

Golf Course Environmental Profile

Volume II

Water Use and Conservation Practices on U.S. Golf Courses



Inside:

- ▶ Total Water Use
- ▶ Irrigated Turfgrass Acreage
- ▶ Water Conservation Measures
- ▶ Recycled Water Use



For the full report, visit www.eifg.org.



Environmental
Institute for Golf

Summary of Volume II

This report is the result of a systematic process to collect golf course data on a national basis. Volume II covers the second of five planned surveys, each of which is an important element that will ultimately provide a more complete understanding of environmental management of golf courses. While research to date indicates that golf courses can be compatible with the environment, the Golf Course Superintendents Association of

America's (GCSAA) Golf Course Environmental Profile will provide reliable information that will identify areas of strength and point out opportunities for improvement. This summary focuses on the Water Use and Conservation survey. It will build on the first survey on the physical characteristics and environmental improvements on golf courses. To view the full report of the first two surveys of GCSAA's Golf Course Environmental Profile, visit www.eifg.org.

Project Overview

GCSAA is the professional golf organization for the men and women who manage and maintain golf courses. Through its philanthropic arm, The Environmental Institute for Golf (The Institute), it develops and delivers programs and services focusing on information collection, research, education and outreach that will enhance the environmental stewardship on golf courses.

At an Institute strategic planning session in July 2003, representatives from the golf industry and environmental community, as well as regulatory representatives, began to identify projects that could advance the position that golf courses are community assets. Participants noted that the golf industry has been proactive through the efforts of voluntary stewardship programs such as the Audubon International, as well as through research in issues related to golf course management and golf's relationship with the environment funded by the United States Golf Association (USGA) with support of GCSAA and its chapters. The data supports that golf courses can be compatible with the environment when properly managed.

What is missing, however, is aggregate data on golf courses that could be examined on a regional basis to document environmental practices. All parties involved agreed that if golf is to remain viable, there must be more information about its relationship with the environment. GCSAA accepted this challenge and, with assistance from a myriad of individuals and organizations, developed a process to collect the data. Thanks to funding from The Institute and a grant from The Toro Giving

"The water use and conservation report, combined with the previously published physical characteristics and land use report, gives us a clearer picture of golf course management and helps us to chart opportunities for innovation and advancement."

*Clark Throssell, Ph.D.
GCSAA Director of Research*

Program, the multi-year Golf Course Environmental Profile was launched in October 2005.

The project, which enlisted the services of the National Golf Foundation, involves a series of five planned surveys sent to GCSAA member and non-member golf course superintendents to collect data focusing on the following:

- ▶ physical characteristics of golf courses
- ▶ water use and conservation
- ▶ nutrient use
- ▶ pesticide use
- ▶ energy use and environmental practices

The entire series of surveys will be replicated at a later date to evaluate change over time.

The data from each survey will be submitted to a scientific journal then presented to other interested parties. The entire project is designed to collect information that will allow golf course superintendents and other facility personnel to become better managers and lead to GCSAA's development of more valuable programs and services for its members, facilities and the industry. The information also will address inquiries from regulators and legislators, the media, environmental advocates and other special interest groups.

"The Golf Course Environmental Profile is a key component to charting our sustainable future. Few other industries have committed to evaluating the operation of their properties in the way golf is doing through this process. Water management on the golf course drives to the heart of sustainability."

*Greg Norman
The Environmental Institute for Golf
Advisory Council Chair*

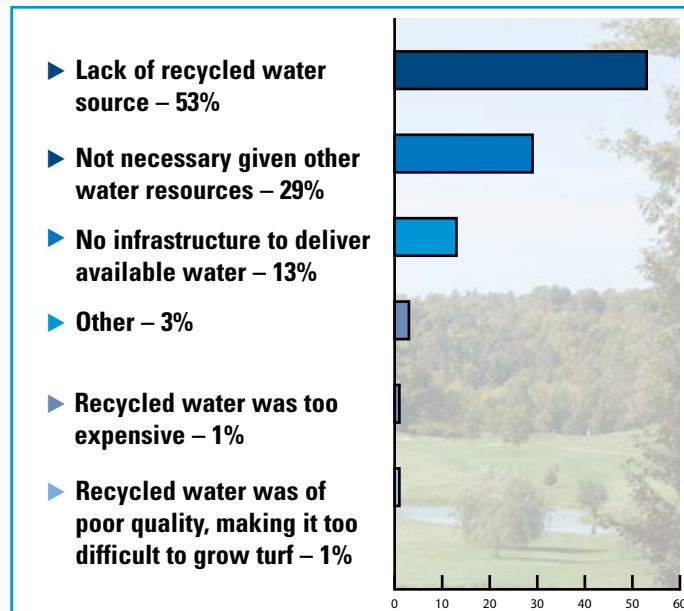


Water Use and Conservation at Golf Facilities

GCSAA surveyed superintendents at 16,979 golf facilities nationwide and received a 15 percent (2,548) return from across seven agronomic regions – Northeast, North Central, Transition, Southeast, Southwest, Upper West/Mountain, and Pacific.

On an aggregate basis, golf facilities cover an estimated 2,244,512 total acres. Of that total, 67 percent (1,504,210 acres) is defined as managed turfgrass (greens, tees, fairways, rough, driving range/practice areas, turfgrass nurseries, clubhouse grounds). The non-turfgrass component – which accounts for 33 percent (740,302) of the total – includes non-turfgrass landscapes, water bodies, buildings, bunkers and parking lots.

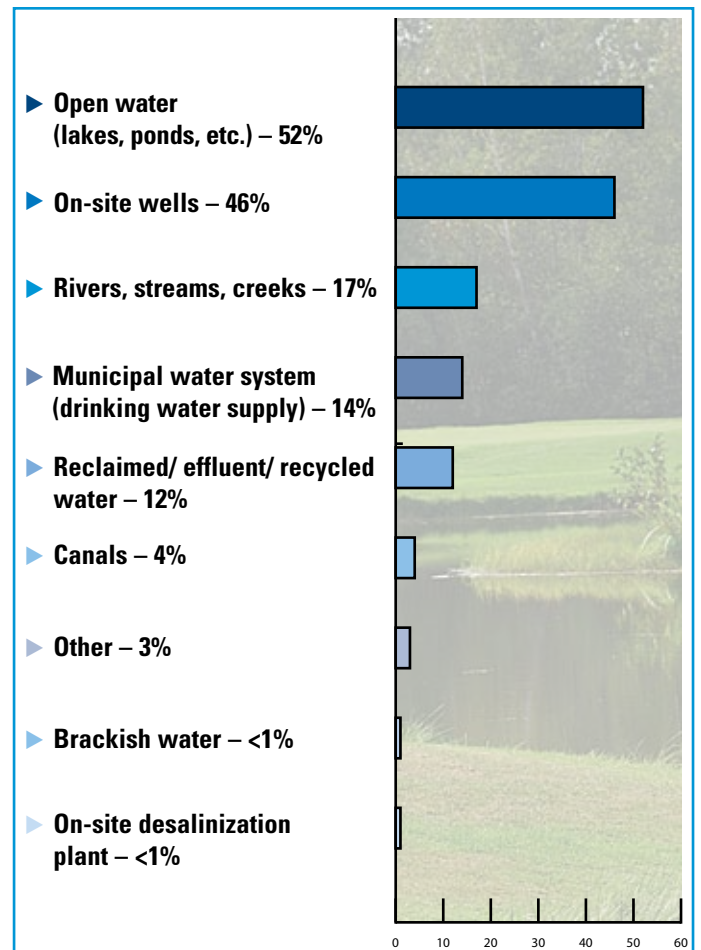
Reasons cited for not using recycled water for irrigation by percent of U.S. golf facilities.



At the individual level, an average 18-hole golf facility covers 150 acres, approximately 100 (67 percent) of which is maintained turfgrass. This area is predominantly comprised of rough (51 acres) and fairways (30 acres). Of the remaining 50 acres, 35 acres are devoted to bunkers, buildings and parking lots.

There are an estimated 1,198,381 acres of irrigated turfgrass, which is approximately 80 percent of the maintained turfgrass acres. The number of acres of irrigated turfgrass increases as the number of golf holes increases. Nationally, nearly 100 percent of greens, tees and fairways are irrigated. Approximately 64 percent of turfgrass in the rough and 74 percent of turfgrass used for the driving range/practice areas are irrigated. There are significant differences in the number of irrigated turfgrass acres among agronomic regions. In the Southwest region, there are approximately 115 acres of irrigated turfgrass per golf facility, compared to 54 acres in the Northeast region per 18-hole golf facility.

Irrigation water sources for average 18-hole golf facilities in the U.S.



Key Findings:

- ▶ Golf facilities account for one-half of one percent of all water withdrawn annually and just one and one half percent of all irrigated water applied.
- ▶ Fourteen percent of golf facilities utilize water from municipal water systems.
- ▶ Superintendents at 18-hole golf facilities utilize numerous methods to conserve water, with the top three tactics being the use of wetting agents (92 percent), hand watering (78 percent), and keeping turf drier than in the past.
- ▶ Superintendents utilize information from multiple sources as part of their decision to apply water. Most facilities utilize direct observations of turfgrass and soil conditions, with approximately 35 percent routinely utilizing evapotranspiration data.
- ▶ Recycled water is used by 12 percent of golf facilities, with 37 percent of facilities in the Southwest region using this source. More than half (53 percent) said they would use effluent water, however there was not an available source. Another 13 percent said there was no infrastructure to deliver it from water providers.

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Water Use and Conservation at Golf Facilities *(continued)*

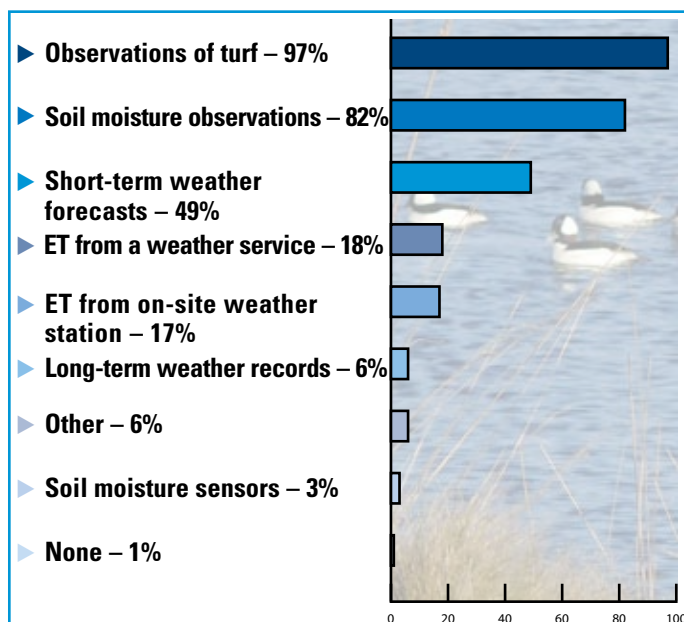
Environmental Improvements

Since 1996, 96 percent of golf facilities have completed at least one environmental improvement. Fifty-seven percent of golf facilities have implemented five environmental improvements in that time. The most common environmental improvement among golf facilities was upgrading the irrigation system (65 percent). Other efforts to conserve water include planting of drought-tolerant, low-maintenance and native grasses. Some parts of the country have taken maintained turfgrass out of play. Since 1996, 44 percent of golf facilities have increased their “native” acreage by 9.8 acres.

Key Conclusions

- ▶ Golf facilities should continue to take advantage of technology as part of the irrigation decision-making process to conserve water. The utilization of data from soil sensors for irrigation scheduling decisions is likely to increase in the future as the equipment becomes more reliable and affordable.
- ▶ GCSAA supports working collaboratively with the golf industry, citizens, communities and all levels of government to develop practical public policy related to water issues.
- ▶ Golf facilities must proactively conserve water. Conserving water on golf facilities is essential to becoming a sustainable business. Optimizing the acreage of irrigated turfgrass, implementing best management practices, utilizing technology to make water application decisions, conducting an irrigation system audit along with an audit of the non-golf course water uses at the entire facility are key to becoming responsible users of water.

Percent of 18-hole golf facilities in the U.S. that used the listed irrigation scheduling technique.



- ▶ Golf facilities provide a valuable long-term customer for local water treatment facilities, and turfgrass is an effective biological filter to further treat the water. The golf industry should strive to maximize the use of reclaimed water when the availability, quality, and cost are sustainable for the golf facility and it is practical given the local water resources available.
- ▶ Nationally, golf facilities irrigate approximately 80 percent of the maintained turfgrass acres. Golf facilities located in areas of limited water supplies should irrigate only the turfgrass essential for the play of the game.

“Since the early 1980s, millions of dollars have been pledged by a variety of organizations, universities and businesses to better understand golf’s potential impact on the environment. This has been invaluable in developing programs and best management practices to ensure golf’s environmental sustainability.”

*David S. Downing II, CGCS
2008 GCSAA President*



About the Golf Course Superintendents Association of America

GCSAA is a leading golf organization that has as its focus golf course management. Since 1926, GCSAA has been the top professional association for the men and women who manage golf courses in the United States and worldwide. From its headquarters in Lawrence, Kan., the association provides education, information and representation to more than 21,000 members in more than 72 countries. GCSAA’s mission is to serve its members, advance their profession and enhance the enjoyment, growth and vitality of the game of golf. Visit GCSAA at www.gcsaa.org.

About The Environmental Institute for Golf

The Environmental Institute for Golf is the philanthropic organization of the Golf Course Superintendents Association of America (GCSAA). It is a collaborative effort of the environmental and golf communities, dedicated to strengthening the compatibility of golf with the natural environment. The Institute concentrates on delivering programs and services involving research, education and outreach that communicate the best management practices of environmental stewardship on the golf course. For more on The Institute, visit www.eifg.org.



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