

Turf M.D.

THE DOCTOR IS IN THE HOUSE

"We never know the worth of water till the well is dry."

— Dr. Thomas Fuller, *Gnomologia*, 1732

The most valuable natural resource in the world is water. In a global sense, water is highly conserved, and the total amount of water found on Earth is about the same as when the Earth first formed. The vast majority of water — 97 percent — is seawater. Of the remaining 3 percent, 2 percent is locked up in the ice caps, which leaves only 1 percent of the world's water available for human consumption.

Turfgrasses contain about 80 percent to 90 percent water by weight. Only a small percentage (1 percent to 3 percent) of this water is used for metabolic processes. The greatest amount of plant water is used in transpiration, which is the cooling process in which energy dissipates through water changing from a liquid to a vapor form.

It's estimated that water evaporated from a leaf surface will remain in the atmosphere for about 10 days, before moving to another area to condense. The transformation of water from a liquid to a vapor and then back again in the form of precipitation is all part of the water cycle. However, water deposited from either rain or irrigation to the turf is often lost from the site through transpiration. It is for this reason that golf course water use is always under the environmental microscope.

In this country, the issue of water availability is most evident in the West and Southwest. Rapid population growth and the associated amenities of growth have taxed the availability of fresh water. With myriad demands for water, public and private sectors are under scrutiny to justify water use and protect what they have. In areas of the Southwest, effluent water use has been legislated or priced to make use on golf courses desirable.

The use of effluent water by golf courses continues to be a means of handling a "waste" source environmentally. The benefit to golf courses was a steady supply of relatively cheap

Keeping a Keen Eye on Effluent

BY KARL DANNEBERGER



LONG-TERM USE
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water. However, with continual use of effluent water, the associated initial benefits must be monitored closely.

In some areas of the Southwest, the cost of effluent water is on the rise and approaching that of potable water in some municipalities. Also, during peak irrigation periods during the summer, shortage in effluent water supplies can occur, which can lead to potential water restrictions.

Effluent water use does come with its own environmental and agronomic concerns. Strict human health guidelines exist for effluent. However, the targeted delivery of effluent water to golf courses might not deliver agronomically desirable water. The levels of nitrate, salt and sodium often found in effluent water can vary among treatment facilities.

Additionally, long-term use of effluent can raise environmental concerns on the golf course. Although acceptable turf quality was achieved with using wastewater in a recent study from Texas (Thomas et al., 2006), nitrate levels tended to increase along with salt and sodium levels.

Delivering high-quality turf using wastewater over the long term will require continual monitoring by analyzing water test reports received from the waste-water treatment facility, soil tests, and also monitoring water quality in irrigation ponds where effluent is stored. Fertility programs will need to be adjusted to account for higher nutrient levels (primarily nitrate and phosphorus, but others too) as well as increased salt levels.

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