

Turf

Intelligent Irrigation

Get a Head Start on Water Conservation Practices

by Vito Cirone

Water is a precious resource and throughout the past few years there has been increasing concern over the management of water at local, regional, provincial and federal levels.

These concerns have stemmed from the "drought like" conditions experienced in the past few years, as well as general concerns over water quality and quantity. Further, these concerns have been brought to the forefront by more informed and concerned members of the public and local municipalities.

This in turn is forcing regulatory agencies throughout Canada to develop strict water use guidelines and impose restrictions governing how much and when water can be used. These restrictions are usually imposed through the issuing and/or renewal of water permits or licenses for water taking.

Typically, a golf course uses water in three key areas: clubhouse (potable water), maintenance area (potable water and equipment cleaning) and irrigation.

Golf courses can make use of various sources of water to supply its water demands and generally these include: groundwater (well water), surface water (streams, ponds and lakes), municipal water and, to some extent, treated wastewater. The most common source of water comprises groundwater and surface water.

An average 18 hole golf course in Canada maintains approximately 57 hectares of turfgrass and uses approximately 18-22 million gallons/year for irrigation purposes. A typical clubhouse will use about 1-1.5 million gallons/year and a typical maintenance facility some 500,000- 750,000 gallons/year.

Although the total water demands of a golf course may initially seem high, when compared to other water users (agricultural operations, municipal and industrial facilities, etc.) this demand is relatively low and seasonal in nature. There are, however, plenty of opportunities to reduce overall water demand at a golf course.

Due to highly visible irrigation practices and well-maintained properties, golf courses are an easy target for the implementation and enforcement of water restrictions, and when such restrictions are applied there will no doubt be an impact on golf course operations.

As environmental issues gain increased awareness, it is important for golf course owners and operators to understand and embrace water management practices

and conservation strategies, to do so in advance of mandatory water restrictions and be viewed as "environmentally friendly" with neighbours, environmental activists and regulatory agencies.

Water conservation is one of the most important tools that a golf course has available to ensure that water supply is sufficient to provide for healthy turfgrass, while maintaining little to no impact on the environment. In the past many golf superintendents have over-watered their golf courses and owners and superintendents are all too familiar with the consequences of applying too much water - promotion of disease in turfgrass, encouragement of shallow root growth and leaching of fertilizers and pesticides into local groundwater and/or surface water sources.

Despite the research that is available and the knowledge within the industry, "people still have a tendency to overwater turfgrass," comments Rob Whitherspoon, director of the Guelph Turfgrass Institute (GTI). "The period of time between irrigation of greens can be much longer than you think and under normal summer conditions greens can go 5-7 days without requiring water," he says.

"Additionally, course operators should be managing water use throughout a golf course at a "micro" level and pay particular attention to some of the site specific features and address these areas individually as opposed to part of a larger watering program."

In addition to reduced water demand and the corresponding environmental benefits associated with applying less water, there are also direct cost savings that can be realized at the golf course, although costs vary depending on the water source used. Generally water costs are in the range of \$0.02 to \$0.05/gallon of water used, taking into account total costs associated with the development of a water source, pumping, maintenance and overall repairs. There is an important economic advantage, therefore, to conserving water.

Although not inclusive, the following represents a few water conservation techniques that can be used throughout the golf course and when water restrictions are imposed.

Improve Record Keeping

Few golf courses keep comprehensive records on water use for irrigation, clubhouse and maintenance area use. Records should be kept on a daily, weekly, monthly and yearly basis and comparisons made to previous periods. The installation of flow meters will help keep good records. Accurate record keeping provides the basis for tracking water conservation efforts.

Use of a Wetting Agent

Although expensive, the use of a surfactant, or wetting agent on tees, greens,

fairways and problem areas can help to establish and maintain a water movement pattern of downward and lateral flow and thereby ensure uniform water movement throughout the soil. This ultimately reduces overall water use and potentially eliminates dry areas. In some cases wetting agents have accounted for up to 40 percent reductions in irrigation water use.

Irrigate During the Early Morning

Irrigation should take place during the early morning to reduce losses related to evaporation. Winds are usually low at this time so the uniformity of application should also be better.

Complete Irrigation System Audit

An irrigation audit should be completed every couple of years to determine that:

- All sprinkler heads are turning properly and at the correct speed;
- Nozzles are not worn, using excess water or causing poor distribution;
- Sprinklers are covering the correct areas and not over-spraying to paved areas or out-of-play areas;
- Satellite stations are timing accurately and close quickly with minimal delay times (particularly with hydraulic systems);
- Problem areas can be fixed quickly.

Reduce amount of nitrogen in fertilizer applications

During the summer months efforts should be made to reduce the amount of nitrogen applied to turfgrass through fertilizers, while still maintaining adequate levels of phosphorous and potassium. Turfgrass that is kept somewhat deficient in nitrogen will use less water and grow a deeper root system than turfgrass that is heavily fertilized with nitrogen.

Drought Resistant Turfgrass Species

Replacing turfgrass in certain areas (i.e., rough and out-of-play areas) with drought-tolerant plant material and developing long-range landscape plans that cluster plantings according to water needs will augment conservation efforts. Also, try to reduce the total amount of "maintainable" acres and let some areas return to a more natural, unmaintained state that require little watering.

Capturing Stormwater Run-Off

Stormwater run-off can represent a significant source of "free" water for a golf course and efforts should be made to direct, or re-direct, stormwater from clubhouse, maintenance facility and parking areas towards ponds/reservoirs. This captured water can later be used for irrigation purposes.

Evaluate the Efficiency of Water Programs

The golf course should re-evaluate its water program to determine specific water

needs as opposed to applying a standard amount of water (e.g., 1 inch per week) throughout the entire golf course. For example, are shaded areas receiving less water than sunny areas, or are clay soils receiving less water than sandy soils? Wherever possible, irrigation should be based on soil moisture content as opposed to pre-set weekly water schedules. Additionally, consider multiple irrigation cycles - three 10-minute cycles as opposed to one 30-minute watering cycle in areas that are clay and more prone to run-off.

Use of Water-Retaining Agents in Root Zone

Although expensive, polymers are sponge-like granules made of synthetic material, or starch, that can absorb large amounts of liquid. They then contract and release the stored water into the soil. In this way polymers can reduce the amount of water lost through percolation and evaporation, thus reducing irrigation requirements. Additionally, they dissolve nutrients and absorb herbicides and pesticides.

Weather Stations

The installation of small-scale weather stations at a golf course can provide specific information regarding air temperature, relative humidity, rainfall, solar radiation (sunlight), wind direction and wind speed. This data is useful in predicting site specific evaporation rates and provide data on how much water needs to be replaced each day. In some cases weather stations can save 20-40 per cent of irrigation water demands.

Establish Annual Goals for Reduction in Water Use

Although there are many factors that can influence water usage on a golf course, it is important to establish goals relating to reductions in annual water demand. All employees and guests should be made aware of such goals and be encouraged to conserve water. It is not uncommon for golf courses to establish a goal of reducing water demand by 10 per cent a year.

In an ideal, garden-of-Eden world, all is available in plenty and life is simple and good. In reality, although life can still be good, it is seldom simplistic. Anticipating changes in the environmental climate and making adjustments in your methodologies is not only good for the health of our planet; it's good business.