

# Water - U.S.A.

by J. R. WATSON

**A**S I PREPARED this paper, I thought it might be interesting to know the number of hours I spent during the past five or 10 years in attending conferences, meetings, seminars, and various other turfgrass related and non-related gatherings, where the subject of water was discussed or was of concern to those who attended.

This was futile. I counted 700 hours in less than two years, the equivalent of more than three months of 50-hour weeks for *one* person. Obviously, if that is multiplied by the hundreds of people who are involved in such meetings, it is apparent that the subject of water receives a great deal of attention.

Rightly so, because water is important; it is one of our most vital natural resources. And it is an *exhaustible* resource.

Three common themes ran through all the meetings:

1. There is a vital need, a desperate need, for everyone who uses water for beneficial purposes to use it more wisely. To practice water conservation every day.

2. There is a need to impress upon *everyone* that the use of water to grow healthy turfgrasses for a golf course, or for any other recreational purpose, is a very important beneficial use of water. We must not overlook the key role turfgrasses play in our communities.

3. It is time to recognize that wastewater — sewage effluent — is an important source of water for turfgrass irrigation, including golf courses and that use of this "recycled" water is in reality water conservation.

Water is really a very serious subject, but we don't treat it with the seriousness it deserves. None of us does — not those of us involved in turf management; not the farmers, who account for about 80 percent of the total amount of water consumed in the U.S. each day; not the people in industry, even in those industries that could not exist without access to large quantities of water: the utility companies, the food processors, the beverage makers, the paper manufacturers. And certainly not the average householder, whose total waste



of water — that's waste, not beneficial use — each day amounts to millions of gallons.

I suppose the main reason we don't regard water more seriously is that we have not been convinced that we're dealing with a scarce commodity. In my home state of Minnesota, it's hard for anyone to believe that water is scarce when he can look out over the countryside right now and see it covered with two to three feet of snow.

Under the snow are more than 15,000 lakes containing many billions of gallons of water. How can water be scarce under those conditions?

The truth is that the amount of water on this planet is constant. Just like land, it's not being made any more. The amount of water available for the use of everyone on earth for all purposes — industry, agriculture, golf courses, and our individual needs — is the same today as it was at the beginning of time, and it will be the same in the year 2000 and in the year 3000.

The amount of water available for our use is less than one percent of the total in existence. The rest is tied up in the polar ice caps and in the oceans — essentially unavailable to us. Not only is what remains a limited, inelastic supply, but we are doing things to it. We are finding new uses for it constantly, and we're polluting it faster than nature can purify it.

I attended the National Conference on Water held in May last year in St. Louis. A great deal of information came out of that conference, but one

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*The amount of water on this planet is constant . . . no more will be available for human needs regardless of population growth.*

thing that stuck in my mind was transmitted to President Carter in this statement:

"Overall most parts of the nation are short of water now, and consumptive use nationwide will increase by 33 percent by the year 2000."

We had better recognize we are dealing with a scarce commodity, and we had better begin treating it with more respect.

What are we going to do about it? What are you and your golf club going to do about it?

I said a little while ago that even those of us involved in the turfgrass industry are guilty of misuse of water. That's true, but to a far less degree than for most of the other major water users. The golf courses in this country, by and large, have for years had better management than any other type of recreational turf. That management includes, of course, the use of water.

As you know, I was the fortunate recipient of a Fellowship sponsored by the USGA Green Section. Dr. Fred Grau, Director of the Green Section at that time, and Professor Burt Musser, my major advisor, considered watering practices to be one of the important areas needing evaluation. That was in 1947.

My dissertation was entitled, "Irrigation and Compaction on Established Fairway Turf." The following conclusions resulted from this study:

1. Moisture levels exerted a greater influence on turf quality during the experimental period than soil compaction.

2. Moderate use of supplemental irrigation seems necessary to produce high-quality playing turf that will remain green throughout the growing season.

3. Unwatered plots were brown and in poor condition for play over an extended period of time.

4. Moderate use of supplemental irrigation on intensively managed turf will favor development of bentgrass at the expense of the slower growing species (Kentucky bluegrass and red fescue) so that eventually the turf will consist largely of bentgrass (and *Poa annua*).

5. Supplemental irrigation in quantities great enough to maintain a soil at approximately field capacity is unnecessary and encourages disease and the subsequent invasion of crabgrass and clover.

6. Excessive watering creates a soggy soil condition, promotes shallow rooting of the turf, encourages disease and the invasion of crabgrass and clover. And, if *Poa annua* had been present or the height of cut lower, I am confident it would have increased.

That was 1950. Since then others have investigated other aspects of water — its application and use on golf course turfgrass. Have we made progress? Yes, we've made a great deal of progress in all phases of golf course management in the past 30 years. One of the reasons is that, aside from agriculture, nothing that grows has received as much attention as golf course turf-

grasses. Research — private, industrial, and university — and all kinds of extension activity have helped the industry make enormous strides. Knowledge, technology and management techniques relating to golf course turf have all advanced dramatically. Despite those gains, however, water and water-related problems are still with us.

As an example, Dr. John Hall, of V.P.I., published an article in the 1978 proceedings of the Rocky Mountain Turfgrass Conference.

"We killed more golf greens in Virginia in 1977 by improper irrigation than by any other management factor." Dr. Hall also said that, too often, greens were irrigated when the intent was to syringe, and when this happens at 90-degree temperatures, damage is likely to occur. Automatic irrigation systems offer many advantages, but too few have the capability to "mist" water. Only a limited number of manufacturers have equipment capable of properly syringing (misting) and too few system designs incorporate this feature. It costs extra, but there are costs involved in replacing greens! We must learn to distinguish between maintenance watering — that applied to meet the water requirements of the plant — and water applied to regulate or control temperature, or syringing.

There obviously is a gap between what we know and what we practice. Sometimes I think it's a chasm. To date, we seem to have been incapable, or at least unsuccessful, in bridging that gap. Why? Perhaps it's an economic factor, perhaps improper dissemination of information, perhaps resistance to change, and probably some of all these reasons, plus others. Certainly, I don't have an answer, but I firmly believe that one of the major challenges facing the turfgrass industry in the next few years is to find a way to narrow this gap. We simply must find a solution to this problem. We need to learn more about such things as drought tolerance and rooting characteristics of grasses, water requirements, watering techniques — water application and efficiency — water conservation, soil-air-water relationships, leaching and weeds and their ecological relationship in the golf course environment. Also, we must find ways to avoid pollution and to use recycled water.

And, of course, we have not learned to use water with the kind of efficiency that we must if we are going to play a significant role in helping to keep this planet from running out of water.

In addition to recommending that we find a solution to the information gap, I should like also to suggest that we do everything we can to generate more knowledge, more new information, better technology, better products, better equipment — so that golf course turfgrass management will continue to advance.

That can be done in a number of ways. One is with college scholarships. Another is to sponsor research, basic or fundamental research, as my company is doing in support of a four-year study of water use rates for turfgrasses at Texas A&M University. We believe knowledge of water use

rates is basic and will be of immense value in determining overall water requirements of a particular region, as well as for the water-efficient turfgrasses that grow and will grow on golf courses in the future.

Another recommendation I should like you to consider is that we all act as if we really believe we face a water crisis. To do that, we must stop wasting water in our personal use of it. It also means golf courses must be managed as though we are in a severe drought right now and will continue to operate under drought conditions for the rest of our lives.

There are some eight or nine steps for conserving water under drought conditions. To conserve water, consider the following:

1. Treat every day as if you were in a period of severe drought.
2. Establish watering priorities. This means giving highest priority to the most intensively managed areas; for example, on a golf course, the greens, the most valuable part of the course and where the most critical play takes place.
3. Follow sound irrigation practices.
4. Reduce, or avoid where possible, all causes of stress, such as salt build-up.
5. Alter mowing and cultivation practices. This includes raising the height of cut for all areas and mowing less frequently.
6. Expand use of mulch. This is very important.
7. Erect wind barriers, especially where there are large expanses of open spaces.
8. Experiment with anti-transpirants and surfactants.
9. Aggressively seek additional sources of water.

Among the alternative sources are wells and ponds, collections of marginal water and, the most abundant and most often wasted supply, treated sewage effluent.

At my company we are convinced that wastewater will become a major source of irrigation water in the future. We would like to see it used widely for all types of irrigation, especially for large turf areas and in agriculture.

We expect to play a strong role in the research and product development necessary to make certain the equipment and the resources will be available for expanded use of wastewater for irrigation.

As many of you are aware, the USGA Green Section, the American Society of Golf Course Architects, the Golf Course Superintendents Association, and the National Golf Foundation sponsored a two-day conference in November in Chicago to deal exclusively with the subject of wastewater use for irrigation of turf on golf courses and other sports fields.

It was a conference that was long overdue. It will, I predict, encourage significant expansion in the use of effluent for irrigation.

The proceedings will be printed and will be available within a matter of weeks. I urge everyone to obtain a copy of the proceedings and to read them carefully and thoroughly.