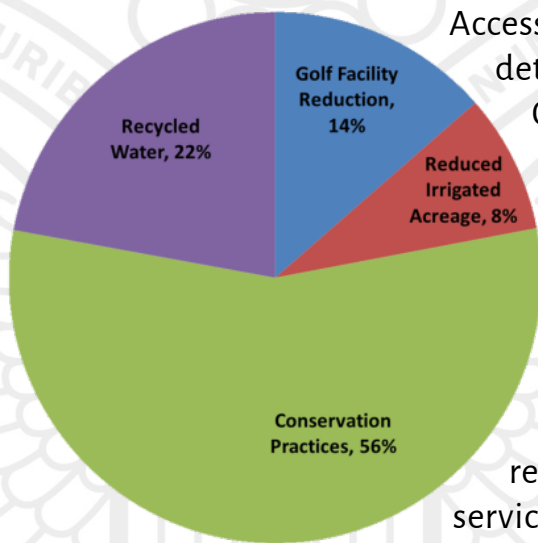




Water Planning For The Future

Since the mid-1980s, the USGA has provided millions of dollars supporting golf course water conservation research. The goal is to use scientific information to more efficiently use water. Early research determined the water use of turfgrasses, provided methods to estimate evapotranspiration (ET) and crop coefficients (Kc), and established a long-term effort to develop new grass cultivars that use less water. However, the [GCSAA's Environmental Institute for Golf](#) (EFIG) survey indicates that more progress is needed in adopting this research for better irrigation scheduling.



University research supported by the USGA has helped golf courses reduce annual irrigation water usage by 22 percent from 2005 to 2013.

Access to ET data allows superintendents to determine how much water turf needs. Obtaining ET data from on-site weather stations was adopted by 17.9 percent of EFIG survey respondents, nationally (Table 1). This trend was much more popular in warm and arid regions, as demonstrated in the Southwest (47.7%), Pacific (37.4%) and Upper West/Mountain (33.3%) regions (data not shown). Nationally, 13 percent of respondents obtained ET data from a weather service. Using ET data from a weather service was also most common in the Southwest (24.1%) and the Upper West/Mountain (15.5%) regions (data not shown). However, there is plenty of room for improvement in adopting the use of ET data to help with irrigation scheduling.

Regulation of water use has generally increased since 2005. The frequency with which annual recurring water allocations were imposed increased in all

regions. Higher-water-use regions – i.e., Southeast, Southwest and Upper West/Mountain – had the highest percentage of courses with recurring water allocations. However, the greatest increase in the regulation of recurring annual

allocations between 2005 and 2013 occurred in the traditionally lower-water-use regions – i.e., Northeast, North Central and Transition. In addition to following government-mandated regulations on water use, golf

courses also have begun to set up voluntary internal guidelines (Table 2). Among U.S. golf facilities, 14 to 20 percent reported the use of written water management plans. These plans were required by state and local authorities in some cases. However, the majority of respondents indicated that these management plans were developed voluntarily; this trend should continue.

The New Year’s resolution for every golf course facility should be to develop: 1) a water budget, 2) a drought emergency plan, and 3) a water management plan. If the golf facility has already achieved this, then this is

Written plans for water-related issues	% of respondents	
	% w/ plan	% required
Drought	14.1	44.5
Water Management	16.8	40.5
Stormwater	13.9	63.0
Preventive irrigation maintenance	20.5	11.3

Percent of survey respondents in 2014 that have written plans to deal with the listed water issues. For those respondents with written plans, the “% required” columns indicate the frequency with which those plans were required by state or local authorities. In the majority of cases, respondents developed plans voluntarily, even when not required by authorities (adapted from GCSAA EIFG Golf Course Environmental Profile, Phase II, Volume I).

Irrigation scheduling methods	% of courses	
	2005	2006
Observation of turf	96	94
Short-term weather forecasts	52	56
Hand-held soil moisture sensors	*	29
In-ground soil moisture sensors	3	4
ET monitoring from weather service	15	13
ET monitoring from on-site weather station	14	18
Long-term weather records		5

Table 1. Irrigation scheduling methods reported by survey respondents for 2005 and 2013. Values represent the percent of facilities in the U.S. that report the listed practice or equipment (adapted from GCSAA EIFG Golf Course Environmental Profile, Phase II, Volume I).

a good time to assess the water-use efficiency of the plan. There is excellent information on the [USGA Water Resource Center](#), as well as university turfgrass extension websites. Drought is not just a problem in the Western U.S. as many in the Northeast and Southeast have experienced in 2016. Every golf facility should have this information available because that is what planning for the future is all about:

[Golf Course Environmental Profile: Water Use and Conservation Practices on U.S. Golf Courses](#)

[USGA Water Budget Calculator](#)

[Developing A Drought-Emergency Plan](#)

[BMPs and Water-Use Efficiency/Conservation Plan for Golf Courses: Template and Guidelines](#)