

PART ONE

Irrigation

Abroad

Golf courses globally face many challenges in managing water efficiently. Australia and Scotland are two such places



CONTENTS: Nothing More Important Than Water | page 30
Taking a Global Approach | page 31
Irrigation in the Land Down Under | page 32
At the Very Minimum | page 36

About This Series

Welcome to the second year of "Water Wise," our special series sponsored by Rain Bird and Aquatrols. As it was last year, our goal in this three-part series, which runs through December, is to examine the world water crisis while educating golf course superintendents and other industry personnel on several fronts of irrigation.

Part one, titled "Irrigation Abroad," reports on golf course irrigation in other world regions, specifically Australia, the world's driest inhabited continent. We also report on Scotland's Machrihanish Dunes, where irrigation is at a minimum. Is this a harbinger of what's to come in European golf?

Part two of the series will examine the future of golf course design and renovation as it relates to water management. It will also feature a story written by golf course superintendent Christopher S. Gray Sr., winner of Rain Bird's Intelligent Use of Water Award last year, who offers his peers the 10 things they can do *now* to conserve water on their golf courses.

Part three will examine the water situations in four U.S. regions. We'll speak with superintendents from each region and get their views on present and future water issues. It will also feature results of a survey we'll conduct with superintendents across the country on water issues.

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In Life and Golf, **Nothing** Is More Important Than Water

BY DEMIE MOORE

Nothing is more important than water for life on earth. And not only is water vital to life, it's vital to golf — for the turf, the golfer, and the aesthetics and wildlife on the golf course.

More efficient use of water and resources affected by water is, and always has been, at the heart of Aquatrols' existence. So we are pleased to again be sponsoring *Golfdom's* Water Wise series in partnership with Rain Bird. In this and the next two issues of *Golfdom*, you'll have the opportunity to read and contribute to information about what's happening on golf courses for the more efficient use of water and its conservation.

The default perception of many is that golf courses, and the people who manage and maintain them, are excessive consumers and wasters of water. As an industry, we know most golf courses are very conscious and careful about their water use for economic as well as environmental and agronomic reasons. At Aquatrols, we know many of you who are shining examples of water-wise superintendents, and we're proud to be part of the water management program at your facilities. Still, the saying "perception is reality" tends to hold true. Hence, current per-



ceptions will influence opinions and policy until we can do something to establish a different perception.

What are we as an industry and you at individual golf facilities doing to reprogram that impression? Knowing, documenting and explaining what we're doing in a respectful manner to those who doubt is key to having a chance of changing the uncertain and negative perceptions out there. A recent New York Times article on superintendents and golf course irrigations, while still containing bits of information that some in the industry don't like, is a great example of how knowing, documenting and being able to explain what you're doing can work. As I understand it, the idea for that article didn't start with the intention of describing golf course superintendents as consultants and shining examples of water conservation specialists. But that's where it ended up, because those interviewed — with a little coaching on how to meet the press — were able to tactfully and tangibly show what they're doing. Do you know, are you documenting, and can you calmly and confidently explain what's being done at your course to use as little water as possible as efficiently as possible?

For more than 50 years Aquatrols has been supplying informa-

tion and products to help you efficiently use and conserve water by managing soil wettability. How water moves into and through soil is a vital but sometimes forgotten aspect of overall water-use efficiency. Our co-sponsor's area of expertise, irrigation system technology, is another aspect. But water use on golf courses entails many angles — from the design of the course and turfgrass selection to equipment conditions, plant growth products, playing conditions demanded and a superintendent's specific management practices.

We encourage all practitioners and suppliers to look at what you're doing today, and what you can do tomorrow to be an example, contributor, spokesperson and role model for the wise use of water, not just on the golf course, but wherever water is used.

Because nothing is more important than water. ■

Moore is an Aquatrols' Director, involved with Corporate Relations, Education and Training.



Taking a Global Approach

It's often easier to focus on the issues that affect us in our own daily lives rather than stepping back to take a look at the bigger picture. Today, however, we must recognize the global need to use water wisely – a fact that's becoming increasingly evident as the Earth's population continues to grow and change.

Many countries are struggling to balance an increased need for water with the positive economic impact of new recreational opportunities and commercial development. More golf courses are now being built outside the United States than within its boundaries, and they bring new challenges and opportunities. Back in the United States, drought continues to affect various regions, making water an even more precious resource than ever before – both on and off the golf course.

Rain Bird has done business internationally for many years, and as a result, we've long been aware of the need to communicate about these issues on a global level. Through our worldwide partnerships and research, we've taken a lead role in water conservation efforts. Our annual Intelligent Use of Water Summit is a prime example of this global orientation.

To date, Rain Bird has hosted 10 summits in locations around the world – Madrid, Spain; Aix-en-Provence, France; and Melbourne, Australia – as well as in cities across the United States. These summits feature panelists and speakers who represent many

facets of the water conservation issue, including water agency representatives, golf course superintendents, landscape architects, irrigation consultants and climatologists. From spurring the development of more water-efficient products to advancing new legislation and finding alternative water sources, the Intelligent Use of Water Summits energize a more global approach to the water issues we face each day.

Rain Bird also uses other creative methods to increase awareness of the need for effective, efficient and responsible water use. The annual Intelligent Use of Water Film Competition (www.iuowfilm.com) uses the powerful medium of film to spotlight the world's water issues by encouraging amateur and professional filmmakers alike to explore methods and ideas to responsibly manage and utilize the earth's most precious resource. Now in its third year, the competition has attracted hundreds of submissions from more than a dozen countries, showcasing the creativity of everyone from landscape professionals to film students to conservation enthusiasts. The varied backgrounds and approaches of the competition's participants further emphasizes the universal recognition of the need to be accountable for the water we use each day.

Another example of Rain Bird's international perspective is its involvement with Australia's Smart Approved WaterMark certification program. This program's goal is to



guide homeowners, municipalities, contractors and commercial users of irrigation to choose products providing the highest level of water efficiency. While the program is based in Australia, its certification process has global implications. By choosing those products certified by the Smart Approved WaterMark program, people around the world can do their part to help ensure that irrigation water is used in the most efficient and responsible manner possible.

We now live in a global society, and environmental uncertainty in one part of the world can and will have an impact on each of us – even in our own daily lives. That's why Rain Bird will continue to sharpen its international perspective, supporting discussion about the world's water issues and encouraging the exchange of ideas for positive future change. ■

RAIN BIRD



Irrigation in the Land Down Under

SUPERINTENDENTS
THROUGHOUT AUSTRALIA
FACE AN ARRAY OF
CHALLENGES IN THEIR
EFFORTS TO MANAGE AND
CONSERVE WATER USE

BY LARRY AYLWARD,
EDITOR IN CHIEF

DARREN WILSON MAINTAINS turfgrass in Western Australia, the largest state in Australia and one of the driest regions on a continent that has the distinction of being the most parched inhabited land in the world.

It's an understatement to say Wilson, the golf course superintendent of Wembley Golf Complex in Perth, Australia, faces challenges when it comes to irrigation management and water conservation at the 36-hole public facility, which Wilson says is the busiest in the country with 175,000 rounds last year.

And the challenges continue to mount. Inflow to Perth's reservoirs has decreased by two-thirds over the last 30 years because of reduced rainfall, according to news reports. Wilson, whose two courses are irrigated with water drawn from an underground bore, says rainfall is down to about 23 inches from the annual average of 34 inches per year. It's also down for the first six months of this year — the total rainfall for January to July this year was 14.6 inches; the average for the period is 21.6 inches.

“The rainfall has been down so the level of the under-

ILLUSTRATION BY: ISTOCK INTERNATIONAL INC.; PHOTO COURTESY: WEMBLEY GOLF COMPLEX

ground bore is dropping,” says Wilson, who irrigates 176.5 acres of the 301 acres that comprise Wembley.

If the aquifer that supplies water to the bore gets too low, there won't be enough water to irrigate crops, let alone golf courses.

Western Australia is not the only region of the country in a water crisis. Daryl Sellar, a former golf course superintendent in Australia who's now the director of Turfwise Consulting in South Australia, says catchment areas in populated areas throughout the country are under increasing pressure, and water restrictions have been implemented.

“It goes without saying that water has always been a precious resource, but with the increase in population and drought conditions throughout most of the populated areas of the country for the past five or six years, our vulnerability has really hit home,” Sellar says. “This has placed enormous scrutiny

on all water consumption, with the federal government working toward developing a comprehensive information base for all water sources.”

Only 8 percent of the water used for golf course irrigation comes from potable supplies, which means restrictions have affected only a small number of clubs severely, Sellar explains. However, 35 percent of courses rely on rivers, storm-water runoff, groundwater and dams, which drought conditions have also impacted. About 25 percent of courses use recycled water.

In addition, “a combination of social conscience and community pressure has seen most clubs regulate their water use and at times sacrifice course presentation,” Sellar says.

Wilson, who has been in the industry for 20 years, knows what he's up against, and he has embraced the ways and means of irrigating responsibly to save water. Wilson has cre-

ated a manual detailing his irrigation management plan. Under the heading, “Golf Course Water Management Goals,” Wilson lists his priorities:

- achieve high water-use efficiency;
- produce high-quality playing surfaces with minimum supplementary watering;
- minimize impact of watering practices on the environment;
- achieve sustainability in water management;
- constantly strive to save water; and
- keep water usage with license application allocation.

Wilson taps his experience to make the proper watering decisions. His mantra is: “Just enough water.”

“We irrigate very lightly,” he adds. “We hand-water the greens a lot, but we don't irrigate the greens every night. Sometimes, we just go out and irrigate the hot spots.”

Continued on page 34



Underground water is pumped to this irrigation dam where it's treated and used to water turf at the Wembley Golf Complex. The dam also poses a hazard for three holes.

Continued from page 33

In 2005, Wembley installed a new irrigation system, a computerized-control model featuring aquifer-monitoring probes. The new technology has helped the course save water, as has Wilson's use of wetting agents, which he says have cut water use on the course by 15 percent.

Wilson's friend and fellow superintendent, Glenn Cross, shares his water management goals. Cross is superintendent of Mount Lawley Golf Club, a private club in Perth. Four years ago, Cross met with the decision makers at his club to discuss the writing on the wall that was the waning water supply.

"We looked at the things we could do to minimize water use," Cross says.

Mount Lawley is permitted to irrigate about 1 million gallons an acre per year. The course is not permitted to increase its area of irrigation. If the course is forced to decrease its area of irrigation, Cross is prepared to do so.

"We can certainly reduce our water when that time comes," he says, noting the course is comprised of 244 acres, of which 79 are irrigated.

Cross recently regrassed the golf course's fairways and tees from common couch (a warm-season Australian turf) to Santa Ana couch, a variety requiring less irrigation. Santa Ana, a fine-leaved grass, requires frequent watering during establishment but tolerates drought well once it's established.

Wilson and Cross aren't concerned about water cost, but they are concerned about water availability. Wilson says only 3 percent of golf courses in Perth use potable/drinking water for irrigation. Most



Glenn Cross and Darren Wilson, golf course superintendents in Perth, Australia, are constantly educating themselves about water management and conservation.

of the courses draw groundwater from aquifers. Wembley pays an annual licensing fee of \$3,000 to extract water. But Wilson watches what he uses, like a state trooper watching for speeding cars in a construction zone, so as not to go over his allotment.

In August, it was raining in Western Australia, where it's winter and the rainy season. If the rains come during the rainy season, then Wilson says it's possible golf courses could get by with only a little irrigation during the season. But the problem is it doesn't always rain like it should during the rainy season, and the irrigation system must be tapped more often.

"If it doesn't rain for a month, which it has done before, you can get into trouble," he says.

There's talk by regulators of halting homeowners and golf courses from irrigating turfgrass for two months in 2010. Wilson

says golf courses are negotiating certain exemptions to the rule, such as watering in pesticides or watering greens if they're in danger of dying.

Wilson says he's not overly concerned about not watering for two months in the winter, but he would be greatly concerned if the restrictions were imposed during Australia's summer.

"[The government] can call a restriction whenever it wants to for water conservation," he adds.

Sellar says alternatives to tapping into the potable water supply, such as desalination, have been implemented around the country. Storm-water harvesting schemes have also been introduced along with increased use of recycled water for non-human consumption use. They are great initiatives, but at a cost.

"The golf industry is now coming to the realization that water is now a precious *and* costly resource, with many clubs having to prepare themselves for increases in supply costs, whether in the form of direct fees, licenses, infrastructure cost sharing, or increased pumping costs through harvesting, storing and recovering water," Sellar says.

More Irrigation Abroad Online

Additional "Water Wise" coverage featuring views from around the world can be found at www.golfdom.com, including:



- Golf great **Gary Player** (above) says the United States, including golf courses, uses too much water.

- Water conservation no big deal in Japan.
- Going the fescue route in the Channel Islands.

While government regulations on golf course irrigation are getting stricter, Sellar believes they will get even tougher in time.

“Thankfully, I think the industry as a whole is pretty well placed to handle these regulations,” he adds.

What will golf course irrigation in Australia resemble in 10 years? For starters, Sellar believes potable water will no longer be allowed for use unless no other supply is available.

“The community pressure on the use of our water supplies will increase, and society will demand alternatives be found to meet the needs of sporting facilities such as golf courses,” he says.

But Sellar takes a glass-is-half-full view to such a situation. “We have a good track record in the sustainable use of recycled wastewater, and we will be communicating that loud and clear in the years to come so that golf courses can secure access to these water sources and continue to provide the social, economic and environmental benefits of which they’re capable,” he says.

Sellar says there’s enormous pressure on Australia’s six state governments to capture and reuse storm water. The problem is most rain falls in the winter throughout much of the populated areas of Australia, and the water is needed in the summer. Hence, there’s a need for enormous space for storage and treatment of the rainwater.

Sellar believes golf courses could provide valuable land for such projects within urban areas, and they’ll be viewed as critical partners in the process.

“This will come with commitments and obligations for the golf clubs involved, but the benefits will leave them with little choice,” Sellar says.

It’s an understatement to say golf course irrigation is undergoing a transformation in the land down under. ■

The Aussie Challenge: Decreasing Water Use While Upgrading Playing Conditions

Australian turfgrass consultant Daryl Sellar says the golf course industry has gained respect among the country’s six state governments and the federal government for its aptness of irrigation. The golf industry has been proactive in developing a profile of its water use after the Australian Golf Industry Council (AGIC) identified water as the greatest threat to the game.

Sellar says superintendents in his country have always strived for more efficient water use on their courses. They’ve had various motivations to do so, including:

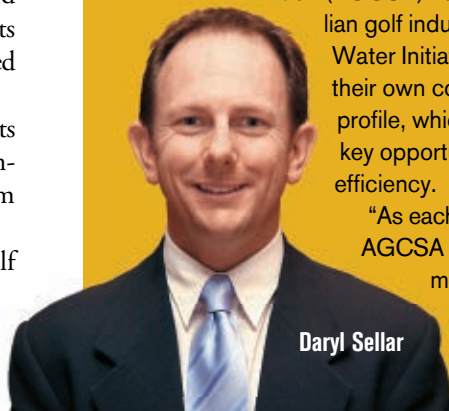
- to achieve the quintessential firm, fast Australian golf course;
- to promote the most desirable grass species;
- to manage budgets that take into account pumping and water costs;
- as an acknowledgement of their obligation to manage water wisely;
- diminishing water quality;
- diminishing water supply as more people utilize the same resource.

Simultaneously, golfer expectations for quality playing surfaces have continued to increase, Sellar says. Hence, superintendents have adopted the following measures to manage water use while providing top conditions:

- use of soil wetting agents and similar technology;
- managing soils more intensively through variable depth aeration, renovations and amendments;
- converting to more appropriate turf species;
- removal or transition of *Poa annua* greens to improved bentgrass varieties;
- upgrading irrigation systems, from the controller to the pump station to the sprinkler head, to develop greater efficiency;
- investing in water-recycling systems at maintenance facilities;
- introducing climatic-based irrigation scheduling;
- treating water prior to application to improve water quality and reduce its negative impacts on soils; and
- injection of products into the irrigation system to reduce the need for additional watering in of products.

Sellar says the Australian Golf Course Superintendents’ Association (AGCSA) has taken a lead role within the Australian golf industry by developing an online National Water Initiative, which allows courses to develop their own comprehensive water management profile, which will help them identify and prioritize key opportunities to improve water-management efficiency.

“As each club develops its own profile online, the AGCSA will be able to demonstrate the commitment of the golf industry to best practice water management through continuous improvement,” he adds.



Daryl Sellar

At the **Very** **Minimum**

SCOTLAND'S MACHRIHANISH DUNES
FEATURES A STATE-OF-THE-ART
IRRIGATION SYSTEM, EVEN THOUGH
IT RARELY GETS TURNED ON

BY ANTHONY PIOPPPI, CONTRIBUTING EDITOR



AS IRRIGATION SYSTEMS have become more precise and more water efficient, the number of heads per golf course has increased dramatically over the last 15 years to the point where 2,000 separate water-dispersing units on a new layout is not a rarity.

Machrihanish Dunes, located on the extreme southwest coast of Scotland, opened in July with a state-of-the-art irrigation system. Asked how many irrigation heads are nestled into the Scottish soil, and Course Manager Keith Martin has to think for a minute, doing the math in his head.

“I don’t know, maybe 200,” he says.

No, Martin doesn’t have a problem with simple addition; his calculations are correct. Machrihanish Dunes is built on a Site of Special Scientific Interest, the most environmentally

sensitive designation of the Scottish National Heritage. As a result, ecologists of the SNH routed the David McLay Kidd-Paul Kimber layout so that tees, fairways and greens avoided rare plants, animals or dunes land found on the site that borders the legendary Machrihanish Golf Club. Irrigation, other than what falls from the sky, is limited to tees, greens and a small portion of the approaches. Not a drop touches fairways or rough. Pesticides can’t be used anywhere on the golf course.

These extremely detailed and strongly enforced parameters also made installing the irrigation system difficult. For instance, instead of going from one point to another on a straight and logical line, Callum Oliphant and his company Applied Irrigation had to avoid sensitive or protected sites, such as the nesting ground of a rare skylark that inhabits that part of the Kintyre Peninsula. Any turf removed, such as during the installation of an irrigation box, had to be replanted in an area of the property deemed by ecologist Carol Crawford to have the same grass species, no matter how small.

Crawford was hired by the owners of Machrihanish Dunes to police all the work to ensure no procedure violated SNH rules. The irrigation pipe was installed with a mole plow that left behind a narrow slit in the ground and barely disturbed turf that healed within days.

Machrihanish receives between 30 inches and 35 inches of rain a year, double what the East Coast of Scotland gets. The turf on the fairways, as it has been for hundreds if not thousands of years, is a blend of creeping bentgrass, ryegrass and red fescue. On the dunes, along with the marram grass, is sheep’s fescue. The mix varies as the golf course



Keith Martin

moves from near the ocean up into what was once agricultural land.

The tees are 40 percent chewings fescue, 40 percent slender creeping red fescue and 20 percent browntop bent. The

greens are of a similar makeup with the long-term goal being 70 percent fescue and 30 percent bent. The bent currently only makes up about 5 percent.

During an average week, Martin might not even turn on his irrigation system. When it’s dry, he puts down about 3 millimeters of water a week and hand-waters dry spots, which are a common occurrence on the large sand-based greens, many of which are replete with wild undulations and bold knobs. He’ll also use the irrigation system to water in fertilizer applications. The oldest greens were seeded in the late summer of 2007 and the youngest ones in the fall of 2008.

“It’s just to keep them alive during dry spells,” Martin says of his decision on when to use the irrigation system on the greens. “We use it as a backup if nature doesn’t stay on our side.”

For seven weeks this past summer, the Kintyre peninsula received little rain, forcing Martin to tap into the course’s 40,000-liter holding tank.

“Although [the drought] was hard to get through, it was great because the turf’s roots went searching [for water],” Martin says.

Martin’s watering regimen during that time went something like this: “In dry spells, rather than water daily, we’d put down 2 to 3 millimeters in one hit and then just hand-water the rest of the week,” he says. “We’d probably water heavily on a Monday, and then let the greens dry out the rest off the week and just hand-water where it’s needed. The main thing is we only ever use it when needed.”

Continued on page 38

Machrihanish Dunes has about 200 irrigation heads on the entire course. None are located on fairways.



The well-known winds of Scotland dry up a lot of water on the course.

Continued from page 37

Martin, like other superintendents who manage a course that hugs a coastline, has to deal with a normal weather occurrence that hinders uniform watering.

“With the winds in Scotland, the amount of water you lose is ridiculous,” he says. “We water at night when it’s better to get the water down.”

There were interesting demands Oliphant faced while installing the system, as well. “It was quite difficult as where we could go with the mainline, where we could put pipe,” Oliphant says. “It made it quite a challenge.”

As an example, because of one no-go area near a tee, he had to rout pipe up the backside of a dune so a valve box could be put in, rather than placing it near the tee and out of view.

According to Oliphant, there are four or five irrigation heads for each green with only one having more than that number. There are five to six heads per each teeing complex. Each complex has its own valve so they can be individually regulated.

Not only did Oliphant have to make sure water was getting to the intended

areas, he also had to make sure it was not going into protected sections.

“We had to be careful not to water the marram grass and only water the tees,” he says.

The same rules apply to the greens. “The main focus is to keep the water on the playing surface,” he says, referring to it as an “oasis effect.”

Stan Phillips, the area officer for Scottish Natural Heritage, explains the reasoning behind this. “The rest of the vegetation, because of the rare plants that grow there, is subject to natural climatic conditions only,” he says.

That means no water and fertilizer.

Martin says the turf is coming along nicely and while the grass may “brown off” at times, it takes a just a little moisture to show it’s alive.

“As soon as it gets a drop of moisture, it loves it,” he says.

We Want to Hear From You

What are you doing on your golf courses to manage water more efficiently? Send an e-mail to *Golfdom’s* Larry Aylward at lailward@questex.com. We’ll print your responses in an upcoming story.

Oliphant returned to Machrihanish Dunes for the grand opening in July, the first time he’d been back since his work was completed.

“We started putting in pipe when there was still cattle in the field,” he says. “The transformation is pretty amazing. It’s a pretty special site.” ■

The GEO Gets to the Point

The Golf Environment Organization (GEO), an international non-profit organization working to integrate the social, environmental and economic benefits of golf, doesn’t beat around the bunkers, so to speak, when it comes to responsible golf course irrigation.

Created out of a partnership project between the European Golf Association, R&A, European Tour and European Commission, the GEO states matter of factly on its Web site (www.golfenvironment.org) that over-watering is a major cause of poor turf management on golf courses.

Efficient irrigation, with the aim to conserve water resources, is also the most economically sensible, the GEO states. “Invasive weeds, disease problems and then reliance on chemical treatments often stem from bad irrigation management,” the GEO states. “This can lead to risks of surface or ground water contamination and potentially regulatory infringements. Where water supply is not a problem, drainage often is.”

The GEO offers its best management practices for proper golf course irrigation:

- Use a computer-controlled system with valve-in-head design and individual head control.
- Calculate frequency as a factor of soil moisture holding capacity, rooting depth and plant water use.
- Monitor daily use and summarize monthly usage.
- Set targets for yearly improvement in system operation and water usage efficiency.
- Utilize soil moisture sensors to determine when soil conditions are dry enough to require irrigation.



Over-watering can cause disease.

PHOTOS COURTESY: SOUTHWORTH DEVELOPMENT (TOP); SYNGENTA PROFESSIONAL PRODUCTS