

Golf Course Irrigation – Where Does It Come From?

Irrigation sources are varied, and sometimes golf facilities have access to more than one source.

BY CHRIS HARTWIGER

Golf is an outdoor sport. For the length of their round, some golfers will play in conditions ranging from just above freezing to scorching heat, but turfgrasses on which the game is played are fully exposed to these conditions at all times. Turfgrass requires good soils and adequate levels of sunlight, nutrients, and water to endure a wide range of environmental extremes and withstand traffic from golfers. Of these requirements, water may be the most challenging to provide because it must be distributed frequently and uniformly into the soil for uptake by the turfgrass root system. Add the fact that “water comprises 80 to 85 percent of the weight of a grass plant” (Beard, 2002), and one sees how vital water is to a turfgrass plant. As a result, almost all golf facilities have an irrigation system and a source of water to help keep the turfgrass healthy and produce a good playing surface. This article will review the most common sources of water for turfgrass irrigation on golf courses.



Water is a key requirement for all turfgrass species.

SOURCES OF GOLF COURSE IRRIGATION WATER

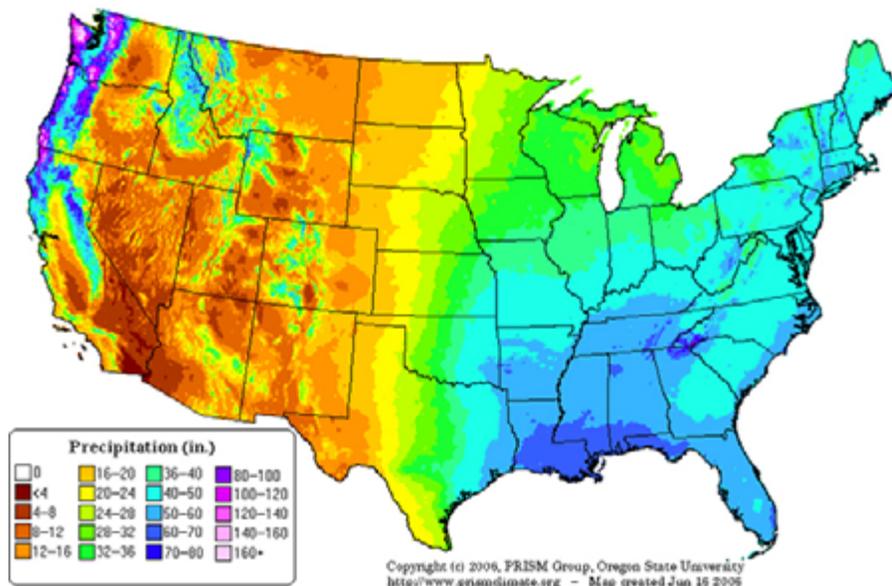
In 2009, [The Environmental Institute for Golf](#) published a report titled [Golf Course Environmental Profile - Volume II: Water Use and Conservation Practices on U.S. Golf Courses](#). A survey in the report provided a breakdown of irrigation water sources for average 18-hole golf courses in the United States. There are six major sources of irrigation water, and Table 1 shows the percentage of golf facilities that use each source. Note that the percentages add up to greater than 100 percent because many golf facilities have access to more than one source of water.

Table 1

Irrigation water sources for average 18-hole golf facilities in the U.S. (source: www.eifg.org)

Water Source	Percent of Facilities Using the Source
Open Water (lakes, ponds, etc.)	52%
On-site wells	46%
Rivers, streams, creeks	17%
Municipal water system (drinking water supply)	14%
Reclaimed/effluent/recycled water	12%
Canals	4%
Other	3%
Brackish Water	<1%
On-site desalinization plant	<1%

Precipitation: Annual Climatology (1971–2000)



Average annual precipitation from 1971 to 2000 varies widely across the United States (source: www.prismclimate.org).

RAINFALL

Although Table 1 does not list rain as a source of irrigation water, it is always the preferred source on a golf course. It is free, clean, and distributed uniformly across the golf course. Unfortunately, natural rainfall cannot be scheduled and often delivers more or less than the turfgrass needs. Arid regions rarely receive routine rainfall throughout the growing season, and when it does rain it can pour, leading to flood events. Conversely, areas with high levels of natural rainfall are not immune from

drought conditions. Regardless, natural rainfall can seldom be the sole source of water used to meet turfgrass needs, and every golf facility requires at least some degree of supplemental irrigation throughout the year.

Figure 1 shows the average annual distribution of rainfall across the United States for the period of 1971 to 2000. There is tremendous variability in average rainfall totals across the country. The blue and green areas receive much higher levels of rainfall than the areas in yellow, red, and brown. As a

result, the need for water supplied through an irrigation system will vary tremendously across the country, too. A reliable source of irrigation water is vital.

OPEN WATER SOURCES (LAKES AND PONDS)

Open water sources such as lakes and ponds can be either natural or man-made. Sometimes they are recharged by underground springs, streams, runoff, or wells. Quite often open water sources for irrigation water also serve as a key feature in the design of one or more golf holes.

ON-SITE WELLS

Many golf facilities have drilled wells on property to access irrigation water. The location or depth of the water varies tremendously in different parts of the country. Well depths to ground water can be as shallow as 20 to 50 feet or as deep as 1,500 to 2,500 feet (Beard, 2002). Well water can be pumped directly onto the golf course or into an irrigation reservoir.

RIVERS, STREAMS, AND CREEKS

Rivers, streams, and creeks are an excellent source of irrigation water, assuming flows are reliable. Sometimes water is pumped directly from these sources onto golf course turf, and other times it is pumped into an irrigation reservoir on the golf course.



Rainfall is the most affordable source of water, but it is too unpredictable to be a reliable water source for turf.



Many golf facilities have large irrigation reservoirs that are fed by surface water runoff, wells, and/or natural springs.

Generally, the smaller the flow and supply typically associated with streams and creeks, the more likely it will be pumped into a reservoir on the golf course for later use.

MUNICIPAL WATER SYSTEM

Sometimes referred to as “city water,” water from a municipal water system is used by some golf facilities for golf course irrigation. Municipal water is often easy to hook into and provides excellent water quality. However, during times of drought, municipal water is often the first golf course water source that will be restricted. In terms of cost, municipal water can be expensive to obtain, depending on region of the country.

RECLAIMED WATER

Most reclaimed water is produced from municipal sewage treatment plants. It may also be referred to as wastewater, effluent water, or recycled water. Most of the reclaimed water used on golf courses has undergone tertiary treatment, which “produces highly purified (and pathogen free) waters, especially if followed by chlorination or ultraviolet treatment for disinfection” (Harivandi, 1994). Reclaimed water is an excellent source for golf courses, but often golf facilities have limited access due to non-existent infrastructure to get the recycled water from the treatment plant to the golf course.

Pricing for reclaimed water varies by location. In some areas, it is available at no cost, while in other locations it may be priced the same as potable water. Further, some reclaimed water contracts specify a minimum quantity that must be used. Other contracts allow a golf facility to use only what it needs.

CANALS

In coastal areas with high levels of rainfall, canals are a source of irrigation for a few golf facilities. Debris, poor water quality, and high levels of particulate matter can be challenges with these sources.

MINOR SOURCES – BRACKISH WATER, DESALINIZATION

Less than 1 percent of golf facilities use irrigation water from brackish sources



The pump station provides the power to push water through irrigation pipes and eventually through the irrigation sprinklers in each area of the golf course.



Some golf facilities have access to fresh water in rivers, but permission to draw water from the river is required.



Golf course architects often integrate irrigation sources such as lakes into the design of one or more golf holes.

that must go through a desalinization plant. Brackish water, or briny water, contains more salt than fresh water but not as much as seawater. The high sodium content in brackish irrigation sources is not tolerated by most turfgrass species. The desalinization process often involves reverse osmosis and, while the quality of water that has been treated is good, the cost of this process is high and is not practical for most golf facilities.

REGULATIONS REGARDING GOLF COURSE IRRIGATION WATER

In the United States, there is no federal water policy per se, and generally water is treated as a state and local

issue. Every type of irrigation water source described above is regulated by myriad local, state, and federal regulations. When investigating a new water source for a golf facility, it is imperative to seek the counsel of an expert in this area.

CONCLUSION

Routing and design of a golf course are heavily influenced by its geographic location. Just as a golf course in Florida will look much different from one in Arizona, water sources are going to vary geographically as well. Nevertheless, one thing remains the same in that turfgrass survival relies on access to water. So wherever golf facilities are found, access to a water source is required.

REFERENCES

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[CHRIS HARTWIGER](#) is a senior agronomist with the USGA Green Section. He appreciates all irrigation sources, but prefers to avoid them when playing a round of golf.