

WATER MANAGEMENT

Continue to learn

"CAMS? I've never heard of it."

"What's The Water Bill?"

"I put 10 minutes of water on the greens and seven or eight minutes on the tees."

"The lakes on the course look after themselves."

Ten years ago these statements were common among the greenkeeping and golf club fraternity. Today, they are heard less so, but there is a greater need for Course Managers and Greenkeepers to be aware of all aspects of water management. It is not just about operating irrigation systems, it's about other aspects including managing lakes, watercourses and dealing with sources of water including abstraction licences and water-use monitoring.

The turf management profession is increasing its environmental awareness all the time and has a huge opportunity to demonstrate environmental responsibility while still producing the best playing surfaces. This is particularly relevant to water, both in relation to irrigation practice and to bodies of water on the course. There is a need to ensure that you keep abreast of legislation and water management methods.

This article provides an overview of those aspects of water management that simply have not been sufficiently covered in the general golf course management field, but are important now and will become more important to all Course Managers and Greenkeepers. It is intended to provide background information that will be relevant to the environmental programmes that are increasingly prevalent in golf course management.

CATCHMENT ABSTRACTION MANAGEMENT STRATEGIES OR CAMS

In 1999, the Government published a development document entitled Taking Water Responsibly. This reviewed and recommended modification to the way in which the abstraction of water for all uses was regulated. A key part of the resultant changes was the development by the Environment Agency of Catchment Abstraction Management Strategies or CAMS. It is often claimed that in the wider sphere of water use in the UK, golf course use is insignificant and will be largely ignored. But can we afford to take that view? I believe not. Public perception and ignorance of the crucial part water plays in both the agronomic and commercial success of golf makes the industry a potential soft target. We should take this into consideration and be able to demonstrate a responsible approach.

CAMS will be inextricably linked with the new Water Bill in changing the ways in which water is made available. It covers drinking water supplies, industry, agriculture, horticulture and turf management and will have some effect on many golf courses.

CAMS are water allocation processes based upon consultation and greater public information on, and involvement in, managing water resources within catchment areas. It is intended to provide a consistent approach to local water resource management. A strategy is developed via a five-stage process for each catchment area. These are: a pre-consultation, a resources assessment, a sustainability appraisal, the creation of a consultation document, and finally the implementation of the strategy.

The strategy is then in place for six years, whereupon it will be reviewed and updated.

So what does this mean for the golf manager? It will change the abstraction licencing process. Water abstraction licences have historically been granted in perpetuity. However, CAMS and The Water Bill bring time-limited licencing linked into the six-year cycle of any CAMS area. At the end of each period, users will need to reapply and new licences will be granted based upon environmental sustainability, ongoing need and efficient use.

The first criterion is largely outside our influence, but ongoing need and



efficient use are aspects we can control. Good irrigation management techniques such as scheduling, preferably based upon ET (evapotranspiration) demand and accountable and sound agronomic practice, will be important in securing the required water quantities. Reliable, accurate and comprehensive control systems with the ability to demonstrate and record operational irrigation strategy and water use will also allow a stronger case to be put forward at the time of renewal. In addition to new licences, a programme of converting existing permanent licences to time-limited status over a 15-year transition period will create a requirement for production of a well founded and justifiable renewal application.

CAMS have a direct effect on courses using boreholes or drawing water from lakes or watercourses. Those using potable water supplies may find The Water Bill of greater significance. www.environment-agency.gov.uk

THE WATER BILL

The Water Bill was introduced in the House of Lords in February. While it will affect England and Wales, the current less regulated position in Scotland will change and Course Managers and Greenkeepers in Scotland should continue to update their knowledge of local water source provision.

Statements have been made as to the practical effects this legislation would have on the golf industry, particularly when discussing irrigation system provision, but it is fair to say that until it becomes law and the full implications of its implementation are understood the impact is difficult to gauge.

This Bill is described as taking... "to a new level the Government's commitment to the sustainable management and use of water resources. It will update the framework for abstraction licencing, promote greater water conservation and planning for the future by water companies."

It appears that this emphasis on the water companies as opposed to end-users is important. Indeed, a legal duty for all licensed abstractions to use water efficiently does not appear to be included in the Bill. The companies will be obliged to develop plans for more effective drought and water resource management and for better water conservation. The investment required to achieve these objectives could well be reflected in more inspection and regulation and potentially in price reviews.

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TORO Count on it.

The Bill will also lead to deregulation for small abstractors. If you take less than 20 cubic metres or 4400 gallons per day then there will be no licence control. The Environment Agency, however, has the power to raise or lower this threshold based upon local CAMS demands. As an industry, we should have, at the very least, an awareness of The Water Bill and the need for the creation and implementation of water conservation programmes. www.defra.gov.uk

EFFICIENT WATER USE

Water use efficiency has many facets and all are becoming of more significance as we see tighter regulatory and financial control on water use.

Course Managers simply must have the right tools to do the job and in irrigation terms this means a system that has been correctly designed using accepted principles relating to areas such as location and spacing of sprinklers, pipe and cable-sizing and control methodology.

Even today too many inferior systems are installed and efficiency is compromised in the shortsighted quest for lower initial capital expenditure. Control systems, particularly, need to be utilised to allow accurate scheduling while providing an easy way in which to create new irrigation programmes and modify existing ones. This, in combination with comprehensive system performance monitoring, will bring effective water conservation. It is possible to reduce water use by as much as 25 per cent by using the right control system and it can be the case that the initial outlay of a PC-based control system can be recouped over a reasonable period by the resulting reduction in water supply costs.

It is not just the original design that is important, however, as installation, operation and maintenance are all crucial. Looking at the day-to-day use of irrigation Course Managers and Greenkeepers need to have an understanding of the methods of calculating precipitation rates and application times and relating those to water consumption. Knowing the rate at which a system applies water in relation to the infiltration rates of soil types and construction profiles allows irrigation scheduling to be adapted to prevent runoff, puddling and rootzone leaching. These calculations are simple mathematics using performance data.

As accountability and the need to prepare justifiable claims and applications for water become more important the ability to explain how water usage figures have been produced is essential. It is fair to say that this aspect of golf course management has not been given the necessary attention. More education on irrigation scheduling and its implications on course management is required as the need for efficient water use increases. www.btlia.org.uk

LAKE AND POND MANAGEMENT

This aspect of water management has been highlighted before. Water quality issues in lakes, whether they are due to high occurrences of algae, low oxygen, excessive weed growth or sediment build-up, do need to be addressed. Every lake is a unique ecosystem and a process of identifying the causes of lake and pond water quality problems should be the first step to better management. All too often, it is the symptoms that are treated while the underlying causes are not understood. A lake should have an environmental balance and any curative actions need to take this into consideration.

All lakes and ponds go through an ageing process that takes them from a state of low nutrient level with little or no algal or macrophytic growth to the eventual creation of a swamp or bog. Where a lake or pond is created it is often subject to an exponentially accelerated ageing process. The reasons for this include erosion, shallowness in construction and high sediment and nutrient loads often deposited from incoming watercourses.

There are a variety of mechanical, chemical and cultural ways in which to solve lake water quality management issues, but the underlying fact remains that without the necessary levels of oxygen and circulation through the water the problems will reoccur. In some cases certain treatments, while producing immediate and short-term results are actually adding to the issues, particularly if organic matter is being added to the nutrient base and depleting oxygen levels in its decomposition.

Methods that are employed include good basin design particularly in relation to depth, a minimum of three metres is recommended. The creation of peripheral wetlands and buffer zones using reedbeds and vascular plants can also assist with lake and pond water management. In some instances the adoption of "no chemical zones" around lakes can also help. Other methods that are used include the introduction of barley straw and voracious weed eating carp but more often than not the environmental balance within the water itself is the key to success and the only real method of quality control.

The four key water quality factors are sunlight, temperature, nutrients and oxygen. Too much of the first three and not enough of the last will create an imbalance and water quality issues will proliferate. In a natural lake transfer from the atmosphere provides enough oxygen by wave and wind action, surface diffusion and rainfall. In man-made lakes it is usually the case that these natural methods are not able to provide sufficient oxygen and therefore mechanical oxygenation and circulation is required.

The use of aeration systems is becoming widespread in commercial landscape and public parks and there are a growing number of examples in golf course lakes. When looking at an aerator for a lake it is important that oxygen transfer rates are available for evaluation. These must be produced by an acknowledged independent testing facility and should be derived from operation of the aerator within accepted electrical parameters.

Aerator design principles dictate that high flows with lower pressures create the best oxygenation and circulation. There may be a fountain-type effect, but the production of a spray pattern is of secondary importance. Fountains generally work the opposite way using low flow with high pressure to produce the spray effect. Aerators provide the best long term and proactive way in which to maintain good water quality in lakes and ponds. Initial capital expenditure may appear high, but what will be the cost of not acting?

This article can only touch on each of these areas of water management. It may appear that some of them may have little relevance to your own course, but it should be seen as part of every Course Manager and Greenkeeper's role to have both an awareness of them and to implement management regimes that are relevant to the course now and for the future.

Ignore water management – whether for irrigation or lakes and ponds – at your peril.



One of the Otterbine range of Concept 3 aerating fountains for ponds and lakes that is available from Toro distributor Lely UK