhoff  
Director Information Services

# CHICAGO AREA PARKS TO RESEARCH USE OF WASTEWATER ON LOCAL TURFGRASSES

By Lorraine Abbott  
Great Lakes Region Director

The February Golf Market Report carried an article entitled, "Federal Funding Spurs Wastewater Irrigation for Recreational Turf." The article told of a recently escalated funding program by the Environmental Protection Agency (EPA) to assist sewage treatment plants in their disposal of wastewater utilizing land sources instead of natural waterways.

Focus was made on benefits which could be realized where municipalities and area golf courses collaborated in arranging for wastewater, or "effluent", to be properly managed and carried for use in golf course irrigation. The words, "properly managed" implied that **careful local research** should precede any attempt to implement such an arrangement for irrigation, to insure that contents of the wastewater are compatible with the nutrient needs and tolerances of local turfgrasses, and that the unpleasant odors are eliminated (all of which previous research studies have indicated can, through special treatment, be achieved).

**Such local research is being carried on now** in the Chicagoland area where, due to international restrictions on Lake Michigan water usage and the continual drop of well water levels, fresh or potable water sources are becoming increasingly scarce and expensive.

At a recent Greens Seminar sponsored by the Chicago District Golf Association, area superintendents' representative, Bob Williams of Bob O'Link Golf Club, declared that, "I foresee within the next two or three decades, that most of our courses will be forced to use effluent wastewater for their irrigation supply. With this kind of handwriting on the wall we should be getting involved in learning how to use effluent. We are planning just that in conjunction with the North Shore Sanitary District and their filtration plant in Highland Park."

Williams related that the plant was currently discharging from 12 to 20 million gallons of treated wastewater into the Skokie River, which ultimately feeds into the Gulf of Mexico, **every day**. "That's enough to irrigate an 18-hole golf course for an entire season," he said. "The NSSD is already working on a plan to pipe wastewater along their existing easements to reach a number of golf clubs in the Skokie Valley." At least eight courses would be able to take advantage of this supply.

**Aware of the EPA funding program**, the Sanitary District contacted the state and federal agencies for funds to install a line and pump station. Due to a shortage of funds and other restrictions at the time, the district was denied but told to resubmit its application at a later date.

Notwithstanding the EPA denial, the timing was obviously right for local research to determine the effects which NSSD wastewater, in its various stages of treatment, would have on turfgrasses particular to those courses that could benefit from its supply. If successful, the project could lead other sanitary districts toward considering similar water recycling operations, benefitting virtually every golf course in the Chicagoland area.

Specifics of the project were outlined at the CDGA Greens Seminar, held March 22, by Onwensia Club superintendent, Wolfgang Mueller. Mueller first pointed out the tremendous cooperation surrounding the project, which had been conceptualized by a three-man team comprised of Dr. Al Turgeon of the University of Illinois, Aurora Country Club superintendent Carl Hophan, and Mueller himself. He remarked that its implementation **would be possible** through the Chicago District Golf Charities, the University of Illinois, the North Shore Sanitary District and the Northmoor Country Club.

### CONFERENCE PROCEEDINGS AVAILABLE

In November 1978, a significant conference took place in Arlington Heights, Illinois. It was the first conference jointly sponsored by four national golf organizations. It was also the first national conference which addressed itself solely to the topic of wastewater for recreational use, a topic of vital importance to golf course management.

Because of the increasing demand on present water supply and possible future restriction in recreational use, it is important to investigate sources of supply other than potable water. Wastewater potentially has great value for irrigating turf. Speakers from throughout the nation assembled to lend their research and experience in use of wastewater on land treatment.

Proceedings covering this two-day conference are now available. It is 200 pages... cost \$10.00 per copy and should prove to be an important part of every golf course turfgrass management library. Place your order with any of the following organizations.

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## WASTEWATER IRRIGATION RESEARCH

(Continued from Page 32)

In addition, donations of time, funds or materials were being provided by the Chicagoland Golf Course Superintendents Association, the Midwest Association of Golf Course Superintendents, and several turfgrass-related businesses in the area. "Such combined efforts," relates Mueller, "guarantee the success of this worthy undertaking geared to the preservation of our ever dwindling fresh water supply."

Mueller continues, "We plan construction of our turf test plots and ornamental shrubs and ground cover test plots in early April, hoping for completion by early June. These plots will be located on property offered to us by the North Shore Sanitary District." Conducting the research will be Dr. Turgeon, with superintendent Jim Johns and the Northmoor Club assuming the maintenance of the plots. Progress reports will be made periodically by the Chicago District Golf Association from research data gathered. It is expected that the entire project will take two or three years, according to Mr. Johns.

"We feel," concluded Mueller, "that this cooperative effort is a significant development in bringing together the CDGA, the Clubs, the superintendents and the University of Illinois into a most ideal relationship. We appreciate and applaud them for their progressive attitude."

The National Golf Foundation adds its commendation to the entire project and its people, and encourages other communities to pursue similar undertakings of research that will reduce turf irrigation expense by utilizing water more efficiently and in a more environmentally desirable manner for everyone concerned.

★ ★ ★ ★ ★

IRRIGATION — (Continued from Page 30)

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### Documents Available:

Federal Register, Wednesday, September 27, 1978, Part III, Environmental Protection Agency, **Municipal Wastewater Treatment Works Construction Grants Program**, Vol. 43, No. 188, U.S. EPA, 340 South Dearborn, Chicago, IL 60604 (or see respective regional office address).

**Order Form for Construction Grants Publications**, US EPA, c/o GSA-Centralized Mailing Lists Services, Bldg. 41, Denver Federal Center, Denver, CO 80225.

**How to Obtain Federal Grants to Build Municipal Wastewater Treatment Works**, US EPA, Office of Water Program Operations, General Services Administration (8 FFS), Centralized Mailing List Services, Bldg. 41, Denver Federal Center, Denver, CO 80225.

Policy Statement for Land Treatment Projects contained in the **Construction Grants Program Requirements Memorandum PRM 79-3**, US EPA Office, 230 So. Dearborn St., Chicago, IL 60604 (or nearest regional office). (free of charge)

For listing of all regional EPA offices and other environmental agencies related to water pollution — **Environmental Hotline Directory**, Office of Public and Intergovernmental Affairs, c/o nearest regional agency.

**Process Design Manual for Land Treatment Municipal Wastewater**, compiled by the US EPA and US Army Corps of Engineers, c/o nearest regional US EPA office.

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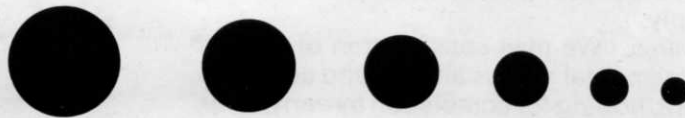


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# Editorial



Less than 3% of the earth's water is potable. Out of this 3% must come water for human consumption, industry, farming and recreational uses. The latter includes golf courses and is considered to be the last priority by many experts.

By 1990 (ten short years from now) golf course superintendents will find themselves in a critical position. No fresh water will be available for irrigation. Only two courses of action are feasible. Cease to operate (as some California courses have done), or find alternate sources of usable irrigation water.

The most readily available water source is sewage effluent. Billions of gallons a day are being dumped into our lakes, rivers and oceans. We cannot afford to let such a precious commodity be wasted. We, as an association must get the government and the EPA to recognize our needs.

A sewage plant sits in the middle of Coral Ridge Country Club (Ft. Lauderdale) and twelve million gallons a day of effluent is being pumped into the ocean. Not one drop can be used on the golf course. Another example, two regional sewage plants are being built in Dade County (Miami). One of these plant will dump sixteen million gallons of effluent into the ocean daily and the other plant will pump it into the ground. Why can't this excellent source of irrigation water be utilized on golf courses, parks and other recreational areas? A pipeline could be run to these different facilities and the effluent could be purchased the same as city water.

Pinellas County (St. Petersburg - Clearwater) is a good example of utilizing sewage effluent. The effluent from a regional plant is pumped to Innisbrook Golf Course and the entire golf complex (36 holes) is irrigated with this water with no adverse effects on plants, grasses or irrigation equipment.

Golf Course Superintendents must take a firm fast stand on this issue. Within ten to fifteen years farmers will be using effluent (as alien as it might sound now) to irrigate crops. Industry will also be using effluent for 50 to 80% of its needs. If golf courses do not secure the use of effluent within the next two to five years we will find ourselves without this precious commodity.



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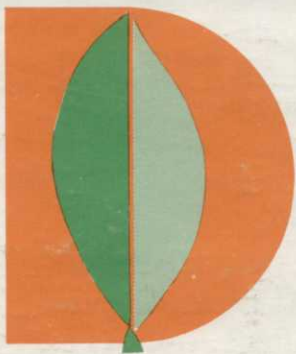
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