GOLF COURSE WATER CONSERVATION – TOP TIER TECHNIQUES

Mark Esoda

AUTHORS: Atlanta Country Club
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Abstract. Golf Courses are part of the community and economic base of the state. The public perception is that golf courses are water abusers and not good stewards of their water resources. As users of water, it is important to utilize the best management practices for water conservation. These practices not only help conserve water but also can improve the success of the facility through power savings, cart revenue, and overall reduced maintenance. Techniques include utilizing drought tolerant grasses, raised mowing heights, irrigation system technologies, irrigation system review, irrigation system audits, staff scouting, utilizing weather station data and wetting agent technology. Of course the process begin with understanding the current state of the course - site assessment. Finally, an educational component can be added to conservation by informing clientelle of the water conservation techniques applied at the course and how they may be applied at home.

Golf courses are large properties with large acreage of plants. The plants need water. Golf courses are part of the community and provide jobs, tax base as well as recreation for citizens. Golf courses provide wild life habitat, erosion control, filter pollutants, provide a cooling effect and are a much needed green space in urban sprawl. In Georgia golf is a $3 billion industry. Golf only uses a small percentage of the outdoor water and even smaller percentage of overall water use. Nationwide golf only uses less than 2% of the nation's water.

Still the public perception is that golf is a major water user. Also some folks feel that golf might even be a water abuser. The following best management practices will show that golf is not a water abuser. They will show that it is in the best interest of golf to reduce water use for economic and environmental reasons.

Golf course superintendents must manage the total property including soils, trees, types of grass, and terrain. The first technique is to do a site assessment. On a 100 acre 18 hole golf course in Georgia it will be typical to see 90 acres of Bermuda grass which is one of the most drought tolerant turf grasses. It is important to understand the soil and plant water characteristics on a site. A clay soil will hold more water than a sandy soil – overwatering either soil type is waste. Bermuda grass on a clay soil will use far less water than a Fescue on a sandy soil. Understanding these relationships helps to conserve water. Sloping terrain will hold less water and must be treated differently than flat land. Each golf course has unique issues and each superintendent must be able to adjust irrigation techniques to the specific site issues. The site assessment is key to this water management.

Understanding irrigation systems is the next component of good water conservation. The pump station, irrigation controls and distribution systems have become very sophisticated over the years. Good training and audits by certified auditors help manage these systems. Golf course irrigation systems can cost in the neighborhood of $1.5 million utilizing 1200 or more heads. The idea behind these systems is effective and efficient water as opposed to MORE water. Low flow heads and drip systems are being used in appropriate areas such as landscapes and slopes. The initial costs of the irrigation system are offset by water savings, power savings and improved environments for the turf. By improved environments it is meant that the correct amount of water is applied – not too much water (puddles, algae, dead grass) or too little water (dead grass, erosion). Both extremes are bad for golf and bad for the environment. Monitoring systems and controls help reduce loss through leak detection, pressure regulation to reduce breaks, rain cut off devices, and water management software. Watering is done at night which reduces loss to evaporation but also keeps golfers dry. Although daily property assessments are done, a system audit should be done every 5 to 7 years. This ensures that the systems are functioning as originally engineered. Over time nozzles wear, gears wear, etc.

Technology is advancing on irrigation systems such that in 5 to 7 years there will be new options for software, sprinkler technology, drip irrigation breakthroughs and even underground watering systems. It is important for golf course superintendents to keep up with trends and new ideas in irrigation. Recent advances include radio controls, GPS systems and flow maintenance. Software has also been developed to utilize weather station data to aid in irrigation decisions.

Also on the irrigation best management practices is the consideration of the water supply – quantity and quality. Usage record keeping must be done to understand the capacity and needs relationship. The water should be tested for irrigation quality. These tests will help decision makers when looking for alternative sources. Frankly when considering reuse water, reuse water may be

cleaner than the current water source. Without the tests, one would never know. Obviously, draw down and stream flows must be considered when using surface water withdrawals.

On golf courses one of the best water conservation techniques is the highly trained staff. By and large golf courses retain a full time irrigation technician. This person does system checks daily as well as needed repairs. A leak can ruin a golf hole in short order. The irrigation technician also does adjustments to heads, nozzles, pressure, etc. based on the needs of the course. Staff is also trained to look for and water "hot spots." These spots might be hydrophobic, they might have shallow soil due to rock or simply may be failure of the irrigation system. The hot spots are hand watered with buckets or hoses. Scouting is done in the morning and afternoon in an effort to identify changing conditions. The staff then makes adjustments to the night watering schedule, up or down, to again ensure proper moisture.

Staff also is involved in other best management practices for water conservation including traffic control and mower height adjustment. All staff is trained to monitor soil moisture conditions as this affects the playing conditions.

The height of cut of the turf affects the water use of turf grass. Although greens are cut very short (.125 in.) the rest of the course is maintained at heights less stressful to plants. Mowing can also affect water usage if the mowers are dull. Sharp mowers leave a clean even cut that reduces water loss. Clean cuts reduce pest infestations as well requiring fewer inputs – pesticides and fertilizers.

Cultivation techniques reduce water usage. Cultivation practices include sand topdressing, aeration, vertical mowing, and spiking. Aeration of the soil produces longer roots and topdressing with sand protects the crown of the plant. Aeration reduces compaction. This allows water penetration reducing runoff of water – the water gets to the plant roots. Any cultivation practice that improves plant health will improve water efficiency.

Pest management has been discussed as a water conservation technique by reducing inputs. Pre emerge weed control leaves a healthy stand of turf. Should harsh post emerge weed control programs be needed, the plant will suffer. This will cause more water and fertilizer to help bring the plant back to a healthy status. Inputs can be reduced by utilizing precise applications as well as evening and early morning applications. Simply put – apply plant protectants only where and when needed.

Fertility management is key to saving water. More fertilizer equals more water usage by the plant. It also means more mowing and clipping removal. Fertilizer programs should be well planned based on soil and/or tissue samples. Golf course maintenance is not about crop yield but more about maintaining a healthy stand of turf. More fertilizer is not a benefit is this type program and is definitely a detriment to water conservation.

Golf courses are always looking for ways to save money. Producing more natural areas around the course will save water as well as other inputs. More and more courses are making areas that are not part of the golf course proper more natural using native plant species. These native areas, once established, are not mowed, fed or watered. This increases habitat for some animals and costs less to maintain. Golf courses are also looking into new grasses. Breeding programs around the country are trying to develop quality turf grasses that require fewer inputs. Drought tolerance, disease resistance, wear tolerance are all good qualities to have in golf course grass. Certainly, in areas that have stress on the water supply golf courses are reducing the acreage of turf and landscape. This is simply the best way to reduce inputs.

Why do golf courses go to all this effort to manage the turf and water resources? Frankly, proper management dictates that OVERWATERING IS UNACCEPTABLE. Playability dictates that dry is better so therefore over-watering is bad for the game of golf. Over-watering breaks down the environment and the micro environments that are essential for the success of the plant. Depleted supplies of water are directly related to reduced quality of the water. So the more you use the worse the water quality will eventually get. Golfers reject wet golf courses. Watering costs money but over-watering will cost you a business.

The future of water in Georgia is changing. Good water management is going to be essential for everyone in the community. Golf courses are part of the community and must share the responsibility. Golf course managers should also share their knowledge and techniques of water management with the community. This is the last Top Tier Technique for water conservation – education. Golf courses should educate their clients on the benefits of golf in the community including being an economic contributor, a wildlife sanctuary, erosion control and water filter as well as the recreational benefits. They need to tell the story of how this is all possible through proper water management. The story can be told at the cash register, through community involvement, articles, and most importantly by example.