

...And not a drop to

Cedric Johns explores the sometimes murky depths of golf course lakes and ponds

Modern day golf course architects – especially our cousins from over the Atlantic – love water, it seems. Give 'em half a chance and they'll come up with at least one spectacular hole designed to force players into making choices. A safety shot for the timid; an arm chancing drive for the bold, tempting them to smash the ball beyond the watery clutches of an in-play lake. And, as we so often see, beyond the back of the green as well...

Water hazards can intimidate club golfers and hardened pros alike. Just think back to that menacing 15th which featured so dramatically in last month's US Masters, staged at the 'garden course', Augusta National.

Apart from Olazabal, whose 30-foot, final day putt killed-off the opposition – at the 15th – and ultimately secured that prized green jacket, most of his rivals were in big trouble. How many shots did Payne Stewart drop attempting to clear those limped waters...?

But it is not only the players who have to be aware of the dangers of still waters these

days. The increasing numbers of feature lakes and off-course reservoirs appearing on our golf courses form the basis for hazards of another type: natural pollution. Greenkeepers beware...!

The relatively new concept of digging holes in the ground for in or out-of-play water storage purposes is linked directly with the use of irrigation systems.

Why? Because legislation imposed by the National Rivers Authority (NRA) insists that abstraction licences are largely conditional on the system's design being self-sufficient in terms of water consumed. This is particularly true of golf courses located in the south and south-east of the country, where water is most often at a premium in the summer months.

This is the reason why we see so many developers and golf clubs – never mind architects – investing in the construction of in-ground storage facilities.

By comparison, the more conventional, above-ground storage tanks – usually used as overnight holding points – are fast going out of fashion. They are simply not large enough to hold the vast volumes of water involved. Even built in multiples, the cost of a number of tanks would far outstrip that of a reservoir.

Based on the broad principle that only winter water, abstracted between October and March, is utilised, man-made feature lakes and off-course reservoirs are today's answer to the problem of sourcing enough water for months of high-season irrigation. A classic example of this trend is the total water management scheme implemented at The Belfry a couple of years ago. Then, a lake, capable of holding ten million gallons of water – 40 million litres for the benefit of thrusting young 'keepers clutching HNC's – was constructed behind the Derby course.

Filled and subsequently topped-up from a nearby stream, the lake actually fulfils two roles – as course manager Derek Ganning explained when I visited him prior to the '93 Ryder Cup.

Not only does this vast tract of water feed irrigation systems watering both the Brabazon and Derby courses, it is also used to overcome evaporation losses by maintaining levels of the in-play lakes dotted around the championship course.

On the club circuit, the lake featuring an island green built during the reconstruction of the Barton-on-Sea course, featured on these pages (April issue) was designed to provide

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similar benefits, albeit on a smaller scale.

So, having dug a hole and filled it, what next? A very good question. Life being what it is, the answer to one problem quite often begets another. Right! All that water adds yet another demand to the day-to-day business of golf course management...

That demand comes in the guise of water management – the important task of ensuring that the quality of water stored in-ground does not deteriorate to the point where it can represent a distinct environmental hazard.

Reservoirs and lakes are, after all, living ecological systems in which the control of algae and weed is an important factor in maintaining a natural balance between what is good and that which can be harmful – to man, wildlife and turf,

As a simple example, think of algae 'bloom'. That thick green stuff which covers the surface of many a village pond. Viewed from a distance, some may feel that it looks attractive but the truth is that its very existence causes trouble down below.

By preventing natural light from penetrating into the depths of the water, algae deprives other oxygen giving plants from thriving deeper down.

Since plantlife is an essential and natural method of releasing life-providing oxygen into the water the lack of light begins a process which, if left unchecked, will upset the balance of nature.

As oxygen levels fall, the 'bloom' dies off and sinks to the bottom of the pond. More oxygen is needed to combat the effects of decomposing plantlife yet, in reality, the reverse is happening. Allowed to develop further, the water becomes anaerobic – deprived of oxygen. At this stage all natural life in the water including fish is seriously at risk. So too is the quality of water intended for irrigation purposes.

As anaerobic bacteria begins to thrive on waste materials – dying plants, fish and even grass cuttings blown into the water from nearby fairways or greens are digested anaerobically rather than by natural means. (Fertiliser entering the water through run-off doesn't help either).

You'll soon know when this stage has been reached because noxious odours are released as a by-product. Yes, the water on your course *smells!*

Apart from the obvious; murky water clogging filters, valves and sprinklers, the bacteria present in the water also threatens both soil and turf.

Algae present in the water will build-up on soil surfaces to create a perched water table. Anaerobic bacteria can, as at least one well-known head greenkeeper in this country will testify, play havoc with fine turf...

In days of yore, many a lake or pond was left to its own devices until the stinking, slimy contents forced those responsible to take action. Then, it was mostly a question of dis-



Fountains like this – and much larger models – help water to circulate and provide additional oxygen

posing of the water and dredging the glutinous mess off the bottom and carting it away. Phew!

Latterly, chemicals have been used to control the imbalance created by neglected water. Repetitively expensive, time and labour consuming, this method has obvious limitations.

Today's answer? Aeration, the method of adding oxygen – and movement – into the water, a natural process aided by man-made equipment which helps rid reservoirs and lakes of the pernicious effects of algae, plant death, suffocating sludge and anaerobic bacteria, automatically.

Aeration, in the form of high-profile fountains, like those at The Belfry, represent one answer to the business of water management. Used as a visual feature in ornamental and in-play lakes, the effect of a single fountain is helpful but conditional on the volume of water it is attempting to re-cycle.

The larger the lake, the more fountains are required to handle the sheer expanse of water involved effectively.

Parallel to introduction of fountains, floating and submersible aspirating and diffused air systems have been developed to increase the below-surface movement of water and add high levels of oxygen on a continuous basis.

Where a breakdown in the quality of water has already taken place, air stripping systems provide an efficient method of dissolving

gases, chlorine hydrogen sulphide and other bacteria at the rate of 150 gallons per minute.

In essence, all these systems work on the basis that air pumped into a reservoir or lake assists the natural aquatic rejuvenation processes by increasing dissolved oxygen levels, providing much needed circulation and maintaining aerobic conditions.

What does that mean? Simply this; aerated water gives you the means whereby irrigation can be carried out without the fear of bacteria and the like affecting the quality of your prized turf, the balance of nature can be maintained in and around the water and irate telephone calls from the secretary's office, complaining about 'that smell' will never reach your ears.

Postscript: As this article was going to press the Daily Telegraph published a story featuring scuba diver, 23-year-old Emma Elliott-Pyle, who has obtained a contract (with a dozen golf clubs) to retrieve balls from in-play lakes. Commenting on her task, Emma was quoted as saying; "The lakes are usually pretty disgusting. I have to shut my eyes and feel about in the dark." Enough said.

●Details of Otterbine fountains are available from Golf Course Services; 0858 463153. Readers wishing to learn more about AquaScape fountains, aspirating aerators and air stripping systems should call TIL Irrigation Limited; 0425 476162.