



Why Can't the Golf Course Irrigation System Keep Up?

By James Francis Moore

During drought conditions, many golfers wonder why the irrigation system cannot keep up. After all, there are sprinklers all over the place and they run automatically, right? Shouldn't an irrigation system that costs more than a million dollars be able to keep the course well-watered in spite of the drought?

Although the complete answer is complicated, there is one simple fact that everyone should understand. Irrigation systems are designed around average annual rainfall. Here is how this works.

The irrigation designer looks at the monthly average rainfall totals for the region. This is compared to a chart that calculates how much water the plant uses each month (transpiration) and another chart that shows how much water is lost through evaporation. The term that combines these two plant factors is *evapotranspiration (ET)*. The irrigation system is then designed around the month with the largest deficit.

As one example**, look at the following table:

	Jan	Feb	March	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
ET*	2.5	2.5	4.2	5.1	6.5	6.3	6.5	6.5	6.0	4.8	4.2	2.5	57.5
Rainfall*	3.0	3.2	2.7	4.0	4.2	3.3	2.7	2.5	3.0	2.7	3.3	3.5	38.1
Deficit*	-0.5	-0.7	1.5	1.1	2.3	3.0	3.8	4.0	3.0	2.1	0.9	-1.0	19.5

* All units in inches

** Values will change depending on region and grass type

In this example, the largest deficit is four inches in the month of August. The irrigation system typically would then be designed to be able to apply one inch of water per week. Since most golf courses do not want large sprinklers that operate while players are using the course, the system must be designed to apply the needed amount of water at night.

But what happens in a drought? In this example, the data was collected from an area that received less than one inch of water in the month of May this year. Therefore, the deficit for May was more than 5.5 inches (May ET of 6.5 inches less the one inch of rain in May = 5.5 inch deficit). A system designed to apply four inches in a month cannot keep up, and something has to give.

In such situations, superintendents often have to resort to watering during daylight hours. This not only is inconvenient for the golfers, but utility rates also can be much higher, evaporation rates are higher (meaning more water must be applied), and wind speeds often are greater (resulting in poorer coverage). Of course, all of this assumes that the extra water is available, which, in a growing number of communities during this summer's drought, is not the case.

So, why not design an irrigation system to completely supplant rainfall? Simple - doing so would result in a massive increase in cost. The bottom line is that if your area is experiencing drought conditions, you must expect to see the impact of the drought on your course.

James Francis Moore is based in Waco, Texas and is the director of the USGA Green Section Construction Education Program. He can be reached at jmoore@usga.org.