Let's Get *Site* Specific About Golf Course Irrigation

Irrigating according to localized conditions saves water, time, and turf.

BY JAMES H. BAIRD, Ph.D.

Recent droughts and water use restrictions in the Northeast and elsewhere along the East Coast are an indication that water availability may soon become a primary concern facing all golf courses, regardless of climatic conditions.

Efficient water use on golf courses is dependent upon several factors, most notably the irrigation practices of the turf manager and performance of the irrigation system. Erick Holm, CGCS, of the Onondaga Golf & Country Club in Fayetteville, New York, is a good example of a superintendent who has combined both sound turf and irrigation management practices with the latest irrigation technology. How does he do it?

In 1999, a new irrigation system was installed at Onondaga G&CC. The original system managed at least 6 or more sprinklers per controller station, so large areas of turf received identical amounts of irrigation even though they often had very different water requirements. Now, it is important to point out here that you don't need a state-of-the-art irrigation system to irrigate on a site-specific basis. In fact, Erick had to rely a great deal on hand watering with the old system in order to prevent over-application of water. However, capitalizing on the latest irrigation technology can significantly improve both the effectiveness and efficiency of site-specific irrigation. For example, the new irrigation system at Onondaga manages one sprinkler per controller station on greens and no more than two sprinklers on the remainder of the golf course. Another key component of Erick's new irrigation system is an on-site weather station that monitors meteorological variables that are then input into a mathematical model to predict turf water loss from evapotranspiration (ET) for irrigation scheduling.

When it comes to scheduling irrigation, one can be very general or, like Erick, very site specific. Unfortunately, too many turf managers take the easy way out and set all of the sprinklers at the same 10-20 minutes per head and then use the "global adjust" to account for different water requirements. On the other hand, Erick plugs several variables into his computer equipped with irrigation management software (Rain Bird Cirrus) that calculates the proper amount of water to be applied to a given area. Predicted ET is corrected for the type of turfgrass (warm vs. cool season) and specific climate using a crop coefficient. Erick then takes three additional steps to dial-in the proper irrigation requirement. First, he uses "ET_{adjust}" as part of the computer software to account for irrigation requirements on different areas of the golf course. For example, putting greens are adjusted to 55% of the corrected ET, whereas fairways are set at 70%. Determination of ET_{adjust} is based largely on cultural practices, specifically mowing height. Erick then uses "$AREA_{adjust}$" to account for the specific growing environment within an area. For instance, a shaded green would be adjusted to a value less than 100%, whereas a green with an open, southern exposure would be set adjusted to a value greater than 100%. Most specifically, Erick uses "$STATION_{adjust}$" to account for the area surrounding each sprinkler based upon visual observations of the turf and underlying soil. Similar to $AREA_{adjust}$, a sprinkler located in a pocketed area of a shaded green would be adjusted to a value less than 100% to further reduce the amount of water applied to that area.

Overall, the irrigation requirement (inches/day) for turf at Onondaga G&CC is calculated as the product of ET × Crop Coefficient × ET_{adjust} × $AREA_{adjust}$ × $STATION_{adjust}$. Although it looks complex, it's as simple as plugging the numbers into your computer and letting the irrigation management sofware take it from there.

Water conservation is the biggest bonus of site-specific irrigation management. Furthermore, having the latest technology allows you to document water savings. For example, 2,201 gallons of water were saved on greens on one day alone at Onondaga as a result of site-specific irrigation management. When you consider irrigation over the entire growing season and that greens represent only 1-2% of the irrigated turf on most golf courses, water conservation will be substantial — conceivably in the range of 500,000 to 5,000,000 gallons per year! In addition, site-specific irrigation management can help reduce the time and money spent on hand watering, provide healthier turf, and yield firmer and more consistent playing conditions.

Whether or not your golf course is equipped with the latest in irrigation technology, it's never too early or late to begin practicing site-specific irrigation *for the good of the game,* golfers, and the environment.

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